COMPLETE SET GATE ARCHITECTURE

BASED ON GATE **SYLLABUS**



pages **QUESTION VOLUME 1 QUESTION VOLUME 2 QUESTION VOLUME 3 QUESTION VOLUME 4 BUILDING SERVICES, CONSTRUCTION & HISTORY & ARCHITECTURE URBAN PLANNING & ARCHITECTS WORK**

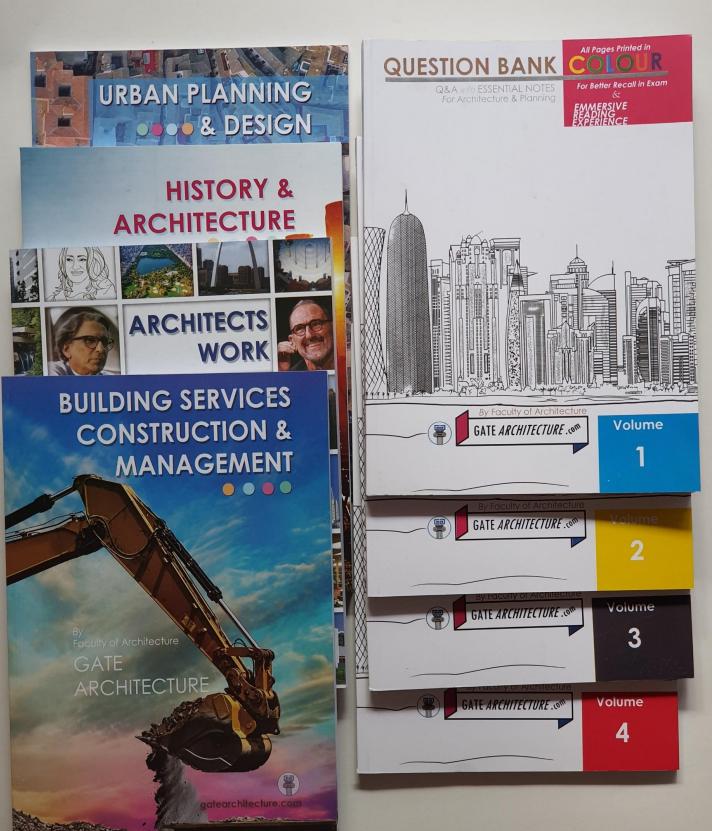
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BUILDING SERVICES CONSTRUCTION & MANAGEMENT

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Introduction

As the name of this section suggests, it is meant for to recap the maximum part of the syllabus in minimum possible time. This is a part of GATE ARCHITECTURE 2022 complete set. It covers through short notes on different topics of

There is no limit on the discussion on the topic on General Aptitude. Scoring marks in this section depend on the intuition, clicks etc of the aspirants in the examination hall. However we have included ample examples with answer on Verbal Ability & Numerical Ability topic.

When it comes to the building services, it is essentially an engineering section. Even its topics (for example HVAC_{or} Fire Fighting) comes from different departments. To solve a numerical from a particular topic, we need to understand the concept & theories behind it and knowledge of SI unit conversion to arrive at the precise answer. Here we have tried to introduce the topic through solved examples and derivation theories.

ING & CO

Contents

Building & Construction (page BC1-BC96) Introduction to Building Services (page BS1-BS58) Introduction to beam mechanics (page BM1-BM22) General Aptitude (page GA1- GA45)

Section 2: Building Materials, Construction and Management

Behavioral characteristics and applications of different building materials

Timber

Introduction: The Mechanical properties and availability of wood have made it a natural material for building structures, furniture, tools, vehicles, and decorative objects. Worldwide it is used more than metal or plastic.

Wood is a natural product and when used responsibly is a sustainable resource which need not result in damage to the environment. Forests can be protected by recycling and reusing the wood, using less wood and by supporting sustainable forest management

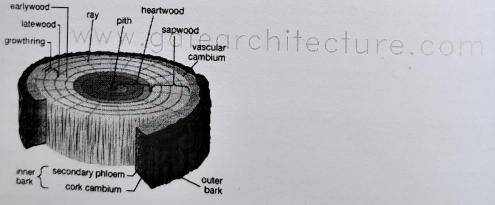
All wood is composed of cellulose, lignin, hemicelluloses, and minor amounts (5% to 10%) of extraneous materials contained in a cellular structure.

Wood comprises about 50% of cellulose which responsible for most of its mechanical properties.

Natural wood is generally composed of bundles of long fibres which are effectively water carrying tubes. These fibres are laid in the direction of the tree trunk or branch from which the wood is removed.

The strength of wood is highly dependent on the loading direction. Wood is strongest in tension along the fibres and is weakest in the radial and tangential direction. When loaded in its strongest direction (longitudinal along the grain-see figure below) wood can have a strength to weight ratio advantage relative to steel of 2:1. However when wood is loaded in other directions (radial and tangential to the grain- see figure below) this advantage disappears

To use wood to its best advantage and most effectively in engineering applications, specific characteristics or physical properties must be considered.



Softwoods are one of the botanical groups of trees that has persistent needle-like or scale-like leaves; softwoods are evergreen and have longer-length fibers than horizonda.

Softwood trees include pines, spruces, firs, cedars.

Hardwood trees are generally broadleaved trees. These tree species are deciduous, retaining their leaves only one growing season. The designation Hardwood trees does not become it are deciduous, retaining their leaves only difference of Hardwood trees does not become it. growing season. The designation Hardwood trees. These tree species are deciduous, retaining their leaves only on trees are also called broad leaf trees or deciduous trees. Typical hardwood trees include ash, elms, oak, maple, walnut, hickory, mahogany, and walnut. Woods grown in tropical climates are aerectally hardwoods. Hardwood have short of Paulie to three manual in the second of the tropical climates are **rece**table ash, elms, oak, maple, walnut, hickory, mahogany, and walnut. Woods grown in tropical climates are **rece**table hardwoods. Hardwood have shorter fibers compared to softwood. some hardwood^{5 are}

This is a product made from an od This is a product made from an oc bounded together by an adhesive, it boded opener of an auresive. Pliwood does not split as easily as Plywood does not spir as easily a with a seasily a with a season of the nussure conditions. riywood wi phyvood is normally supplied as 1 Chipboard is made from particles

unipulation of the second seco The particles are obtained from 1 granulated to chips. The resin use n the manufacture of low cost fur

MDF (Medium Density FibreBo

There are different types fibreboan the size and type of wood fibres the method of heating what type of bonding agent is us the method by which it is pressed

Medium Density Fibreboard (MD bonded under heat and pressure. hardboard. The natural glues and bonding agents / resins. The resin quality board will use stronger glu chipboard. It is dense, flat, stiff, does not have an easily recognisat

MDF can be painted to produce a and filed without damaging the su cut MDF may be glued together

Veneers and laminates may also b Safety: It should be noted by any c

evel, is a carcinogen (cancer caus tomaldehyde by inhalation can ca cause dermatitis. A number of con

Strength of wood

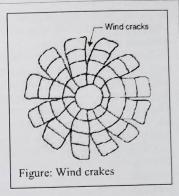
Wood is a natural product and its p down. Green wood has high moist the moisture content and becomes Wood may be described as an ortho directions of the construction of the constructions of the construction of the constru

BUILDING SERVICES, CONSTRUCTION & MANAGEMENT

compression in the tree when it was young. Upset is an injury by crushing. This is also known as rupture.



Figure: A typical upset in a Timber



(ii) Defects due to Defective Seasoning and Conversion: If seasoning is not uniform, the converted timber may warp and twist in various directions. Sometimes honey combining and even cracks appear. This type of defects are more susceptible in case of kiln seasoning.

In the process of converting timber to commercial sizes and shapes the following types of defects are likely to airse: chip marks, torn grain etc.

(iii) Defects due to Fungi and Insects Attack: Fungi are minute microscopic plant organism.

They grow in wood if moisture content is more than 20°C and exposed to air. Due to fungi attack rotting of wood, takes place. Wood becomes weak and stains appear on it.

Beetles, marine borers and termites (white ants) are the insects which eat wood and weaken the timber. Some woods like teak have chemicals in their compositions and resist such attacks. Other woods are to be protected by chemical treatment.(Source: http://www.civilengineeringx.com/traditional-materials/defects-in-timber/)

Seasoning

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erican sources (see white wood, The second second

is covered. In the

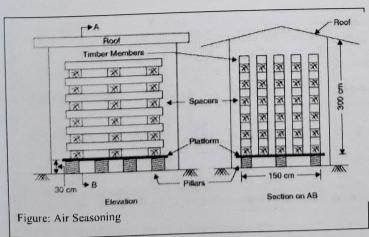
live or

tar shakes

This is a process by which moisture content in a freshly cut tree is reduced to a suitable level. By doing so the durability of timber is increased. The various methods of seasoning used may be classified into: (i) Natural seasoning www.gatearcontection and the content of the

(i) Natural Seasoning: It may be air seasoning or water seasoning. Air seasoning is carried out in a shed with a platform. On about 300 mm high platform timber balks are stacked as shown in Fig. 1.8. Care is taken to see that there is proper air circulation around each timber balk. Over a period, in a natural process moisture content reduces. A well seasoned timber contains only 15% moisture. This is a slow but a good process of

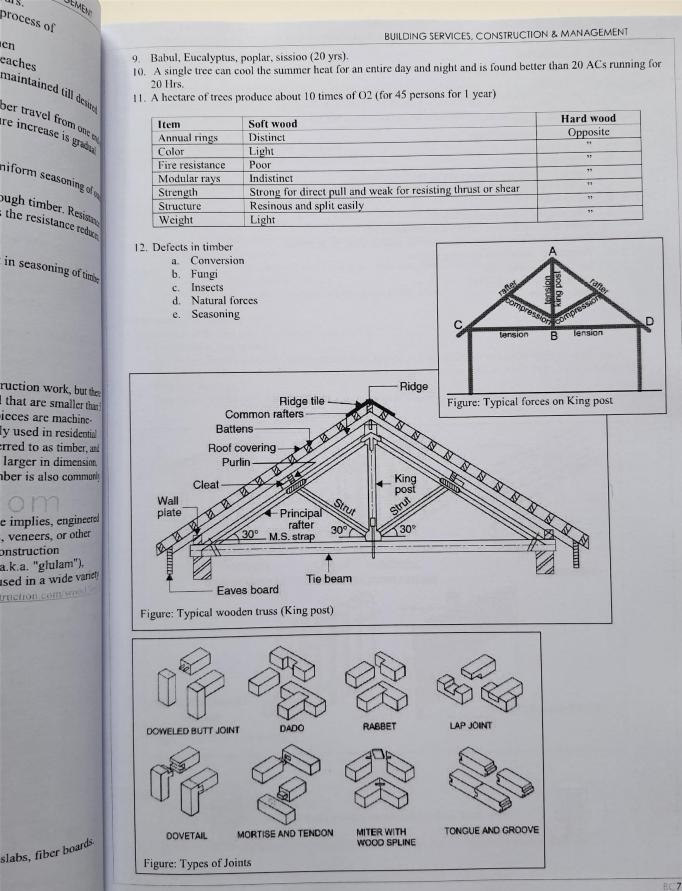
Water seasoning is carried out on the banks of rivers. The thicker end of the timber is kept pointing upstream side. After a period of 2 to 4 weeks the timber is taken out. During this period sap contained in the timber is stalked in a



great extent. Then timber is stalked in a shed with free air circulation.

 (ii) Artificial Seasoning: In this method timber is seasoned in a chamber with regulated heat, controlled humidity and proper air circulation. Seasoning can be completed in 4 to 5 days only. The different methods of seasoning are:
 (a) Boiling

- (b) Kiln seasoning
- (c) Chemical seasoning
- (d) Electrical seasoning.



cement cage into the to ring wet concrete into h

called the casing, and d for casting concrete has no structural role

ve, meaning that if one 1 foot wide by 50 feet of the hole and does not ock it. If such soil is pres need to leave a casing to drill the hole for they cast the pile in place. It g tube can be used to di

ound using a pile driver. blow by blow. Each blo arily covered with a stee cts as a crane, and liftst and second, it hammen

any further into the sol

s sometimes difficultw tended, driving piles w es. The vibrations could ible to use *micropiling*^u

he ground using an

Irilled into the ground. above, much like a scre he pile to prepare it for

BUILDING SERVICES, CONSTRUCTION & MANAGEMENT

RAFT or MAT FOUNDATIONS

A raft foundation, also called a mat foundation, is essentially a continuous slab resting on the soil that extends over the entire footprint of the building, thereby supporting the building and transferring its weight to the ground.

A raft foundation is often used when the soil is weak, as it distributes the weight of the building over the entire area of de in the following steel stores on the soil. the building, and not over smaller zones (like individual footings) or at individual points (like pile foundations). This

building measuring 5 x 5 weighs 50 tons, and has a raft foundation, then the stress on the soil is weight / area = 50/25 = 2 tons per square meter.

If the same building were supported by say 4 individual footings, each of 1 x 1m, then the total area of the foundation would be 4 m2, and the stress on the soil would be 50/16, which is about 12.5 tons per square meter. So increasing the total area of the foundation can dramatically lower the stress on the soil, which is nothing but weight per square meter.

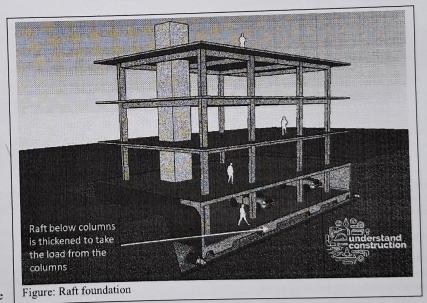
A raft foundation is also very good for basements. Foundations are created by excavating soil in order to find strong, compact, undisturbed natural soil that is at least a few feet below ground level. This soil is much stronger than the loose soil at the surface. If we construct a raft foundation at say 10 feet below ground, and build concrete walls around the periphery, this makes an excellent basement. Therefore, an engineer designing a building with a basement will tend to choose a raft foundation over other types of foundations.

How to construct a raft or mat foundation

A raft foundation is constructed by first excavating the ground to a uniform, flat level.

Then, a waterproof plastic sheet is laid over the earth, and a thin 3" layer of plain cement concrete (PCC) is poured just to create a perfectly flat and level base for the foundation.

After this, a waterproofing layer is installed, and then reinforcement steel for the

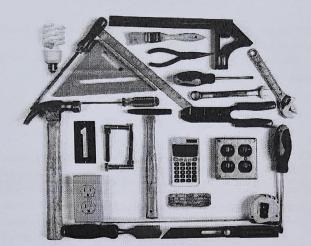


raft slab is tied in place. After all the steel has been put in place, concrete is poured to the desired thickness, which is usually in the range of 200mm (8") to 300mm (12") thick for small buildings: this can be much thicker if heavy loads are to be carried.

Waterproofing of basements

Basements often extend several stories below ground. The soil or rock around the basement can easily be saturated with water. This water will seep into the building if the building is not waterproofed properly, as concrete is not impermeable to water (it allows water to pass through). So engineers pay a great deal of attention to the waterproofing design of basements, as once this is done, there is no way to repair it, so it must be done perfectly during construction.

The best way to do the second of the basement in a waterproof layer called a waterproofing membrane. This should cover the pattom and all sides of the basement, and should be placed between the soil and the concrete, so that the concrete always remains dry. The waterproofing membrane must also be physically strong, as the raft will be constructed on top of it, and the weight of the building will press down on it. This layer also serves to chemically



Introduction

to

Building Services

GATE Syllabus related to Building Services: Water supply; Sewerage and drainage systems; Sanitary fittings and fixtures; Plumbing systems; Principles of internal and external drainage system; Principles of electrification of buildings; Intelligent Buildings; Elevators and Escalators - standards and uses; Air-Conditioning systems; Firefighting Systems; Building Safety and Security systems.

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8.	Fire protection Mechanical transportation	
9.	Mechanical transportation	
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This study manual is prepared from different source books & references on advance level building services. It's been trimmed down to restrict around GATE syllabus. However to maintain the coverage of topic, some discussions may have exceeded the syllabus. The aim of this manual is to introduce the concept of derivations and basic engineering.

Some topics on building services that may not be discussed here are better discussed in question-bank. You are suggested to read this section along question-bank as complementary.

Thus the overall value of U is given by: U = (0.97*1.8) + (0.03*2.54) W/m²K = 1.82 W/m²K

The thermal transmittance of windows depends on glazing and frame types and exposure. If a low-emissivity reflective metallic film is applied to the inside surface of the glass, then the internal surface resistance value can be significantly increased, resulting in a lower U value and reduced heat and light transmission from outside. Glass and metal window frames, in themselves, offer negligible resistance to heat flow, but when resistive materials are used the overall U value can be found using the proportional area method.

Heat loss from buildings

Heat loss occurs by convection and radiation from the outside of the building, and by infiltration of outdoor air. Heating equipment is sized on the basis of steady-state heat flows through the building fabric, with an estimation of the effect of non-steady influences relating to the thermal storage capacity of the structure, adventitious heat gains from people, lighting and machines, and the intermittency of heating system operation.

The steady-state heat loss Qu through the building fabric is:

the cavity is filled

ng of brick has a Un

 $Q_{\rm u} = \sum (AU)(t_{\rm ei} - t_{\rm ao}) W$

Where $\Sigma(AU)$ is the sum of the products of the area and thermal transmittance of each room surface. Heat flows to adjacent rooms that are warmer than the outdoor air are found by using the appropriate temperature difference between them.

The ventilation heat Q_V required to warm the natural infiltration of outdoor air is:

$$O_{\rm V} = 0.33 \ NV \ (t_{\rm ai} - t_{\rm ao}) \ {\rm W}$$

The total heat requirement for each room is:

 $Q_{\rm p} = Q_{\rm u} + Q_{\rm v}$

The values of environmental and air temperature used in the calculations depend upon the type of heating system employed, and the following temperature ratios are used:

$$F_1 = \frac{t_{ei} - t_{ao}}{t_c - t_{ao}}$$
$$F_2 = \frac{t_{ai} - t_{ao}}{t_c - t_{ao}}$$

high. Thirty dense co These two ratios are substituted into the equations for heat requirements $Q_{\rm u}$ and $Q_{\rm v}$. The total heat requirement exposure is normal^g Qp then becomes:

 $Q_{\rm p} = \left[F_1 \sum (AU) + 0.33F_2NV\right] (t_c - t_{\rm ao}) W$

For buildings with average external U values in the range 0.60–3.0 W/m²K, including openings, which covers the majority of habitable structures, the temperature ratios have the following values (with an accuracy to 5.0%):

 $F_1 = 1.00$ $F_2 = 1.10$

For panel radiator heating systems: $F_1 = 0.92$ $F_2 = 1.23$

For forced warm-air heating systems. Further values are tabulated in the CIBSE Guide. To check the comfort conditions produced by the heating system in a room we use:

BS5

Circuit design

The resistance R ohms (K) of an electrical conductor depends on its specific resistance ρ Km, its length l m ic world as The residue appendix on its specific resistance ρKm , its length 7 m and its cross-sectional area A m². The specific resistance of annealed copper is 0.0172 μKm (μ , micro stands e times its for 10^{-6}) at 20° C. ned and a re

$$R = P \overline{\Lambda} \Omega$$

K =

Example 6.1

 $Rt = R0 (1 + \alpha t) K$

Example 6.2

culate the electrical resistance per metre length at 20°c of a copper conductor of Ca ional area. 2.5

resistance (a) of copper is 0.00428 K/K°C at 0°C. If the resistance of the conductor is R_0 at 0°C, then its

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RMS) value Th

s of power are nared by each in ent which has be distribute

ater pump or lift

10 V lamp

dric ealer

Find the resistance of a 2.5 mm^2 copper conductor at 40°c.

where t is the conductor temperature (°C).

R0 is not known but the resistance of this conductor at 20°C was found in and t can represent the increase in temperature above this value. A graph of resistance versus temperature would reveal a straight line of slope α .

$$R_{40} = R_{20} (1 + \alpha \times 20) K$$

$$= 0.0069 \times (1 + 0.00428 \times 20) K$$

The relation between applied voltage, electric current and resistance is given by Ohm's law:

The load may be an electrical resistance heater or tungsten filament lamp, in which case the power lamps = consumption in watts is found from:

power in watts = V volts $\times A$ amps $\times \cos \varphi$

$$\frac{0.0172}{10^6} \text{ Km} \times \frac{1 \text{ m}}{2.5 \text{ mm}^2} \times \frac{10^6 \text{ mm}^2}{1 \text{ m}^2}$$

$$R = \frac{0.0172}{10^6} Km \times \frac{1 m}{2.5 mm^2} \times \frac{10^6 mm^2}{1 m^2}$$

= 0.0069 K
The resistance of a cable increases with increase in temperature and the temperature coefficient of R0 at 0°C, then its

resistance at another temperature R_t can be found from:

Introduction to Building

Sound power and pressure levels

Sound power and pressure levels Sound power and pressure levels are measured over a range of frequencies that are representative of the response Sound power and pressure levels are measured over a range of sound is the Bel (B). The smallest increment Sound power and pressure levels are measured over a range of frequences of the Bel (B). The smallest increment of sound is the Bel (B). The smallest increment of sound is the human ear to sounds. The unit of measurement of a Bel, one decibel (dB). This means that the smallest characteristics of the burget of the sound state of the smallest characteristics of the sound state of the sound sta Sound power and pressure revers are the total and the sound is the sound is the sound of the human ear to sounds. The unit of measurement of sound is the decibel (dB). This means that the smallest changes that the human ear can detect is one-tenth of a Bel, one decibel (dB), so any decimal places that are produced and the human ear is 1 dB, so any decimal places that are produced and the human ear is 1 dB. -tenth of a Bel, one decider (any decimal places that are produced the by the human ear is 1 dB, so any decimal places that are produced the sound level that is perceptible by the human ear is 1 ub, so a calculated sound level of 84.86 can_{00} calculations using sound power or pressure level are not relevant. A calculated sound level of 84.86 can_{00} calculations using sound power or pressure level are not relevant. A calculated sound level of 84.86 can_{00} calculations using sound power or pressure level are not relevant. calculations using sound power or pressure level are not reference. The 'A' scale of measurement gives be 84 dB as the 0.86 decimal portion is not detectable by the ear. The 'A' scale of measurement gives a construction of the same ratio as can be be weighting to each frequency in the range 20 Hz to 20 kHz in the same ratio as can be heard. For example, the human ear is more sensitive to sounds at 1000 Hz than at higher frequencies.

The acoustic output power of a machine is termed its sound power level, SWL dB. Think of SWL as the machine The value of acoustic power in the state machine. The acoustic output power of a machine is termed its decline. The value of acoustic power in watts the sound watts level of the acoustic output power of the machine. The word level is used been sound watts level of the acoustic output power of the machine power. The word level is used because it is not building services plant is very small, much less than 1 watt of power. The sound level produced in acoustic it is the building services plant is very small, much less that is normally used; it is the sound level produced in acoustic units of the actual value of the number of watts that is normally used; it is the sound level produced in acoustic units of the plant provides the the actual value of the number of watts that is normally used, and antifacturer of the plant provides the sound power measurement, dB, that are taken for practical use. The manufacturer of the plant provides the sound power measurement, dB, that are taken for practical use. levels produced by a particular machine from test results and predictions for known ranges of similar equipment. The sound power level of a machine at the range of frequencies from 125 to 8000 Hz is required h the building services design engineer in order to assess the acoustic affects upon the occupied spaces of the building. The overall sound power level for a range of frequencies is also quoted by the manufacturer of machine.

Sound pressure level

A sound field is created by the sound power output from a machine within a plant room. It is made up of a direct sound field, that is, directly radiated sound, and a reverberant sound field, that is, general sound that reflects uniformly from the hard surfaces around the room. The direct sound field reduces with the inverse square of the distance from the sound source and is not normally of importance as it only applies to very short distances from the sound source. The reverberant sound field results from the average value of the sound pressure wave passing around the room. These waves try to escape from the plant room and find their way into the occupid spaces where the air-conditioning engineer is attempting to create a quiet and comfortable environment. The sound pressure level, SPL dB, of the total sound field, direct plus reverberant, that is generated within a room from a sound source of sound power level SWL dB, is found from

$$SPL = SWL + 10 \times \log\left(\frac{Q}{4 \times \pi \times r^2} + \frac{4}{R}\right) dB$$

where,

SPL = sound pressure level produced in room SWL = sound power level of acoustic source dB $\log = \log \operatorname{arithm} to base 10$ dB Q = geometric directivity factor dimensionless r = distance from sound source to the receiver m dimensionless $R = room sound absorption constant m^2$

Logarithms to base 10, log10, are used throughout the calculation of acoustic values. A sound source that radiates sound waves uniformly in all directions through unobstructed space will create an expanding spherical sound field and have a dimensionless geometric directionality factor Q of 1. A sound source that is on a plane surface radiates all its sound energy 1. A sound source and field moving away from the surface. This has a into a nemispherical Q of 2, that is, twice the sound energy passes through a directionality factor Q of 2, that is, twice the sound energy passes through a hemisphere. Similarly, if the sound source occurs at the junction of two adjacent surfaces that are at right angles to each other, such as the junction adjacent surfaces that the second state of a such as the junction of a wall and ceiling, Q is 4. When there are three adjacent surfaces at the



Sound level meter device.

sound source. person, surface isorption of

The room sou and the mean

where

a = mean al

S = total rooMean absorptic space. All the a overall sound a

$$\frac{A_1 \times \alpha_1 + A_1}{A_1}$$

where

 $A_1 = surface$

 $\alpha_1 = absorp$

Materials absor their fibres and molecular vibra sound waves to the sound waves acoustic energy. of the barrier.

Reverberation ti

Reverberation til the time taken fo to the human ear surfaces and this it allows echoes. ultimate in short equipment. The v suspended wire n surfaces. The sou reverberation or 4 reverberant field As interesting exc

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BEAM MECHANICS

ion to Building Services



For B.M diagram:

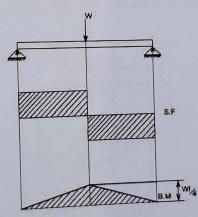
OCANI MES

liwe just take the moments to the left of the cross-section,

B.M_{X-X} =
$$\frac{W}{2}$$
 x for xliesbetween 0 and 1/2
B.M_{at x = $\frac{1}{2}$} = $\frac{W}{2}$ $\frac{1}{2}$ i.eB.Mat x = 0
= $\frac{WI}{4}$
B.M_{Y-Y} = $\frac{W}{2}$ x - W(x - $\frac{1}{2}$)
Again
= $\frac{W}{2}$ x - Wx + $\frac{WI}{2}$
= $-\frac{W}{2}$ x + $\frac{WI}{2}$
B.M_{at x - 1} = $-\frac{WI}{2}$ + $\frac{WI}{2}$
= 0

section X-X from the leas

Which when plotted will give a straight relation i.e.



It may be observed that at the point of application of load there is an abrupt change in the shear force, at this point the B.M is maximum.

3. A cantilever beam subjected to U.d.L, draw S.F and B.M diagram.



Here the cantilever beam is subjected to a uniformly distributed load whose intensity is given w / length.

 $C_{Onsider}$ any cross-section XX which is at a distance of x from the free end. If we just take the resultant of all the f_{Orces} on the label of the label forces on the left of the X-section, then

 $\delta_{|f_{xx}|} = -Wx$ for all values of 'x'. (1)

GENERAL APTITUDE

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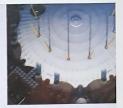
General Aptitude	
Aptitude	dents to Solve General Aptitude
hot agree with Anun andhe his weight cannot be rent probable weights of	
	A Vincent and Thomas live in the same neighborhood. A Vincent and Thomas more than 50 minutes to deliver the papers. B. It takes Thomas more than 50 minutes to deliver the papers. C. It is dark outside when Vincent begins his deliveries. C. It is dark outside when Vincent begins his deliveries. D. Thomas would like to have his own paper route. D. Thomas would like to have his own paper route. Answer: Option A Explanation: The fact that Vincent and Thomas live on the same street indicates that they live in the same neighborhood. There is no support for any of the other choices.
that of B and C be $43 kg$.	 The Pacific yew is an evergreen tree that grows in the Pacific Northwest. The Pacific yew has a fleshy, poisonous fuil. Recently, taxol, a substance found in the bark of the Pacific yew, was discovered to be a promising new micancer drug. A Taxol is poisonous when taken by healthy people. B Taxol has cured people from various diseases. C People should not eat the fruit of the Pacific yew. D The Pacific yew was considered worthless until taxol was discovered.
	Answer: Option C Explanation: Given the information presented, the only statement that could be considered true is that the fruit should not be eaten because it is poisonous. There is no support that taxol is poisonous or that taxol has cured anyone (choices a and b). There is no support for choice d.
COM	 3. Erin is twelve years old. For three years, she has been asking her parents for a dog. Her parents have told her that they believe a dog would not be happy in an apartment, but they have given her permission to have a bird. Erin has not yet decided what kind of bird she would like to have. A Erin's parents like birds better than they like dogs. B Erin does not like birds. C Erin and her parents live in an apartment. D Erin and her parents would like to move.
positions of its digits is 3h	 Answer: Option C Explanation: Since Erin's parents think a dog would not be happy in an apartment, we can reasonably conclude that the family lives in an apartment. We do not know if Erin's parents dislike dogs (choice a) or if Erin dislikes birds (choice b). There is no support for choice d. 4. Tim's commute never bothered him because there were always seats available on the train and he was able to spend his 40 minutes comfortably reading the newspaper or catching up on paperwork. Ever since the train schedule changed, the train has been extremely crowded, and by the time the doors open at his station, there isn't a seat to be found. A.Tim's commute is less comfortable since the train schedule changed. C.Many commuters will complain about the new train schedule. D.Tim will likely look for a new job closer to home.
	Answer: Option B Explanation: The passage tells us that Tim's commute didn't bother him because he was always able to sit down and confortably read or do paperwork. Therefore, it is reasonable to assume that Tim's commute has become less confortable since the schedule change, because it is very crowded and he can no longer find a seat. There is no information given that supports choices a, c, and d. ⁵ . When they heard news of the hurricane, Maya and Julian decided to change their vacation plans. Instead of traveling to the island beach report, they booked a room at a fancy new spa in the mountains. Their plans were a bit more expensive, but they'd heard wonderful things about the spa and they were relieved to find availability on such short hotice.
1	

















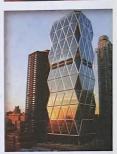








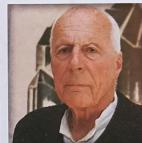










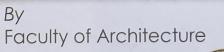






















Pritzker Prize

To honor a **living architect** or architects whose built work demonstrates a combination of those qualities of talent, vision, and commitment, which has produced consistent and significant contributions to humanity and the built environment through the art of architecture. The award consists of \$100,000 (US) and a bronze medallion.



Figure: Medal of the Pritzker Architecture Prize (Front & Back)

The international prize, which is awarded each year to a living architect/s for significant achievement, was established by the Pritzker family of Chicago through their Hyatt Foundation in 1979. It is granted annually and is often referred to as "architecture's Nobel" and "the profession's highest honor."

How to nominate?

The Pritzker Architecture Prize does not discriminate on the basis of race, color, religion, national origin, sex, disability, or age in its programs and activities. The prize is awarded irrespective of nationality, race, creed, or ideology. Nominations are accepted internationally from persons of diverse fields who have a knowledge of and interest in advancing great architecture.

The Executive Director actively solicits nominations from past laureates, architects, academics, critics, politicians, professionals involved in cultural endeavors, and persons of diverse fields who have an expertise and interest in the field of architecture.

Additionally, any licensed architect may submit a nomination to the Executive Director for consideration by the jury for the Pritzker Architecture Prize. Nominations are accepted through November 1 of any given year. It is sufficient to send an e-mail to the Executive Director with the nominee's name and contact information. Nominations that do not

send an e-main to the Exceditive Director main dover to the following year. The Jury result in the award are automatically carried over to the following year. The Jury normally undertakes deliberations early in the calendar year and the winner is announced in the spring. For more info, visit: https://www.pritzkerprize.com

Jury Members: *Ratan N. Tata* from India is one of the jury members of Pritzker Prize. He is also the Chairman Emeritus of Tata Sons, the holding company of the Tata Group. He was Chairman from 1991 until his retirement in 2012. He was responsible for transforming Tata Sons into a group strategy think-tank, and a promoter of new ventures in high technology businesses. Tata serves on the board of directors of Alcoa and on the international advisory boards of Mitsubishi Corporation, JPMorgan Chase, Rolls-Royce, Temasek Holdings, and the Monetary Authority of Singapore. He serves on the board of trustees of the University of Southern California and Cornell University.

Tata received a Bachelor of Architecture degree from Cornell in 1962. He completed the Advanced Management Program at Harvard Business School in 1975. Tata is the Chairman of two of the largest philanthropic trusts in India and has received numerous international honors for his philanthropy. Through Tata Group's



(979)

for his unconventional de tor his to the modernism

p Johnson

rganizing of volumes. These cture exists only in time.

ontains, cuddles, exalts, or

itself around you.

on became the first Directord nd 1945-1954). He coined the Ludwig Mies van der Rohe s considered the most super

Breuer. For his master degr tich has been called one of the



Figure: The Glass House, 1949

The Glass House is best understood as a pavilion for viewing the surrounding landscape. Invisible from the road, the house sits on a promontory overlooking a pond with views towards the woods beyond. The house is 55 feet long and 33 feet wide, with 1,815 square feet. Each of the four exterior walls is punctuated by a centrally located glass door that opens onto the landscape. The house, which ushered the International Style into residential American architecture, is iconic because of its innovative use of materials and its seamless integration into the landscape. http://theglasshouse.org/explore/the-glass-house/

> The Seagram Building is a modern office tower designed by famed German architect Mies van der Rohe, in collaboration with Philip Johnson. Mies believed that "less is more" and that "God is in the details." Both of these tenets are in evidence (and occasionally in contradiction) in his sleek, modern Seagram Building an avant-garde statement when it was completed in 1958.

ARCHITECTS WORK

Flaunting its glass and metal, and foregoing the heavy stone and brick used in ornamental facades of previous decades, the Seagram Building helped usher in a new era of simple, straightforward skyscrapers - buildings that embraced and celebrated their structures and minimalist geometries, rather than camouflaging them with superfluous ornament and detail.

Concept: Symbol of contemporary industrial world, illustrates the architect's motto "Less is more" showing that a simple building can be just as surprising that a building with more composite designs. The Seagram Building is a refined synthesis of rationalist architecture in which Mies had formed, the international style that was beginning to dawn on architecture since 1950 and the contributions of the Chicago school.

https://interactive.wttw.com/tenbuildings/seagram-building https://en.wikiarquitectura.com/building/seagram-building/

Figure: The Seagram Building, New York

nponent of a Associates for a nct. The Decome half. crown, which uildings. dilected in both o be "obsessive culously crafted o the varied , though not the

ARCHITECT

gy-tower



ted to the l, focusing attention tureless slab.



Figure: Crystal Cathedral, Garden Grove, CA

The Crystal Cathedral was designed as a religious theater of sorts, acting as both television studio and stage to a congregation of 3,000. Philip Johnson and John Burgee devised the glass enclosure so that that the church be open to the "sky and the surrounding world."

The single, gigantic space measures 400 feet by 200 feet in length and width. The design is a modification of the typical Latin cross plan, with a shortened nave and widened transept, to bring each seat closer to the chancel. In a nod to Los Angeles car culture, the parking lot was designed for a drive-in congregation to listen to the sermon via car stereo. 90-foot-high doors beside the chancel open onto the parking lot, providing ventilation and a visual connection between attendees.

https://www.archdaily.com/445618/ad-classics-the-crystal-cathedral-philip-johnson

Figure 2019 with a consistent of dependence of theory by Partony Wanta consisting of six buildings. The brittengs are all or emotion given a consisting of six buildings. The brittengs are all an emotion given a consisting of six buildings. The brittengs are assessed as a consisting of the second of the second are assessed as a consisting of the second of the se

The city Hague (Netherland) has unveiled the world's largest mondrian painting on the façade of richard meier's iconic architectural landmark, city hall. familiar red, yellow and blue surfaces and straight lines wrap the mega-structure, forming a totally unique composition that blends the building's architectural facets with precisely-painted blocks of color. the hague municipal council's decision to honor the world renowned artist through this outdoor exhibition heralds the start of a themed year coined 'mondrian to dutch design'. https://www.designboom.com/art/richard-meier-mondrian-city-hall-the-hague-02-15-2017/



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e women—four of what esting that he remember viour.





Figure: Known informally as the **Jubilee Church**, the Church of God the Merciful Father in Rome was completed in 2003 with distinctive walls that gently curve toward the building's center. Designed to reflect sunlight to regulate the structure's internal temperature, the concrete walls contain titanium dioxide that not only keeps them pristine white but also reacts with UV rays to break down air pollutants.



Figure: Rome's Museum of the Ara Pacis, completed in 2006, contains the namesake altar of Augustus, built in dedication to Pax, the Roman goddess of peace. Made using steel, travertine, and glass, the building also features exhibition space, a digital library, a café, and rooftop terrace. https://www.architecturaldigest.com/gallery/richardmeier-architecture/all



Figure: Opened to the public in 1995, the Barcelona Museum of Contemporary Art was referred to as the Pearl by the city's news media because of its luminous exterior of concrete and white enamel-coated steel. With a three-story atrium and smooth geometry, the structure, designed in homage to the modernist architectural movement, stands in stark contrast to the Gothic buildings in the area" or similar.



Figure: Frank Gehry has described 98% of modern architecture as "shit" and given a journalist the middle finger salute at a press conference. Gehry was in Oviedo, Spain to collect the Prince of Asturias prize. 2014.

Photograph: J | Cereijido/EPA Source: https://www.theguardian.com/artanddesign/2014/oct/24/frank-gehry-journalist-finger-architecture-shit

Buildings by Frank Gehry: From his earliest works, architect Frank Gehry has shattered conventions, designing buildings that some critics say are more sculpture than architecture. Using unorthodox materials like corrugated mand chain link, Gehry creates unexpected, twisted forms. His work has been called radical, playful, organic, and sensual.

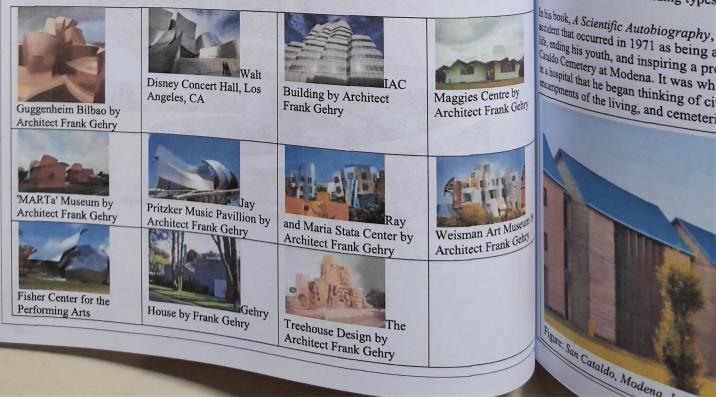


Figure: Architect Aldo Rossi

Aldo Rossi (Itary) C

Figure: Architect rules Theory: Rossi's design theory evolved fi enty Italian modernism, to surrealist pair Chirico.

Hisbook, L'architettura della città (The City), is to this day considered a pioneeri theory. The book argues that architects sl unhar/cultural context, making use of his precedent rather than trying to reinvent ty that the city remembers its past through in position is called neorationalist, since it to lalian rationalist architects of the 1920s favored a limited range of building types

ARCHITECTS WORK

Zaha Hadid, UK (Pritzker Prize 2004)



Figure: From parking garages and ski-jumps to vast urban landscapes, Zaha Hadid's works have been called bold, unconventional, and theatrical. The Iraqi-born British architect was the first woman to win a Pritzker Prize.

Dame Zaha Hadid (31 October 1950 - 31 March 2016) was the uncrowned queen of contemporary iconic architecture. Her buildings practically scream, "I'm a Hadid". A bona fide autrice, Hadid was without a doubt the world's most famous woman in a starchitect stratosphere strangely dominated by her masculine peers.

Since her student days in London at the Architectural Association School of Architecture, Iraqi-British architect Zaha Hadid (born 1950) had been intensely preoccupied with changing our general notions of space - not only in a physical sense, but also socially and culturally. Hadid's projects are characterized by their dynamic formal qualities of sinuously, curving shapes, or crystallized strata. This sums up as a kind of new Baroque, a sensuous, more vibrant and engaging type of architecture.

Hadid's projects during the late 1970s and 1980s were marked by a profound understanding of early 20th Century avant-garde artists and architects. In an attempt to redevelop and make relevant again the formal investigations of Russian Constructivism and Italian Futurism, her projects expressed utopian ideals.

Today, Zaha Hadid Architects create landmarks projects for all types of functional programs. Their buildings are never bland or mundane, but moreover assertive statements of a particular view, that the world may indeed look different. Their efforts have resulted in a staggering almost one thousand projects throughout the globe, in every scale, from urban design schemes to objects and furniture design.

Along with her strong conceptual and historical awareness, nature's forms and shapes appear as a recurrent source of inspiration for Zaha Hadid's architecture. It includes attention to physical contexts and landscapes, whether resulting in layered structures or powerful moving lines but also exploring possible interfaces between patterns and construction. Zaha Hadid Architects embraced digital drawing early on. This has made the studio able to challenge traditional ways of making architecture. In collaboration with senior office partner Patrik Schumacher, Zaha Hadid has meticulously explored the possibilities of parametric design, allowing for the conception and construction of architecture as seamless flows of energy and matter. Zaha Hadid is the 2004 Pritzker Prize laureate and winner of the Stirling Prize in 2010 and 2011. https://arcspace.com/architect/zaha-hadid-architects/

Famous buildings:

Richard and Lois Rosenthal Center for Contemporary Art, Cincinnati, Ohio Price Tower Arts Center, Bartlesville, Oklahoma BMW in Leipzig Guggenheim Museum for Taichung, Taiwan

allayne (US) (Pritzker Prize 2005

Fore: American architect Thom Mayne demism and postmodernism.

ding designed by Thom Mayne:

me L. Morse United States Courthouse maity of Cincinnati Student Recreatio Center School, Los Angeles, Calif ans District 7 Headquarters, Los Ang WAlpe-Adria Center, Klagenfurt, Aus usity of Toronto Graduate House main of Toronto Graduate House, To and Ranch High School, Pomona, Ca alower, Seoul, Korea 1997 Residence, Santa Barbara, Californ Healthcare Office Building, Los An ^{vind Residence,} Montecito, CA, 199 a Sinai Comprehensive Cancer Center Atter Residence / Santa Monica, CA, Autoritation / Santa Montecher A Academic Building, The Cooper Un And Oceanic Atmospheric Administr

Recisco Federal Building, San Fran ^{Tower,} La Défense, France (The Li

Peter Zumthor (Switzerland) (Pritzker Prize 2009)



Figure: The son of a cabinet maker, Swiss architect Peter Zumthor is often praised for the detailed craftsmanship of yima + Nishizawa his designs. salfim, Sejima + Nishizawa

Buildings and Projects by Peter Zumthor:

Peter Zumthor writes: "I believe that architecture today needs to reflect on the tasks and possibilities which are inherently its own. Architecture is not a vehicle or a symbol for things that do not belong to its essence. In a society that celebrates the inessential, architecture can put up a resistance, counteract the waste of forms and meanings, and speak its own language. I believe that the language of architecture is not a question of a specific style. Every building built for a specific use in a specific place and for a specific society. My buildings try to answer the questions that emerge from these simple facts as precisely and critically as they can." ~Thinking Architecture by Peter Zumthou



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~Thinking Architecture by Peter Zumthor						
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1986: Protective Housing for Roman Excavations, Chur, Graubünden, Switzerland	1988: Saint Benedict Chapel in Sumvitg, Graubünden, Switzerland	1993: Homes for Senior Citizens in Masans, Graubünden, Switzerland	Thermal Bath at Vals, Graubünden, Switzerland	as the of Art	Nao	
2000: Swiss Sound Box, Swiss Pavilion, Expo 2000	2002: Luzi House in Jenaz, Graubünden, Switzerland	2007: Brother Klaus Field Chapel in Wachard	Brother Klaus Field Chapel in Wachendorf,			
4		Eifel, Germany (Exterior)	Eifel, Germany (Interior)	allery	Lea Pol	

BV Doshi, (Pritzker Prize 2018)

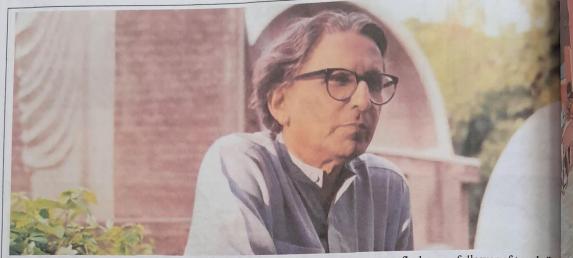


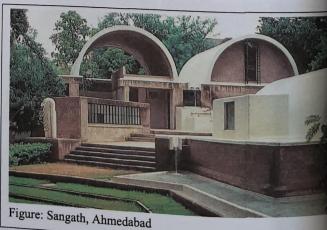
Figure: "Balkrishna Doshi has always created an architecture that is serious, never flashy or a follower of trends," said the Pritzker jury.

Balkrishna Vithaldas Doshi was born in Pune in 1927. He did his bachelors from J. J. S chool of Art, Bombay in 1950 He worked for four years with Le Corbusier as senior designer (1951 - 54) in Paris. In 1956 he established a private practice Vastu -Shilpa, Ahmedabad and in 1962 he established the Vastu -Shilpa Foundation for Environmental Design. He also founded and designed the School of Architecture and Planning in Ahmedabad. Doshi has worked in partnership as Stein, Doshi & Bhalla since 1977. Doshi worked closely with Louis Khan and Anant Raje, when Kahn designed the campus of the Indian Institute of Management, Ahmedabad. In 1958 he was a fellow at the Graham Foundation for Advanced Studies in the Fine Arts. Doshi has been a member of the Jury for several international and national competitions including the Indira Gandhi National Centre for Arts and Aga Khan Award for Architecture, H was presented in 1995, Aga Khan Award for Architecture, for the Aranya Community Housing in Indore, India.

Philosophies: According to him Architecture of a building is conceived not as a container of specific activities but as place to be inhabited, as a place to facilitate the course of human environment. Doshi's work has consistently revolved around the interrelationship of indoor and outdoor space, an appropriate and honest approach to materials, proper climatic response and observance of hierarchy and order that has always been present in the best modern architecture.

It is this so called 'filter' between contemporary and traditional architecture which Doshi has masterfully brought in. The success of any project depends on effective construction, contracting, logistic planning and co-ordination. An essential part of the philosophy is the construction of scale models and of full scale mockups to make decisions jointly with the client about the building.

"I learned from Le Corbusier to observe and react to climate, to tradition, to function, to structure, to economy, and to the landscape. To an extent, I also understand how to build buildings and create spaces and forms. However, I have in the last two decades. gradually discovered that the buildings that I have desifned seems somewhat foreign and out of milieu; they do not appear to have their roots in the soil. With the esperience of my work over the years and my own observation, I am trying to understand a little about my people, their traditions, and social customs, and their philosophy of life." (B.V.Doshi, Contemporary Architects, 1987, p. 236.)

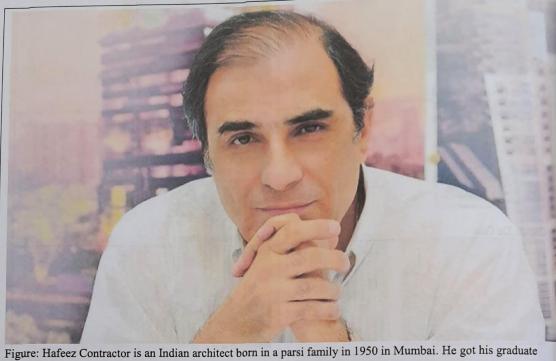


glow cost housing, indore, ir



No. Ahmedabad(1957-62 Ahmedabad 1968 Management, Bangalore Electricity Board, Jabalpur & Indore (1083

Hafeez Contractor



diploma in architecture in 1975 from the University of Mumbai followed by bachelor's degree from the Academy of Architecture in Mumbai and master's degrees in Architecture from Columbia University, New York on a Tata scholarship.

Hafeez Contractor commenced his architectural practice in 1968 as an internee at his uncle, T. Khareghat's office while studying to get his architecture degree. After working for a while he became the associate partner in the same firm in 1977 and between the years from 1977 to 1980, he served as a visiting faculty member at the Academy of Architecture, Mumbai.

He set up his own architectural firm in 1983 with a staff of two and today his firm has grown to one of the largest architectural firms in India with around 500 employees. He has built a vast variety of buildings all over India but gained large chunk of success and fame due to his residential projects. He also owns the credit of making a couple of buildings with magnificent heights, The Imperial I and II being the tallest among them all. Other than that he has also designed one of the tallest residential buildings in the world, the 23 Marina in Dubai. Apart from tall towers, Hafeez also gained enough fame for his exuberant cricket stadium designs, railways stations, educational institutes, hotels, hostel blocks and majestic airport terminals with modernistic approach.

Hafeez shows great concern regarding the lack of greenery in India and rejects the idea of going behind western techniques and following their footsteps blindly as they don't go in accordance with the climatic conditions and other demands of this region. He proposes the installment of green spaces and public parks at walking distance from residential zones and other urban centers to minimize the scarcity of greenery and other natural resources. Following are the major projects done by Hafeez Contractor:

- Sky Garden [Greater Noida (West)]
- Mahagun Meadows Noida .
- The 42in Kolkata (under construction)
- DY Patil Stadiumin Nerul, Navi Mumbai
- Seawoods Estate (or NRI complex) in Nerul, Navi Mumbai
- DLF Aralias, Gurgaon
- One Indiabulls Center, Mumbai, India(Ongoing)
- Morya Regency in Bandra, Mumbai
- Rodas An ecotel in Hiranandani Gardens, Powai
- Hiranandani Gardens
- Multiple Buildings, DLF City, Gurgaon

ARCHITECTS WORK Works Bangalou center Main Bangalou center Main Birla Corporate He MBirla Corporate Corporate Kenter MBirla Corporate Kenter V^{Bra} A Corporate Hea Modi Centre of Exce Wheesh Osho Ashram, Pu Wingel City Mall, Indore Press City, Nagpur Noc Green Buildings whe railway station, Na how income housing sche Will Slum Redevelop Bar House, Worli, Mu Corand Central, Mumi Watt Regency, Mumbai gra Birla Academy, Bar JFS Building, Bandra K idarbha Cricket Associa ajiv Gandhi Institute of Birla Institute of Technol juhara Hospital, Lucknov Hostel # 12, 13 & 14, Ind Manipal University Jaipu lokhandwala Minerva, N OFT City, Gandhinagar, Belhi Public School, Nav The Alexandria, Mangal Contractor has also been ww.famous-architects.or

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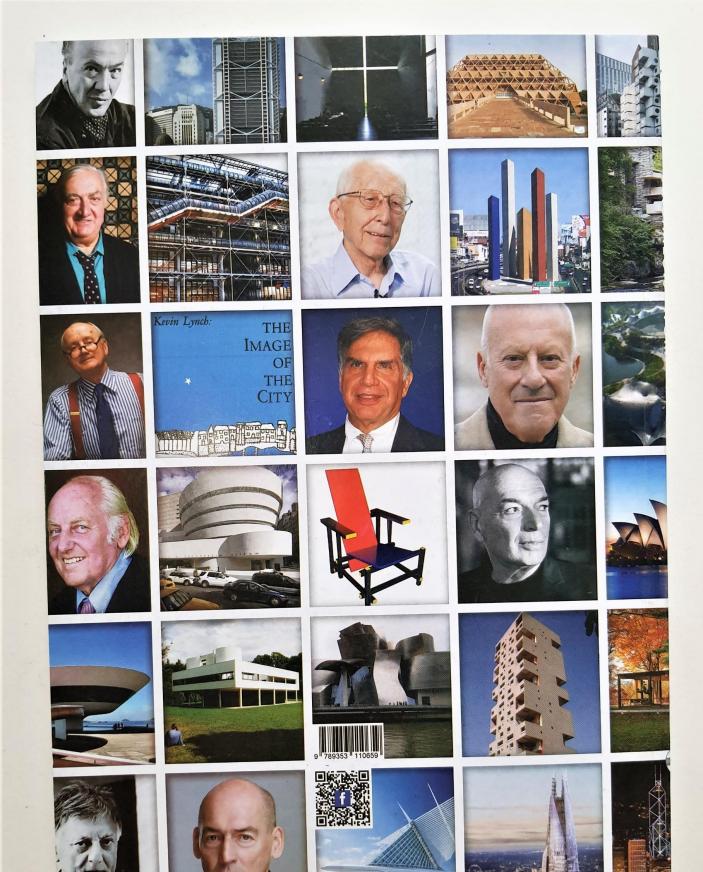
door swimming Pool, th of India- Bhuddhist

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HISTORY & ARCHITECTURE

GATE ARCHITECTURE

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gatearchitecture.com

- Well built bathrooms
- Wells throughout the city
- Remarkable similarity of architecture all over the civilization
- No large monumental structures



Figure: The large corbelled drain was built in the middle of an abandoned gateway at Harappa to dispose of rainwater and sewage.

Indian History of Architecture



Figure: Wells in some parts of Mohenjodaro have been excavated in such a way that they appear to be towers. It stands like a chimney because all of the surrounding earth has been removed by excavation.



Mohenjo-Daro

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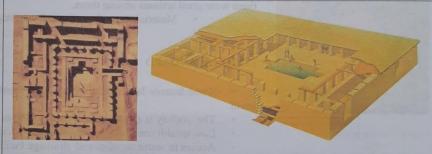


Figure: The Great Bath. The artist has cut through the roof and walls to show hidden detail.

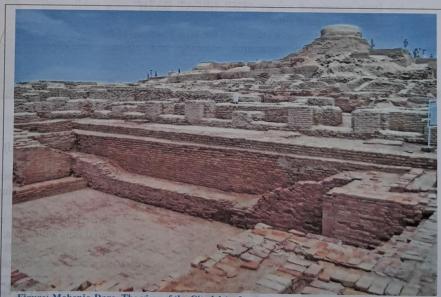


Figure: Mohenjo-Daro. The view of the Citadel (a fortress protecting a town), as seen from the lower town.

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Bamayan Buddhas (destroyed)

Bamayan, Afghanistan 3rd century C.E. 150 feet tall.

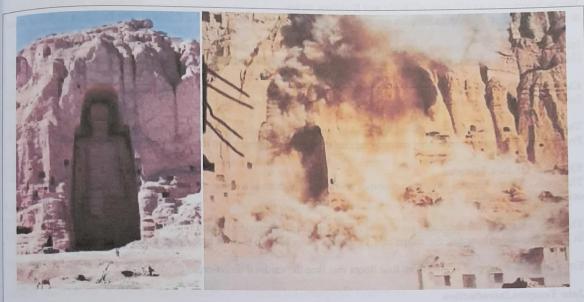


Figure: Built in 3rd and 5th-centuries monumental statues of standing Buddha carved into the side of a cliff in the Bamyan valley in Afghanistan destroyed by Taliban in 2008.





http://bit.ly/1QsnOaZ

Indian History of Architecture

Scan or visit for urther reading on Bamayan Buddhas

The Pagoda

The Pagoda is the general term in the English language for a tiered tower with multiple eaves common in China, Japan, Korea, Vietnam, and other parts of Asia. Most pagodas were built to have a religious function, most commonly Buddhist, and were often located in or near temples. This term may refer to other religious structures in some countries. The pagoda's original purpose was to house relics and sacred writings.

Figure: Pagoda in Japan.

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Indian History of Architecture

an elements, diminish by the importance of the Sun Temple is on the easte Jagmohana toward) The angular of a direction.

th and south. alls to accommodate the new rituals were erected hagriha, jagamohaha nandira (festival hall for the dance perfomance by devadasis. ong the main axis of the temple-The Bhog mandir, door in the gate of the temple was mounted on a huge Rath, On a subcole which had to be pulled door in the gate of the umber of large wheels which had to be pulled by ade of sandalwood

Lingaraja temple, A.D. is perfect the korank temple for the sun god is an allegoric A.D., is perhaps the mone vision of the deity as described in the rig le ever erected in the eda. lest and the loftiest (ab)

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marking the culm he entire planning concept of the spectacular activities at mple is devised out of the perfectly square plans, temple consists of orum, a closed hall, a

he main sanctum which (229 ft. high) was instructed along with the audience hall (128 ft. gh) having elaborate external projections.

Figure: The wheels of the chariot are also symbolic and have been interpreted as the 'Wheel of Life'. They portray the cycle of creation, preservation and achievement of realisation

of the deuls, the jagmohan & the nat mandir and their precise geometric subdivisions.

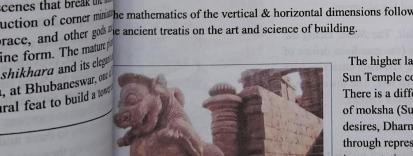
The main temple and the deuls of four accompanying

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The higher layer (above the basement and middle layers) of Konark Sun Temple contains a number of bigger sculptures, mostly erotic. There is a different interpretation. For the average man, the attainment of moksha (Success) can come after the fullfilment of all earthly desires, Dharma (religion), Artha (Wealth), Kama (desire) and not through repression. The figure of an ascetic seem to confirm the above interpretation.

While the Buddhism was preaching for renouncing everything for the purpose of achieving moksha (success), the Vaisnavism at that time were teaching people, that the achievement of success was possible, if he can fulfil all his desires even by staying among the members of his family. People can only think of this when he is almost disgusted with all sorts of enjoyments.



Figure: Royal Guard of Konark - Lion Upon Elephant Upon Man.

enakshi Temple, Madurai



The temple complex is dedicated to Shiva, known here as Sundaresh vara and his consort Parvati or Meenakshi

The temple complex is within a highwalled enclosure,

Figure: Meenakshi Temple, Madurai.

he core of which are the two sanctums for meenakshi and Sundareshwara, surrounded by a number of smaller ines and grand pillared halls. Especially impressive are the 12 gopuras. Their soaring towers rise from solid granite ies, and are covered with stucco figures of dieties, mythical animals and monsters painted in vivid colours.

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es(gopuras) rise to a ght of more than n. These towering eways indicate the rance to the temple nplex at the four dinal points, while ser gopuras lead to sanctums of the in dieties.

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Figure: Stucco work.

hta Shakthi Mandapam

risure The se distributed to the devotees who came from far off places. Next to this hall is the

URBAN PLANNING

GATE ARCHITECTURE

Faculty of Architecture



gatearchitecture.com

Concepts of urban design

Key urban design concepts are:

- Physical comfort
- Circulation and accessibility
- Transitions and boundaries
- The connection between street and building Scale

Physical comfort is the basic concept in urban design for people to feel comfortable in a public place. There are basic needs like a good

walking surface and some garbage bins, but a good environment also

readily accessible public toilets, and decent lighting at night. It is also

There should be a peaceful coexistence between the pedestrian and the car. Comprehending and feeling comfortable in the urban environment means that

offers places to sit, some shade on a hot day, shelter from the rain,

possible to physically design areas in a way that may help to deter

crime.

- Detail, variety, and complexity
- Cohesiveness

Circulation and Accessibility

Transitions and Boundaries

pedestrian when looking at circulation.

Physical Comfort

ne street you glance? That's easy to answa' erstanding some of the be a mystery. Knowing as you stroll through

building must meet future potholes.

that, once undersity

rtain places are appendent

architectural present

vns and cities. It is but nd engage with the

ure, landscape

zoning, transport and ited into policy and form and even the son

Jrban Planning Whole neighborhood, listricts & cities Jnity Predominantly 2D Long term (5 to 20)

Most people feel a deep need to know where one neighborhood or district ends and another begins. A logical world with good spatial definition orients us and gives us

separation between pedestrian use, driving lanes, and parking must be easy to see and interpret. In many developments it will be important to reassert the priority of the

Figure: Transitions and Boundaries: these can be effective in helping orient visitors where to go. Better with signage.

enter and leave the town, what is public and what is someone's private space, where to sit and meet people, where to stroll, where to shop, and where to drive or park. Using urban design to clearly show these transitions and boundaries can be the difference between comfort and confusion; and between feeling invited and feeling unwelcome.

information to help us make decisions about where to go and what to do. Elements such as the shape of buildings, doorway design, paving materials, curbs,

URBAN PLANNING & DESIGN



Figure: Physical Comfort: A Market Street is designed to offer places to sit



Figure: Circulation and Accessibility: Providing an adequate buffer strip and sidewalks can help people walkthrough easily.

landscaping, street furniture, changes in the elevation of the ground, and signage let us know where one category of uses gives way to another. The transitions and bounda

ries of the urban world tell us when we



Figure: Scale: The varied rhythm of storefronts in towns helps establish a pedestrian-oriented scale.

URBAN PLANNING & DESIGN

an uninviting, inter-



Screens

Fast-growing evergreens, willow hybrids and privet shrubs offer a natural screen in the landscape, affording privacy while adding interest and beauty to the yard. In addition to trees and shrubs, vining plants, such as clematis and climbing rose, provide perennial cover for a fence. Annual vines, such as morning glory, cardinal vine, moonflower and Spanish flag, provide bursts of color on a trellis or an arbor.



Figure: Outwardly oriented rooms are enhanced by amenities outside the space such as good views and breezes. Activities taking place within the front yard are more public in nature and will require free visual access on and off the site and little enclosure.

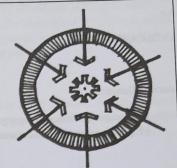


Figure: Inwardly oriented space is characterized by either complete or nearly complete enclosure and a strong central focal point. Central areas for sitting, sculpture displays, patios, and hot tubs require enclosure for purpose of privacy, quit, and concentration.

Shade

Large trees with dense leaf

en and phosphorus at growth, such as maple, ash, oak and elm, provide welcome relief from the itional growth boost hot summer sun when positioned between the roof of the home and the angle of the sun at midday and afternoon.

Borders Outlining a driveway or a sidewalk or enhancing the edge of a flower garden is ideal for border plantings. Shrubs or



windbreaks to contro

Ground Cover

While grass may be the most common ground cover, you can reduce soil erosion, create a blanket of texture or add color beneath trees or in bordered areas. Low-growing plants that spread, such as vinca, creeping phlox, ivy, creeping juniper and ajuga, create a living plant carpet. For permanent ground cover in the landscape, choose hardy plants that will continue to grow each year.

flowering plants of a similar height and shape form attractive borders and offer a visual separation between elements in the landscape. Both annual and perennial plants make attractive borders when chosen for their mature height and width, their texture or color, and their growth pattern. Tall plants, including butterpat, fountain grass and snow bank, look the

best at the rear of the border, creating a backdrop for shorter plants such as variegated lily and marigold.

Types of Plants

wing zone and soil ar.



ergreen plantings ctive sound control.

There are about 350,000 plus plant species, their classification gets a little difficult. However, most of them are

categorized in the following three types:

Mosses: Mosses are very tiny plants with equally tiny leaves and no flower-bearing capacity. They do not have true roots like other plants, but very thin hair like structures known as a filament that holds them down. They have no seeds, but spores which they use to multiply.

Grasses! Grass can be identified by their distinct leaves; narrow, slender and usually long. They may or may not bear flowers that are made up of three or six parts which are either ways inconspicuous. The roots are in clump form.

13

Transit Oriented D Transit Oriented Dev communities. Also ki communities centered complete dependence

Transit oriented devel neighborhoods combi after city. The public l Real estate developers systems.

Transit oriented develo global energy security consumption. This typ

Rationale Transit-oriented develo Rising energy

- Road congestio
- Climate change
- Shrinking hous
- . Increasing dem .
- Interest in gree

Homebuyers, renters ar urban amenities such as

Factors Driving The T

-Rapidly growing, mind -Growing distaste for su -Growing desire for qua -Growing desire for mo -Changes in family strue -Growing national supp New focus of Federal p

"Traffic congestion has routine. Attempts to alle and, eventually, more co

24

COMPONENTS OF T

-Walkable design with p Train station as promine -Public square fronting to A regional node contain High density, walkable of Collector support transit Designed to include the Large ride-in bicycle par Bikeshare rental system Reduced and managed p Specialized retail at stati

haloos will be regularly spaced clusters located	with in hexagonal under
he leave will be regularly spaced clusters for	ingles formed by

- 3. Lower order centers will be located at the gravity centers of the triangles formed by next higher order centers 4. Distances separating the centers will be greater in case of higher order centers and proportionally less for
- fower order centers5. All the central places constitute a hierarchy of the smallest villages to the largest town of national
- importance

SETTLEMENT PATTERN

(i) all places with a municipality, corporation, cantonment board or notified town area committee; Census of India defines an Urban Area as

- (ii) all other places which has features as

 - (2) at least 75% of the male working population engaged in non- agricultural pursuits and
- (3) a density of population of at least 400 persons per sq. km.

Apart from urban area & urban agglomeration rest is considered as Rural Area.

Census Classification of Cities and Towns:

Class of Cities/Towns	Range of Population
Class I	100,000 and above
Class II	50,000 to 99,999
Class III	20,000 to 49,999
Class IV	10,000 to 19,999
Class V	5,000 to 9,999
Class VI	Below 5,000

Source: Report of National Commission on Urbanization

LANDUSE AND LAND UTILISATION

At any particular point of time, a parcel of land put to some use is landuse. This concept is a dynamic phenomenon as the use of a vacant land may be converted to residential or commercial.

Need for 'land use'

- To guide the use of land to promote the advantages of development of the
- Curb misuse of land i.e. increased intensity of development, encroachment of
- Prevent abuse of land i.e. prevent formation of slums, squatters
- Regulate the nonuse or misuse of land i.e. land being used for speculation, without development

Land use plan

Landuse plans show us the various kinds of activities that are carried out in the different location of the city.

Tural housing is SURVEY METHODS

TYPES OF SURVEYS

n the perspective of the

Surveys can broadly be divided into two categories depending on the area upon which they are to be conducted. They are :

s to improve building, REGIONAL SURVEYS is and market research s how a building weil They are those surveys, which are done over a region dealing with

- PHYSICAL FACTORS like topography, physically difficult land, geology, landscape etc.
- PHYSICAL ECONOMIC FACTORS like agricultural value of the land, mineral resources and water gathering lands, areas with public services, transportation linkages etc.
- SOCIAL ECONOMIC FACTORS like areas of influence of towns and villages, employment, population changes etc.

TOWN SURVEYS

They are done at much small scale and apart from the above data collected from the regional surveys it also ncludes

- LANDUSE SURVEYS
- DENSITY SURVEYS
- SURVEYS FOR THE AGE AND CONDITION OF THE BUILDINGS
- TRAFFIC SURVEYS
- OTHER SOCIAL SURVEYS

For conducting proper survey, primarily relevant enquiries should be framed in the form of questionnaires for presentation, when required.

ECHNIOUES OF SURVEYS

f the various techniques of surveys that are followed, the four listed below are most prominent

- 1. self surveys (i.e. mailing questionnaires to the persons to be surveyed)
- 2. interviews (i.e. by asking questions to the people to be surveyed)
- 3. direct inspection (i.e. when the surveyor himself inspects the situations concerned
- 4. observers participation (i.e. when the observer himself participate in acquiring the data required)

LALES FOR STRUCTURING QUESTIONNAIRES

e questions that are asked in the questionnaires formed for doing the surveys can be of various types. Some of e asks for general things, some asks for some order of preferences or some give stress to the time erval between two incidents. Thus the scales of the questionnaires are fixed, which can be described as follows

MINAL where there is no ordering, like asking of sex, age, employment in any particular service etc. DINAL where there is a specific order of choices like asking of priorities, housing conditions, climate etc. TERVAL where an interval of time is given importance like time taken to shift from LIG housing to MIG using, time interval to change from two wheelers to four wheelers etc. this provides an yardstick of measurements

LECTION OF SAMPLES

conducting surveys, it is not always possible to ask each person about his or her opinion. Hence, certain nbers of persons are selected for conducting the surveys and these selected persons are known as 'samples' of veying. The selection of the number of samples is of utmost importance. The basic rules for selection of ple size are as follows:

MORE DISASTROUS THE RESULTS OF POOR INFORMATION, LARGER SAMPLE SIZE IS REQUIRED. That is if the information got are poor (both qualitatively and quantitatively) the analysis 1. done from them will be wrong. Thus, if getting incorrect results have a very disastrous effect on the

	hectare
6. Desirable densities of population	Persons per hectare
D timber	100
the for the city	150 - 200
	200 - 250
Average gross density for the average gross density for the average gross density for residential neighborhood Gross density at the periphery and suburbs	100
in a huding low and Value areas	200
Intermediate rings of cities and districts	250 - 375
Inner ring around core area	500
Core of city and high land value areas	and a support of the support

7. Residential plot sizes for to	wus in India	Area in sq.mts.
	Dimensions in mts.	135
Income group	9 x 15	180
Low income group	12 x 15	216
Middle income group	12 x 18	294
Wildle meene group	14 x 21	

	15 - 24	360
	15 x 24 18 x 27	486
High income group	24 x 30	720
	27 x 36	972
Public housing and multiple	90 x 90	8100
amily plots (90 sq.m. per	90 x 180 and multiples of 90	16,200
amily with 12 m. to 18m.	consumption in lines per day	
oad)	The sector and the sector	Day series I make

8. Plot area coverage and floor area ratio

Residential

Max. Percentage of coverage
65
60
55
50
45
40

Floor area ratio: 1.0 to 3.0

Commercial

Area of plot in sq.m.	Max De
Up to 100	Max. Percentage of coverage
100 - 300	80
300 - 400	75
400 - 500	70
500 - 1,000	65
1000 - 2000	50
Above 2000	40
Floor area ratio: 1.0 to 4.0	35

Industrial

	Area of plot in sq.m.	10.0
Light industry	250 - 2000	Max. Percentage of coverage
Medium industry Heavy industry	2000 - 4000	50
	Above 4000	40

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L	Children's park
L	Children's pain Children's pain Neighbourhood
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E	playebourne
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н	Regional park
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ł	Decision factors for
I	Decision lactors
1	Age group
1	Distance
1	Family incor
1	Mode of trav
1	Availability
1	
1	Outline the details re
1	
	a town
	□ Financial as
	Population
	Quality of w
	Rate of cons
	Cale of cons
	Sanitary sur
	Sources of v
	Topography
	Trend of toy

"VAMBAY" HOL

The Government Scheme, which e will be funded w and the balance 1 has programmed Chennai, Madura Rs.1.60 crore to Clearance Board Commenced to co 2002-2003 with crores and benef

REPAIRS AND SCHEME

During the Silve Minister has an



Photograph

Unique Features

\star The Question Bank in 4 Volumes

Easy to buy with friends by sharing. Easy to study in groups for best result.

All pages colour prints

For Emmersive Reading Experience For better recall in exam!

Extensive coverage

Question Paper of GATE since 1991 to 2021 (31 Years)

Essential Notes

 $\frac{1}{2}$

Notes has been provided not just for answering a question but also for extra coverage!

Comprehensive content

With total 672 pages. And it can be added further for upgrade without prior information!

QR-coded text

You can scan QR-code printed in the book from your phone for extra reading related of the subject.

Prejace

Complete Syllabus through Question Bank: The best way to prepare for an exam like GATE is through a comprehensive study of previous-year question papers. It takes less time to cover most part of the syllabus. Solving the previous GATE questions helps aspirants to understand the exam pattern, knowing the level of questions, and predict the pattern. At the same time, you may be aware that just knowing the answers of previous-year question paper is just not enough.

For example, if the question is: The teahouse is a feature of which type of landscape architecture? And you learnt that the answer is 'Japanese Garden'. It is best to support the answer with additional notes & figures about different types of gardens, i.e. French, English, and Chinese, etc. One reason for providing such notes is that it is rarely possible that in the next few years, the same question will be repeated. But it is quite possible that if a question is asked from a related topic, you should answer it if you have gone through additional studies or notes.

Essential Notes: Providing answer with essential notes & explanation is the main features of this Question Bank. It's been tried to cover the maximum part of the syllabus through providing supportive notes and answer itself.

QR-code based book: We have been using QR-code based deep learning for our GATE reference books since 2015.

It gave us encouragement when it came to news that a teacher **Ranjitsinh Disale** won \$1mn Global Teacher Prize 2020 for using QR-

codes based book for teaching in school.

This book is very concise. It contains a very exhaustive source of reference material for a deep understanding of the subject. So, it has QR-codes. Scan the code for further studies if you need. There are many QR code scanners available on Google Play Store or apple App Store.



Scan to know more about Ranjitsinh Disale, Winner of Global Teacher Prize 2020

We recommend, you scan the QR-codes with the app that comes with your phone itself. Installing the 'QR Code Reader' app from the Google Play Store or the Apple App Store may contain advertisement that could be irritating and downgrade reading experience. Some phone can scan QR-codes directly with its camera itself without any app!

All Pages Color Printed: All pages and illustrations of this Question Bank are color printed. Paper published by National Center for Biotechnology Information; US suggests that there are positive effects of color illustration on cognitive process.

Complete Package: This question bank contains question papers of last 31 years from 2021 to 1991. All it makes it the complete Question Bank. When you go through all these, you will get an idea of how question pattern and trend has changed over time. This will greatly help you to focus on the part of the syllabus which are frequently asked in exams.

Feedback: We keep improving the contents of this book through the feedback and suggestion from the readers. You are always welcome for your valuable suggestion and feedback about this book. If you find better contents or alternative solution, send us to gatearchitecture@gmail.com

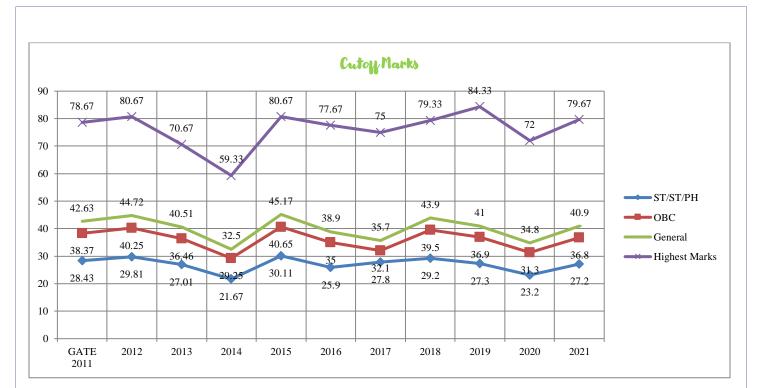
We request you to write a fair review on the ecommerce webpage from where you have bought the book.

This book should provide an edge to your study. Hopeful that it will make you confident and feel easy on question pattern.

Fab Quote"

"The interesting observation is to try to work with people, but even more than that, to try to make them successful. If you try to make others successful, they, in turn, will try to make you successful. No matter how brilliant you are, no matter how good you are, no matter how hard you work, if you rely only on yourself and believe you don't need the help of others, you are sadly mistaken. If you engage everybody around you by helping them, they will help you, in turn. And you will be more successful than you ever dreamed of." – Former Director, Goldman Sachs

Happy reading. Make most of this book. We wish you all the best for GATE 2022.



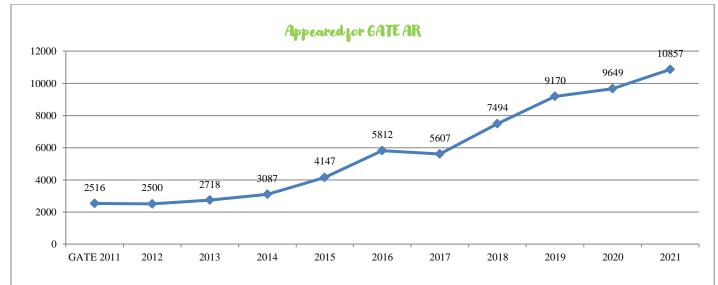


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GATE 1993 Q&A with Essential Notes	141 ~ 146	05	
GATE 1992 Q&A with Essential Notes	147 ~ 153	06	
GATE 1991 Q&A with Essential Notes	154 ~ 159	05	
		(70)	
Total		672	

In pursuit of constantly improving this book, we would delete or add contents without prior information!

Benefits of Colour Illustration

Why is the Question Bank COLOUR printed?

A color printed book has numerous benefits to the readers in comparison to a black & white printed book. Following are the articles published in reputed journals and media elaborating the impacts of color illustrations. (Color: US spelling, Colour: UK spelling)

Color Images More Memorable Than Black and White (Article)

Psychologists have found that colors enhance an individual's visual memory. From a series of experiments, researchers learned that subjects were more likely to recall the color version of an image than the same scene in black and white. The results, which appear in a issue of the *Journal of Experimental Psychology: Learning, Memory and Cognition*, also indicate that natural colors make a difference.

Felix Wichmann of the Max Planck Institute for Biological Cybernetics and his colleagues conducted five experiments, using subjects with normal vision. Participants initially viewed 48 images, half in color and half in black and white. The picture subjects fell into four different categories: landscapes, flowers, rock formations and man-made objects. Each category provided a different check on the results. For example, the flower pictures varied in terms of color, not shape, but those of rock formations offered the opposite. After presenting these images, the team mixed in 48 new scenes, showed the entire set of 96, and then recorded whether the subjects remembered the originals. The color images, they found, made much longer-lasting impressions than did the black-and-white ones.

To assess whether the visual memory system treats natural color and false color differently, the researchers presented subjects with altered images, such as scenes with reddish grass. They found that people did not remember these scenes any better than they did the black-and-white versions. According to study co-author Karl Gegenfurtner, this indicates that the visual memory system is

tuned to the color schemes of the natural world. "If stimuli are too strange," Gegenfurtner says, "the system simply doesn't engage them as well." Advertising or design industries might do well to take note of the findings. To catch someone's eye, bright colors might be best, but if "the aim is more to have an image 'stick' in the viewer's memory," Wichmann suggests, "unnatural colors may not be suitable."

(Author: Greg Mone, 2002, Scientific American: https://www.scientificamerican.com/article/color-images-more-memorab/)

The Influence of Colour on Memory Performance: A Review (Research Paper)

Human cognition involves many mental processes that are highly interrelated, such as perception, attention, memory, and thinking. An important and core cognitive process is memory, which is commonly associated with the storing and remembering of environmental information. An interesting issue in memory research is on ways to enhance memory performance, and thus, remembering of information. Can colour result in improved memory abilities? The present paper highlights the relationship between colours, attention, and memory performance. The significance of colour in different settings is presented first, followed by a description on the nature of human memory. The role of attention and emotional arousal on memory performance is discussed next. The review of several studies on colours and memory are meant to explain some empirical works done in the area and related issues that arise from such studies.

Introduction

Memory refers to the mental process of encoding, retaining, and retrieving environmental information. How the human cognitive system deals with the memorization process remains the centre of research among cognitive psychologists. One of the most interesting and challenging questions in contemporary memory research is on ways to enhance human memory performance. Many variables have been proposed to contribute to the retrieval operations and one of the variables is colour, which will be discussed thoroughly in the present paper.

Colour is believed to be the most important visual experience to human beings. It functions as a powerful information channel to the human cognitive system and has been found to play a significant role in enhancing memory performance. Colour can be very effective in learning and educational setting, marketing, communication, or even sport. For instance, a marketing study has found that colour can increase brand recognition by up to 80%. Most advertisements use colour as one of the important element in influencing people's attention, attitude towards the product, and pressuring decision making. According to White, coloured advertisements can attract people to read the advertisement up to 42% more often than the non-coloured advertisement. This shows the importance of colour in making the information or message more attractive to the public.

In the educational setting, higher demand is put on excellent academic achievement. The extent to which students utilize their cognitive abilities is also important and may contribute to better academic achievement. The cognitive abilities of the students refer to the way the students perceive, pay attention, remember, think, and understand the lessons. There need to be strategies to facilitate the learning process and colours can play a role in motivating students to learn and profit from their educational experiences.





Memory Techniques

How to enhance your memory so that you can remember fast to get best of the Question Bank?

For that, we have already this book printed in **Colour** as it supports better cognitive activity of your brain. On our website: gatearchitecture.com, there is a tab '**Student Yoga**' that may help perform you better in exam. Other than this, following articles can help you in better learning. Many students complain that they can't remember necessary material. They say they understand the content when they read it, but can't recall it later. There is a difference between understanding and remembering. You may understand all the systems of the human body (they make sense when you read about them), but that doesn't mean you'll be able to recall the necessary terms. Fortunately, there are memory techniques and strategies for you to use. Some will be more useful for some subjects and content than others.

Baker/baker paradox

There is a term "elaborative encoding" that is well-illustrated by a nifty paradox known as the Baker/baker paradox, which goes like this: If a person tells two people (you and your friend) to remember the same word, if the person says to your friend, "Remember that there is a guy named Baker." That's his name. And the person says to you, "Remember that there is a guy who is a baker." The person comes back to your friend at some point later on, and says, "Do you remember that word that I told you a while back? Do you remember what it was?" The friend who was told his name is Baker is less likely to remember the same word than what was told to you that his job is a baker. Same word, different amount of remembering; that's weird. What's going on here?



Well, the name Baker doesn't actually mean anything to you. It is entirely untethered from all of the other memories floating around in your skull. But the common noun "baker" -- we know bakers. Bakers wear funny white hats. Bakers have flour on their hands. Bakers smell good when they come home from work. Maybe we even know a baker. And when we first hear that word, we start putting these associational hooks into it, that make it easier to fish it back out at some later date.

20 Memory Techniques Experiment with these techniques to make a flexible, custom-made memory system that fits your style of learning.

1. Learn from the general to the specific.

Imagine looking at a new painting this way. Blindfold yourself. Put a magnifying glass up to your eye. Move your face within inches of the painting. Now, yank the blindfold off and begin studying the painting, one square inch at a time. Chances are, even after you finished "looking" at the painting this way, you wouldn't know what it is. Unfortunately, many students approach new courses and textbooks just this way. They feel driven to jump right in and tackle the details before they get the big picture. Here is a different approach. Before you begin your next reading assignment, skim it for the general idea. You can also use this technique at the beginning of a course. Ask someone who has taken it to quickly review it with you. Do a textbook reconnaissance of the reading assignments for the entire course. This technique works best at the beginning of a term, but it's never too late to use it. If you're lost, step back and look at the big picture. The details might make more sense.

Meditation for Memory

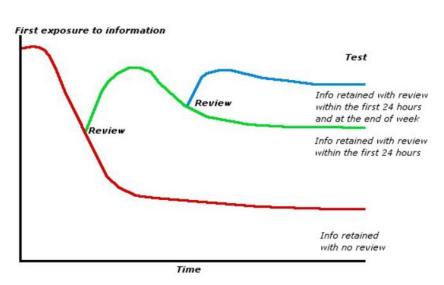
Meditation is the most effective way of improving the ability of our mind to pay attention to tasks – which is important for improving retention and converting a short-term memory into a long-term memory.

Studies have demonstrated that practicing meditation improves our ability to focus on smaller details. (Maclean et al. 2010).

Source: https://www.magneticmemorymethod.com/how-to-remember-things/

The Importance of Review

The most important part of note taking is reviewing your notes after class. Notes do very little if they are never looked at again! The average student forgets up to 80 percent of the information within 24 hours of learning it. Students can dramatically increase the amount of information they retain by reviewing the information within that first 24 hours. When reviewing, edit and clarify notes, focusing on main ideas and key points. One way of doing this is by using the Cornell System. To further improve retention, do a weekly review as well. Choose one night of the week (weekends work well for this) to go over notes from the past week of class for all of your classes. Plan to spend about 30 minutes per class. Review also improves retention of information from textbooks and can be done in almost the same manner. After reading



each chapter or section of the text, do a short review within 24 hours and a comprehensive review on a weekly basis. Nobody is anxious to add another task to their list of things to do, but reviewing often saves time in the long run, since consistent review leads to less cramming before tests. Studying for a short period of time each day is more effective than studying for many hours on a single day.

(Figure: Adapted from WWU's Tutorial Center) Source: https://selkirk.ca/sites/default/files/Learning/Selkirk-College-Learning-Success-Memory-Techniques-Workshop.pdf



Syllabus 2022

Architecture and Planning (AR): New Pattern

New

The Paper contains General Aptitude (GA) section (15 Marks) as applicable for all papers of GATE 2022. The Paper consists of two parts covering the syllabus: Part A (60 marks) and Part B (25 marks). **Part A** is compulsory for all the candidates. **Part B** contains two **optional** sections: Part B1 (Architecture) and Part B2 (Planning). *Candidates have to choose any one of these during the examination! (Part B1 or Part B2)*

Part A: General

Section 1: Architecture, Planning and Design

Architectural Graphics; Visual composition in 2D and 3D; Computer application in Architecture and Planning; Anthropometrics; Organization of space; Circulation- horizontal and vertical; Space Standards; Universal design; Building byelaws; Codes and standards;

Section 2: Construction and Management

Project management techniques e.g. PERT, CPM etc. ;Estimation and Specification; Professional practice and ethics; Form and Structure; Principles and design of disaster resistant structures; Temporary structures for rehabilitation;

Section 3: Environmental Planning and Design

Natural and man-made ecosystem; Ecological principles; Environmental considerations in Planning and design; Environmental pollution- types, causes, controls and abatement strategies; Sustainable development, goals and strategies; Climate change and built environment; Climate responsive design;

Section 4: Urban Design, landscape and Conservation

Historical and modern examples of urban design; Elements of urban built environment –urban form, spaces, structure, pattern, fabric, texture, grain etc.; Concepts and theories of urban design; Principles, tools and techniques of urban design; Public spaces, character, spatial qualities and Sense of Place; Urban design interventions for sustainable development and transportation; Development controls – FAR, densities and building byelaws.; Urban renewal and conservation; heritage conservation; historical public spaces and gardens; Landscape design; Site planning;

Section 5: Planning process

Salient concepts, theories and principles of urban planning; concepts of cities - Eco-City, Smart City; Concepts and theories by trendsetting planners and designers; Ekistics; Urban sociology; Social, Economic and environmental cost benefit analysis; Methods of non-spatial and spatial data analysis; Development guidelines such as URDPFI;

Section 6: Housing

Housing typologies; Concepts, principles and examples of neighbourhood; Residential densities; Affordable Housing; Real estate valuation;

Section 7: Services and Infrastructure

Firefighting Systems; Building Safety and Security systems; Building Management Systems; Water treatment; Water supply and distribution system; Water harvesting systems; Principles, Planning and Design of storm water drainage system; Sewage disposal methods; Methods of solid waste management - collection, transportation and disposal; Recycling and Reuse of solid waste; Land-use – transportation - urban form inter-relationships; Design of roads, intersections, grade separators and parking areas; Hierarchy of roads and level of service; Para-transits and other modes of transportation, Pedestrian and slow moving traffic planning;

Part B1: Architecture

Section B1.1: History and Contemporary Architecture

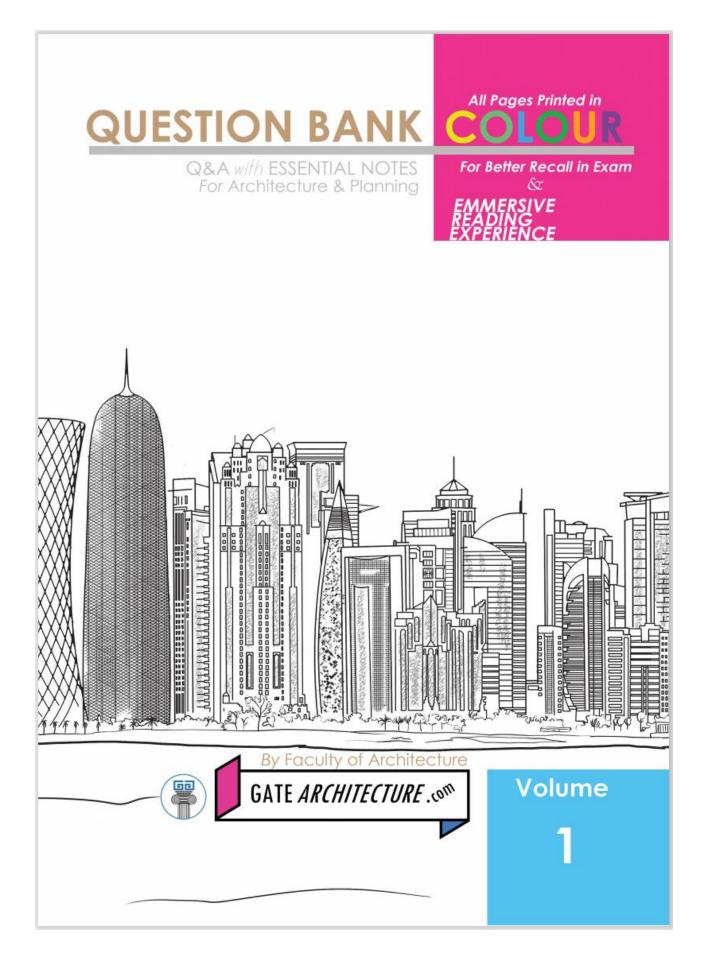
Principles of Art and Architecture; World History of Architecture: Egyptian, Greco-Roman classical period, Byzantine, Gothic, Renaissance, Baroque-Rococo, etc.; Recent trends in Contemporary Architecture: Art nouveau, Art Deco, Eclecticism, International styles, Post Modernism, Deconstruction in architecture, etc.; Influence of Modern art and Design in Architecture; Indian vernacular and traditional Architecture, Oriental Architecture; Works of renowned national and international architects;

Section B1.2: Building Construction and Structural systems

Building construction techniques, methods and details; Building systems and prefabrication of building elements; Principles of Modular Coordination; Construction planning and equipment; Building material characteristics and applications; Principles of strength of materials; Alternative building materials; Foundations; Design of structural elements with different materials; Elastic and Limit State design; Structural systems; Principles of Pre-stressing; High Rise and Long Span structures, gravity and lateral load resisting systems;

Section B1.3: Building Services and Sustainability

Solar architecture; Thermal, visual and acoustic comfort in built environments; Natural and Mechanical ventilation in buildings; Air-Conditioning systems; Sustainable building strategies; Building Performance Simulation and Evaluation; Intelligent Buildings;





Area of triangle shown 1 given]



1/3). e is to

Where, PMV = Predicted Mean Vote Index M = metabolic rateL = thermal load - defined as the differencebetween the internal heat production and the heat loss to the actual environment - for a person at comfort skin temperature and evaporative heat loss by sweating at the actual activity level

What is PPD?

GATE

Through PMV, we can predict the thermal sensation of a population, but this doesn't paint the whole picture. We also need to consider the level of satisfaction of the occupants in a space, to get a more holistic idea of if and how thermal comfort can be achieved. For this, Fanger developed another equation to relate the PMV to the predicted percentage of dissatisfied (PPD).

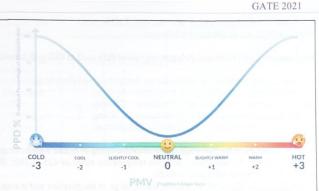
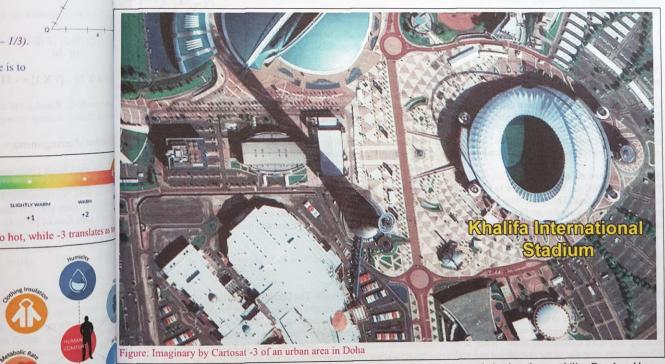


Figure: Once the PMV is calculated, the PPD, or index that establishes a quantitative prediction of the percentage of thermally dissatisfied occupants (i.e., too warm or too cold), can be determined. PPD essentially gives the percentage of people predicted to experience local discomfort. The main factors causing local discomfort are unwanted cooling or heating of an occupant's body. Common contributing factors are drafts, abnormally high vertical temperature differences between the ankles and head, and/or floor temperature.

into six equal parts and side high resolution mapping of urban areas is Q3. Indian satellite sensor that can be used for very (A) LANDSAT (B) CARTOSAT (C) RESOURCESAT (D) MODIS (Marks to all)

> Cartosat series of satellites launched by ISRO (Indian Space Research Organization) with high-resolution imaging sensors are primarily intended for applications in the areas of cartography and large-scale mapping. Some of the important applications include monitoring of irrigation infrastructure created under Accelerated Irrigation Benefit Program, NUIM (National Urban Information System), Topo-thematic mapping at 1:10,000 scale, Urban Infrastructure planning, and many State level Geospatial applications.



artosat-3 is a third-generation agile advanced earth observation satellite with high-resolution imaging capability. Developed by ie ISRO, it will replace the IRS series. Cartosat-3 has a panchromatic resolution of 0.25 metres making it the imaging satellite ith highest resolution and Mx of 1 metre with a high-quality resolution, which is a major improvement from the previous ayloads in the Cartosat series.

aree: https://www.isro.gov.in, https://www.sciencedirect.com/topics/earth-and-planetary-sciences/cartosat, https://www.business-standard.com/

Figure: Environmental and pe actors that influence therma comfort

GATE 2021

are lose all the free water

e organic matter in the ron) also become reach

of brick clay, that is

extreme temperature of

nary, building bricks

ed before using it in the



crucial as construction

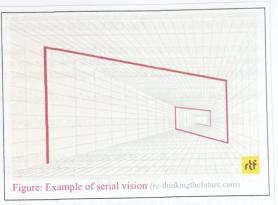
ability, a consortium d is now known as M. It promotes IFC asi es. (Source:

example of

nscape' by the one who lts.

Gordon Cullen, the humanist and urbanist designer, first published his seminal work "Townscape" in 1961, and a concise version of it was published ten years later (Cullen 1961, 1971). Cullen liked to call his theory and approach to understanding and manipulating the elements of townscape an "Environment Game." He presented his discovery of humanistic urban design in three "gateways": Motion (Serial Vision), Position (Here and There), and Content (This and That). A detailed review of the entire Townscape treatise is not intended here but a short revisit of the serial vision. In concerning "Optics," Cullen calls a series of "jerks or revelations" that we may experience when walking through a town or city at a uniform speed as Serial Vision.

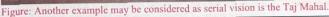
He considers that a town can become visible in a deeper sense if vivid contrasts can be felt, as "the human mind reacts to the difference between things," or "the drama of juxtaposition" Source: http://papers.cumincad.org/data/works/att/cf2003_m_017.content.pdf)



Rashtrapati Bhavan, New Delhi, India

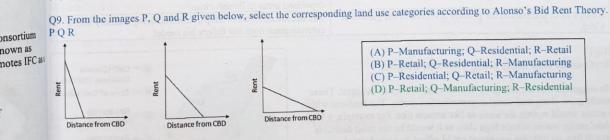
Designed by Herbert Baker and Edward Lutyens, the new capital was envisioned on the principles of Garden City. The Rajpath that





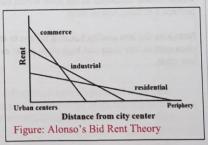
leads to the Rashtrapati Bhavan has a series of visual screening as well as enhancing elements, thus, creating a progression of frames. A sense of progression is created and keeps the observer moving forward. The avenues and the water bodies confine you to the focal point and as you move forward your frame gets bigger with multiple buildings and different views. An illusion of nearness and closeness that is created in the first frame fades out as one approaches the main building in focus, revealing more and more buildings of different scales and functions. In this example, serial vision is used to suggest the majestic and authoritative r choosing to work with nature of the building in focus.

Q8. A waste water pipe connecting two inspection chambers (IC) is laid at a slope of 1:200. The Invert Level of the starting IC is signed to facilitate shan 450 mm. The Invert level of the second pit at a distance of 40 m from the first IC is (A) -650 mm (B) -200 mm (C) -250 mm (D) -550 mm



n predestined. Several Explanation: It can be seen that commerce (in particular large department ations and at the same stores/chain stores) is willing to pay the several stores. ations and at the same stores/chain stores) is willing to pay the greatest rent to be located in the CBD. The road or a simple rect¹⁰¹ CBD is very valuable for them because it is traditionally the stores. road or a simple rectal stores, than stores) is willing to pay the greatest rent to be located in the CBD. The CBD is very valuable for them because it is traditionally the most accessible is single frame or glanct location for a large population. This large population is essential for department brise in the viewer ofter stores, which require a considerable turnover. As a result, they are willing and able ban design take shape^W to pay a very high land rent value. They maximise the potential of their site by building many stories.

As you move from the CBD, commerce is unwilling to pay as much for a site. In fact, what they are willing to pay declines rapidly.



ble for their factories, but

acentric ring model.

purchase land. The further h **GATE 2021 Evaluation:** races, flats and high rises, For Against Some cities seem to follow Hoyt's sectors. Bristol, for Like Burgess' there is little reference to the physical example, has a very clear industrial sector following a main environment. rail line and the River Avon. It provides us with an alternative set of explanations to The growth of sector can be stopped as land-use leapfrogs out s have influenced the patter Burgess. of the old inner city. For example, out of town council estates have prevented large high-class sector developing in other

A - CBD (Central Busine areas of Bristol. Communication routes (Rivers, roads, railways) do often Again, like Burgess, there is no reference to out of town provide a very definite boundary to a sector/land-use. District developments.

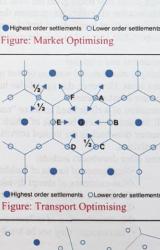
Zone of Transition In addition, the division between land-uses in both models is far to clear-cut. Firstly, you would not suddenly walk from lower to middle to higher class housing. Also, all zones will have a mixture of land-uses. Residential zones will have shops and industry in Residential (lowersamongst them.

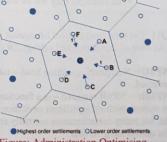
el

Residential (mids, They do, however, give us a bench mark for comparison and allow us to have a basic understanding of the complex set of processes Residential (upper that determine the distribution of land-use within a city.

Zone Model by Ernest BarCentral place theory Christaller's central place theory basically tells us that if there is an even distribution of population, all with equal money and transport opportunities, and the land is flat and houses the workers for the featureless, then settlements will follow a distribution pattern according to size. The distribution will follow one of three patterns: 1. Market Optimising: The shoppers in smaller settlements divide into three equal groups when shopping in the three nearest larger settlements. 2. Transport Optimising: Shoppers in smaller settlements divide into two equal groups when shopping in the two features into account. Burne hearest larger settlements. bes not follow the patterning. Administration Optimising: Figure: Market Optimising All shoppers in the smaller settlements shop in the nearest large settlement. area. ly available allowing more meant that commuter villa. The largest settlement, which is in the centre of the hexagon, will be surrounded by a e from the edge of the une number of smaller settlements. People from the small settlements will visit the large settlement for a particular good or service that their village does not provide. People 1/2 en this. cannot cross the boundary hexagons because Cristaller says they must shop in their an now be found in tradiu il estates have built up at the also introduced the concepts of threshold and range: ese are now some of the Threshold is the minimum number of people needed to support a service. Range is the maximum distance people are prepared to travel to purchase a good or manufacturing industry Highest order settlements OLower order service. Source: https://s-cool.co.uk/a-level/geography/urban-profiles/revise-it/models-from-burgess-and-hoyt) Figure: Transport Optimising his model. 210. The urban land use model based on the concept of a polycentric city is known as CBD (Centri (B) Harris and Ullman model A) Burgess Model - Zone of Trail (D) Homer Hoyt's model Residential Concept and need for Multiple Nuclei Model (lower class This model is based on the structure of Chicago just like the Burgess model or Residential Concentric zone model of 1925. (middle class It can be considered as an attempt to explain the structure of city taking into account OD Residential he complexity and growth over time. (upper class Harris and Ullman argued that a city might start with a single central business district CBD) but over the time the activities scatter and gets modified. - Industry The scattered activities attract people from surrounding areas and acts as smaller Figure: Administration Optimising uclei in itself. These small nuclei gain importance and grow in size and starts influencing the growth of activities around them.

The need for this model was to provide a more realistic explanation of the cities. The influence of cars on personal travel and reater movement of goods provided opportunity in different places instead of concentrating all economic activities in one place. People started optimizing their business for maximum profit by locating at different place and bringing down their rent with a light increase in transportation cost.





Linear regression

130

Rainfall (mm)

Figure: Example of linear regression. It is finding of the formula

of the line (here in red) that would reparent the best relationship

between the variables. The regression line will demonstrate the

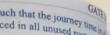
relationship between the independent variable (rainfall) and

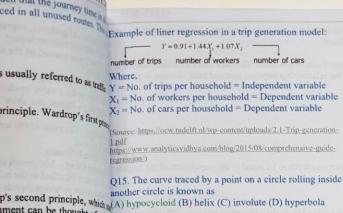
Figure: Helix, Involute and Hyperbola respectively

dependent variable (umbrella sales)

30

20





ment can be thought of as an ot a behaviorally realistic mod travel costs and therefore ach

le, minimum cost, path betwee s another path with the same ot there is adequate capacity

a link. However, this mode Source: https://mathimages.swarthmore.edu/index.php/Involute) y have a large difference in the

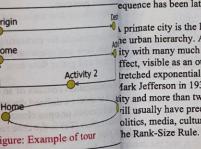
Hypocycloid

r other types of assignment to A) Samuel A. Stouffer (B) Colin Clark when there is congestion or that C) Mark Jefferson

e to travel in the absence of m216. The law of Primate City was first proposed by (D) Harold Hotelling

The idea of primacy was first introduced by Mark Jefferson

n 1939. His proposition was that nationalism crystallizes in primate cities which are super eminent eps. In each step, a fixed proph both size and national influence. He assessed the degree of primacy by computing the ratio of the I times are recalculated base ize of the second and third ranking cities to that of the largest one. He found that in the forty-six gnment; however, this metal ountries of the world the largest cities were two or three times as large as the next largest city. The umes and travel times that a kind largest is one fight the interface of the sequence 100:30:20 (i.e. the tumes and travel times that a hird largest is one-fifth the six of the largest). According to him there are various reasons for a city ich volumes for O-D pairs are o exceed its neighbors in size, but once it did so the process became cumulative giving it an



nTse/web/web.html)

mpetus to grow and draw away from all other cities in character as well as size. The particular ratio equence has been later ignored, though the concept of the primate city and primacy is widely used.

primate city is the largest city in its country or region, disproportionately larger than any others in the urban hierarchy. A primate city distribution is a rank-size distribution that has one very large ity with many much smaller cities and towns, and no intermediate-sized urban centers: a King ffect, visible as an outlier on an otherwise linear graph, when the rest of the data fit a power law or tretched exponential function. The law of the primate city was first proposed by the geographer fark Jefferson in 1939. He defines a primate city as being "at least twice as large as the next largest ity and more than twice as significant." Aside from size and economic influence, a primate city vill usually have precedence in all other aspects of its country's society, such as being a center of olitics, media, culture and education and receive most internal migration.



as being at least twice as large to the next largest city, and more than twice as significant." ~ Mark Jefferson



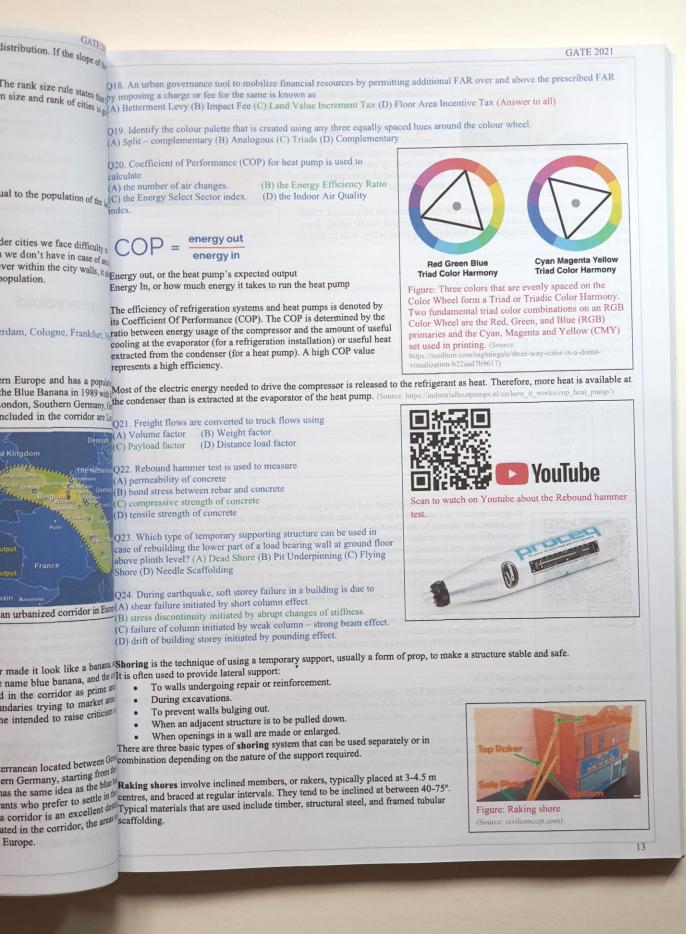
cept of trip

xamples of Countries with Primate Cities Paris (9.6 million) is definitely the focus of France while Marseilles has a population of 1.3 million.

Similarly, the United Kingdom has London as its primate city (7 million) while the second-largest city, Birmingham, is home to mere one million people.

Mexico City, Mexico (8.6 million) outshines Guadalajara (1.6 million). A huge dichotomy exists between Bangkok (7.5 million) and Thailand's second city, Nonthaburi (481,000).

he rank-size rule says that 'when ranks of cities, arranged in descending order, are plotted against their populations (rank 1 being ven to the largest, and so on) in a doubly logarithmic graph, a rank-size distribution results' (Das and Dutt 1993: 125), or to put it much simpler words: 'In an ordered set of cities representing a given country, the product of the rank and size of a city is instant' (Dziewonski 1972: 73). The rank-size rule is also commonly referred to as Zipf's Law because the model describing a unstant relation between the size of an event and its rank was at first developed by G. Zipf. In the case of cities distribution by opulation, when the natural logarithms of the rank and of the city size (in terms of the number of people) are calculated and



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Source type: Descent hype://www.de.com/en/Malk-self-eper-and-shuld-self-eper-and-self-e	and the second	global	warming, and the ef	fects of climate change on land, oceans and icy places.		
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S Group II



Jehry



Figure: Centre Georges Pompidou, Paris, 1971-77, Photo credit: Charles Leonard/Shutterstock.

hitney Museum of American Art, New York (2015) tt between the Hudson River and New York's High Line, ano's Whitney Museum of American Art was designed to bring e gallery, which had been scattered in various buildings after atgrowing its Marcel Breuer-designed Madison Avenue home, atk together on one site.

alifornia Academy of Sciences, San Francisco (2008) (5) Norma Then it was completed more than a decade ago, Piano's alifornia Academy of Sciences, signalled a significant velopment in sustainable architecture. Designed to be the eenest museum in the world, the building received LEED atinum (the highest green standard in the US) and featured any elements which contributed to its eco-credentials.

> 1e 37,000m2 project, which includes exhibition space, research aces, an aquarium and a planetarium, is designed as if a piece park has been lifted up out of the ground. Its living roof

Figure: Whitney Museum of American Art, New York,

e 2015, Photography: Nic Lehoux4. The Menil Collection, Houston (1987)

dulates into a series of domes marking out the various spaces beneath, and contributing to the natural movement of air through e building.

London by Renzo Pi

ch make up the build

om 680 other archites s contentious at its ope the designs had originaere cut and fire regular d be flexible with cregallery space alonguprant public space. For nark.

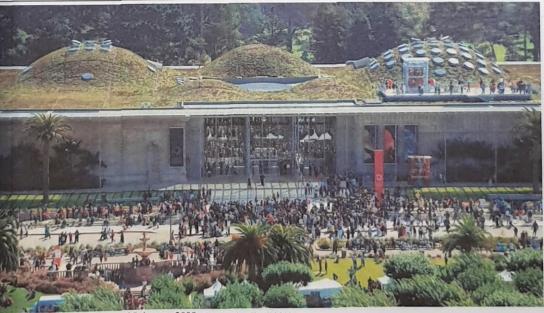


Figure: California Academy of Sciences, 2008. Photography: Shunji Ishida.



The Burra Charter is a nati Australia. The Charter is par cultural significance to mana the values and needs of a part

2006), Denver, USA by Daniel Libeskind

Figure: Jewish Museum, Berlin (2001) by Daniel Libeskind

ples in Group I with their style of Architecture in Group II O32 Mate

temples in Group i with and	C	Options
Group I P. Badami Cave Temples Q. Kalugumalai Temple Complex R. Airavatesvara Temple S. Chennakeshava Temple	Group II 1. Pandya style 2. Chola style 3. Chalukya style 4. Vijayanagara style 5. Hoysala style	(A) P-3, Q-1, R-2, S-5 (B) P-3, Q-4, R-2, S-1 (C) P-2, Q-1, R-3, S-5 (D) P-5, Q-1, R-4, S-2

greatest and most enduring dynasties in Southern India – the Chalukyas. There were three branches of the Chalukyas, the fine of building in the being the 'Badami Chalukyas', who reigned from here from 543 – 753 CE.

The valley of the Mallaprabha (ehere Badami lies) and the Ghataprabha (both tributaries of the Krishna river) formed the very Ine values of the Mallaprabha (enere Badami nes) and the Ghadaprabha (containing ravine that cuts through the heart of the farmed based economy of this early empire. Nestled in an imposing ravine that cuts through the heart of the heart of the farmed based economy of this early empire. Nestled in an imposing ravine that cuts through the heart of the heart of the farmed based economy of this early empire. Nestled in an imposing ravine that cuts through the heart of the heart of the farmed based economy of this early empire. Nestled in an imposing ravine that cuts through the heart of the heart of the farmed based economy of this early empire. Nestled in an imposing ravine that cuts through the heart of the heart of the heart of the farmed based economy of this early empire. Nestled in an imposing ravine that cuts through the heart of the h sandstone landscape by the Mallaprabha, the site is graced by some beautiful rock-cut temples that are remnants of a bygone land outsid

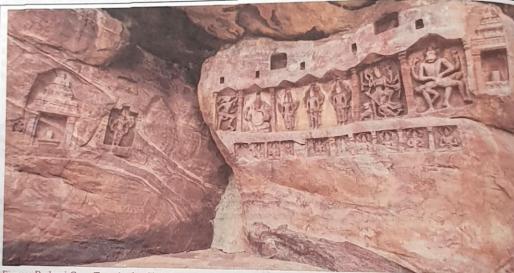
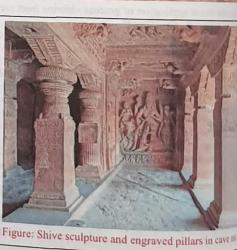


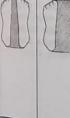
Figure: Badami Cave Temples by Chalukya empire



Figure: Old Kannada inscription of Chalukya King Mangalesha dated 578 CE at Badami Cave 3



R Group



Q36. Match the buildings i

Group I
P. Empire State
Q. John Hanco
allaipei 101
S. Sears Tower

Q33. Match the urban form/structure in Group I with their respective proponents in G

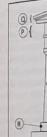
P. Trabantenstadte	Group II	0
Q. Linear city	1. Arturo Soria Y Mata	Options
R. Bloomsbury Precinct	2. Le Corbusier	(A) P-4, Q-1, R-5, S-3
S. Radiant city	3. Ernst May	(B) P-5, Q-1, R-4, S-2
	4 Front Li	(C) P 2, Q-1, K-4, S-2
	4. Frank Lloyd Wright	(C) P-3, Q-1, R-5, S-2
	5. Patrick Abercrombie	(D) P-3, Q-4, R-1, S-2

ururu Soria y Mata: Ti ba was promoted by the auprises and schools it and presence was in an artic aratical measure for the f and of the strip would be sup he main actor would sulding exclusively for m that the cities should add but this perpetuate the con

May combined uncompror

May's "brigade" of Ger successfully applied urban wentieth century". (Source:

Q14. Match the elements in



Q35. Match the position of

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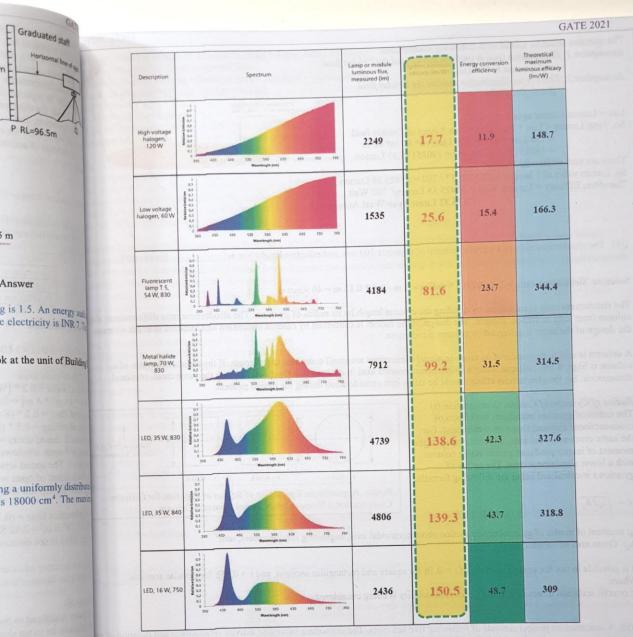


Figure: The table shows observed and the theoretical maximum luminous efficacy of different spectra.

483 10 1496

that could fit in the offici

are Law', the illumination on the table we can see that the typical spectrum of a warm white LED achieves a theoretical module luminous efficacy of each lamp is 700 Watt prox. 320 lm/W. However, since the assumption is that there is loss-free conversion of physical radiated power into the velengths of the spectrum, then the actual realisable module luminous efficacy is much smaller. In future it may be possible to hieve system luminous efficacy in the range of 200–250 lm/ W.

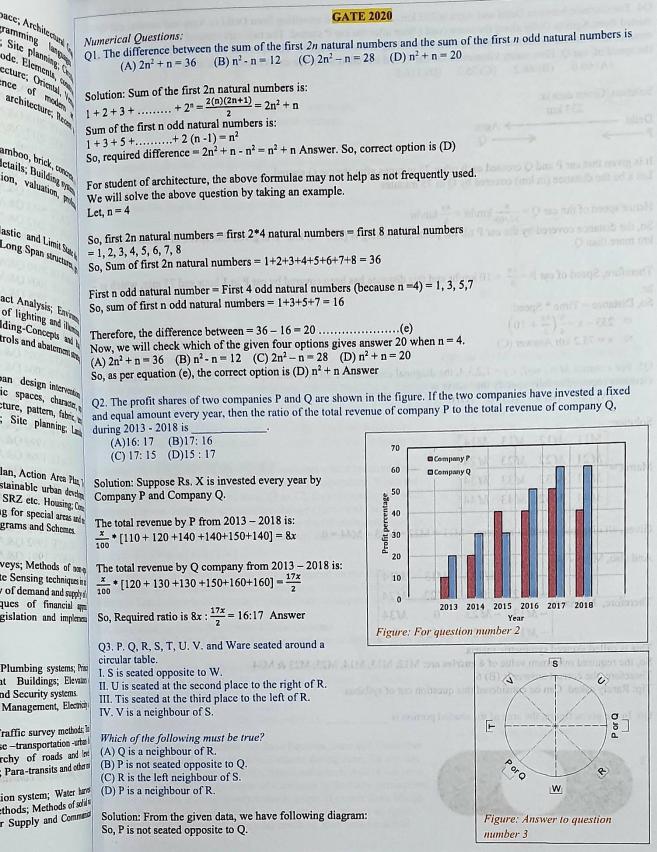
addition, the overview shows energy conversion efficiency of the lamps examined. The energy aversion efficiency describes how much of the power is converted into visible light. In this practice this value candiplect efficient LEDs are clearly well ahead of conventional lamps. While energy conversion practice this value of the field of the least of the leas sent achieve values between 40% and 50%. Nevertheless, this is still only 40 - 50%, so 50% to % of the power is lost as heat.

urce: https://www.dial.de/en/blog/article/efficiency-of-leds-the-highest-luminous-efficacy-of-a-white-led/



efficacy of lamps.

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odc. Elements, con ccture; Oriental, Ve nce of moden

amboo, brick, conce Ictails; Building synt

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act Analysis; Environ of lighting and illuma Iding-Concepts and by

oan design intervention ic spaces, character, o cture, pattern, fabric, e ; Site planning; Land

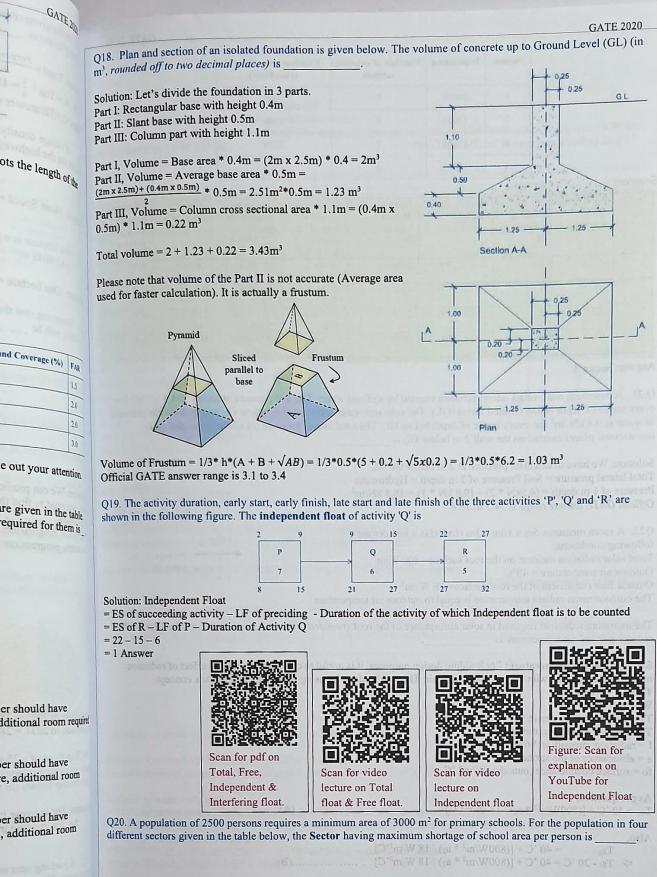
lan, Action Area Plan stainable urban develop SRZ etc. Housing; Con g for special areas and a grams and Schemes.

veys; Methods of non-p te Sensing techniques in of demand and supplyd ques of financial appr gislation and implement

Plumbing systems; Print nt Buildings; Elevator nd Security systems. Management, Electricity

raffic survey methods, In se -transportation -unbai rchy of roads and let Para-transits and other

ion system; Water hans thods; Methods of solid a r Supply and Communication gra and another of ed each other 75 **GATE 2020** vas 10 km/hr more Solution: 2 1' 2 3' 4' 4 3 Here, Area of region 1 = Area of void region 1' and so on. Therefore, area of the shaded portion = 8 units Answer. Q7. A 1.2 m high window is located on a south facing wall. The solar azimuth angle is equal to the wall azimuth angle and the solar altitude angle is 60°. The minimum depth (in metres, rounded off to two decimal places) of overhang required to completely shade the window is (Assume that the overhang is located at the lintel level of the window) eed of the car P is it Lintel Solution: b and 75 min, which Sill а Tan 30° = Official GATE answer range: 0.68 to 0.70 minimum number of b = 0.69 Answer Q8. For the same thickness of material layers, relative position of insulation in the wall sections I and 2 shown below will have an impact on Wall Section 2 Wall Section 1 (A) Thermal Time Constant (B) Thermal Resistivity (C) Thermal Transmittance (D) Thermal Conductivity Solution: The Thermal Time Constant indicates a time required for a thermistor to respond to a change in its ambient temperature. When the OUT ambient temperature is changed from T1 to T2, the relationship between IN IN the time elapsed during the temperature change t (sec.) and the thermistor temperature T can be expressed by the following equation. [τ (tau in sec.) in the equation denotes the thermal time constant.] $T = (T_2 - T_1) (1 - \exp(-t/\tau)) + T_1$ Please note that the above equation does not depend on the thickness of T2 T2 the material. But when we look at the formula of Thermal Resistivity, Thermal Transmittance & Thermal Conductivity, all depend on the thickness of the material. So, the correct option is (A) Thermal Time Constant. (Please also note that T1 & T2 in the question figure is different from the T1 & T2 in the answer equation.) Q9. The solar altitude angle on April 16 at 7:00 AM in Kochi is 16°. The same solar altitude angle will occur at the same time in the same year at the same location on (B) July 21 (A) October 21 (D) September 23 (C) August 27 Augus Solution: March and September, we have Equinox. June and December we have summer and winter solstice. It means during June, the sun has March direct rays on tropic of cancer in Northern hemisphere. And in the same way during Dec it will be on tropic of Capricorn in Southern hemisphere. Decen So if the sun starts moving slowly towards tropic of cancer from March to June. It will go via Kochi (which is northern hemisphere) on April (one month after equinox) so then after reaching June Solstice it will 3



11

8 m. It is subjected to a ess (in N/mm², rounded)

 (\mathbf{R})

i), I = moment of inertia $2N/mm^2$

same units, rounded off

yramid is BC. Consider the onsider the triangle ABC

ATE answer range is 7.0 w

ve been affected. Officialsh i (winter sown) crops so the ar 2019-20 (July-June). The eriod, helping winter sowne

produce. ns.

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vorld champion in boxing. residence) in New Delhi.

Q31. Repo rate is the rate at which Reserve Bank of India (RBI) lends commercial banks, and reverse repo rate is the rate at which RBI borrows money from commercial banks.

Which of the following statements can be inferred from the above passage? (A) Increase in repo rate will decrease cost of borrowing and decrease lending by commercial banks. (B) Decrease in repo rate will decrease cost of borrowing and increase lending by commercial banks. (C) Decrease in repo rate will increase cost of borrowing and decrease lending by commercial banks. (D)Increase in repo rate will decrease cost of borrowing and increase lending by commercial banks.

Q32. Shyam-Rai temple of Bishnupur in West Bengal, is an example of

- (A) Pancha-ratna type terracotta temple
- (B) Stone carved Dravidian type temple (D) Stone carved Nagara type temple

(A) Pancha-tatility by terracotta temple (C) Nava-ratina type terracotta temple (C) Nava-ratina type terracotta temple (D) Stole carved regime is massive in terms of its scale (D) Stole carved regime is massive in terms of its scale (Notes: Made of bricks, with square-shaped towers at the corners, the Shyam Rai Temple is massive in terms of its scale (Notes: Made of bricks, with square-shaped towers at the corners, the Shyam Rai Temple is massive in terms of its scale (Notes: Made of bricks, with square-shaped towers at the corners, the Shyam Rai Temple is massive in terms of its scale (Notes: Made of bricks, with square-shaped towers at the corners, the Shyam Rai Temple is massive in terms of its scale (D) Stole carved regime is massive in terms of Vishnu in his form as Lord Krishna. It is built in the Panchratna Architectural style (in which five pillars stand on the noof) and is probably the state's oldest temple reflecting this design. One can also catch a few glimpses of the Gandhar style (Buddhist art) on the walls. The artists have displayed remarkable skill and craftsmanship in intricately engraving designs on the baked bricks to make the temple. The four sides of the temple are followed by arched gateways leading to the sanctum. The temple has figurines and floral motifs, which were the first of its kind in the state. The inner and outer walls, along with the ceiling, are adorned with terracotta sculptures depicting Krishna leela and episodes from reat Indian epics like Ramayana and Mahabharata, Answer (A)

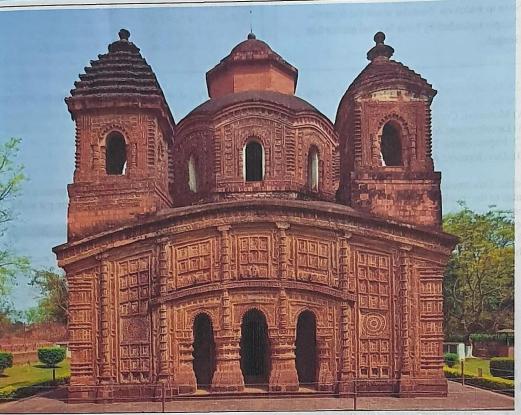
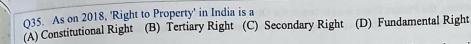


Figure: Shyam Rai Temple, Bishnupur, West Bengal. It is built in the Panchratna Architectural style (in which five pillars stand on the roof). Four pillar stands an four corners and one at the centre. The word Panchratna means Panch = five & Ratna = Gems.



Notes: The right to property is not a Fundamental Right but it is a constitutional right. In the original Constitution the right to property was listed as a fundamental right. By the 44th Amendment to the Constitution, the right to property was removed as a fundamental right and instead, a new provision was added to the Constitution i.e. Article 300-A making it a constitutional right.

The 'Right to Property' was initially the Fundamental Right but it caused many issues and then converted into Constitutional Right. Why was this done so? An insightful answer by Prateek Singotiya on Quora.com is given below:

Right to property as a fundamental right was guaranteed by Article 19(1)(f) and 31. Article 19(1)(f) gave every citizen a right to acquire, hold and dispose her property. Whereas article 31 ensured that any person (citizen + foreigners) cannot be deprived of her property except by authority of law. It also mentioned that state can acquire property only for public purposes and in return of which compensation had to be paid.

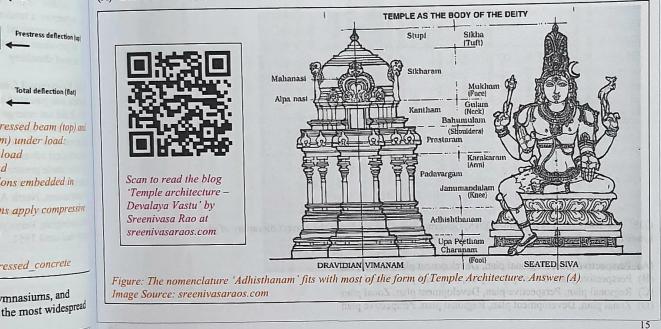
But India's economic structure was still dominated by zamindar, big landlords etc. Freedom fighters were committed to land reforms to bring justice to poor people. It was perhaps a necessary action to lift people from poverty. So govt started bringing legislations, such as land ceiling act (a person cannot own land above a certain limit, excess land will become a govt property, which would be distributed among poor people), zamindari abolition, tenancy regulation etc.

But this act of govt was challenged in the court as it violated fundamental right to property of some sections of people. The supreme Court being the guarantor of fundamental right generally ruled in favor of property holders. This had created a paradoxical situation, a new question emerged, should the directive principles of state policy prevail over fundamental rights or not? Should the welfare prevail over fundamental rights? Under directive principles, it is the moral duty of the govt to take action for welfare of people.

The confrontation between parliament and judiciary started, and it became more aggressive later. To nullify Court's order, parliament had to enact multiple constitutional amendment acts- 1st, 4th, 25th, 39th, 40th, 42nd etc. It finally paved a way forward for land reforms. But still, there was possibility of many challenges in future, as the root cause of the issue was still not addressed. Parliament has just cured from symptoms but not the disease. Therefore, in 1978, it abolished right to property as a fundamental right and removed article 19(1)(f) and 31 out of part III of constitution.

Right to property was now no more a fundamental right but it was made a legal right well within the constitution itself, by inserting article 300A in part XII. Now if this right is violated, the aggrieved person cannot approach to supreme Court directly, but he can move to high courts. This right can now be regulated, abridged even by an ordinary law. Answer (A)

O36. In the architectural style of ancient North Indian Temples, the term 'Adhisthana' refers to (A) Base Platform (B) Vestibule (C) Pinnacle (D) Transept



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Unstressed beam

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Figure: Plan of Shyam Rai Temple, Bishnupur. This brick-built Temple is Figure: Plan of Shyam Kai Temple, or a square roof surmounted by five towers and is a within the fort and consists of a square roof surmounted by five towers and is a within the fort and consists of a sine central tower itself is octagonal enclosed an example of Panchratna type. The central tower itself is octagonal enclosed an example of Fanchianni spectra is the most profusely carved temple in a octagonal corritor, the temperation by Raghunatha Singha in 1643 AD Source; asikolkata.in/bankura.aspx





Scan to watch on Youtube about the Syamrai Temple uploaded by Mon Ja Chai narrated in Bengali.

Scan to read the blog 'Bishnupur: A Land of Terracotta Temple' by Aveeta Biswas Paul at sahapedia.org

Q33. In India, the Constitution (Seventy Fourth Amendment) Act, 1992, delegates powers to institutions formingh third tier of government, which are:

- (A) Municipal Corporation, Municipality and Nagar Panchayat
- (B) Development Authority, Improvement Trust and Panchayat
- (C) Improvement Trust, Nagar Panchayat and Panchayat
- (D) Development Authority, Municipal Corporation and Municipality

Notes: This amendment, also known as Nagarpalika Act, came into force on 1st June 1993. It has given constituted status to the municipalities and brought them under the justifiable part of the constitution. States were put under constitutional obligation to adopt municipalities as per system enshrined in the constitution. Definition of Metropolitan area: Metropolitan area in the country is an area where population is above 10 Lak

Three Kinds of Municipalities: Article 243Q provides for establishment of 3 kinds of Municipalities of every suit

- Nagar Panchayat: A Nagar Panchayat is for those areas which are transitional areas i.e. transiting from he Area to Urban areas. "Governor" will by public notice, will define these three areas based upon the population, density of population, revenue generated for local administration, % of employment in Nonagricultural activities and other factors. Further, a Governor may also if, he fits it necessary, based upal industrial establishments, can specify the Industrial Townships by public notice.
- Municipal Council: A Municipal council is for smaller urban area
- Municipal Corporation: A municipal Corporation for Larger urban Areas

Background of the Constitution (Seventy - Fourth Amendment) Act, 1992

- The Constitution of India has assigned the subjects pertaining to the urban areas to the State Legislates. In so full urban issues are concerned, the legislative newers of the Urban areas to the State Legislates. In so full
- urban issues are concerned, the legislative powers of the Union are limited only to the following subject/areas
 - Property of the Union

A subject of the state list which two or more state legislatures authorise Union Parliament to legislate Constitution (Seventy-Fourth Amendment) Act 1992 is a revolutionary piece of legislation by which Constitution India was amended to incorporate a separate Chapter on where the interval is a separate chapter on where the interval is the interval in the interval is the interval in the interval is the interval interval in the interval interval is the interval inte

India was amended to incorporate a separate Chapter on urban local bodies, which seeks to redefine their role, per

Urban local bodies, to be known as Municipal Corporations, Municipal Councils and Nagar Panchayal depending on the population, shall be constituted the depending on the population, shall be constituted through universal adult franchise in each notified universal

GATE

be completed before the expiratio Not less than one-third of total nu The Legislature of a State may by enable them to function as institut The Twelfth Schedule of the Con Urban Planning including

- Regulation of land-use at Planning for economic an
- Roads and bridges. Water supply for domesti
- Public health, sanitation,
- Fire services.
- Urban forestry, protection
- 9. Safeguarding the interests
 - - retarded.
- 10. Slum improvement and u 11. Urban poverty alleviation
- 12. Provision of Urban ameni
 - 13. Promotion of cultural, edu
 - 14. Burials and burial ground
 - 15. Cattle pounds; prevention
 - 16. Vital statistics including
 - 17. Public amenities includin
 - 18. Regulation of slaughter h
- . In order that the urban local bodie assign them specific taxes, duties same.
- Each State shall also constitute a local bodies and recommend the in-aid from the Consolidated Fun
- · The superintendence, direction an elections to the urban local bodie
- In each district a District Plannin and rural local bodies.
- Similarly for each metropolitan a development plan for the metrop

034. 'Tendon' is primarily used

- (A) to prepare a tender document
- (B) as a compression member
- (C) to pre-stress concrete (D) as roof sheathing

Neer Prestressed Concrete: Although gaarete was patented by a San Francisc 186, it did not emerge as an accepted b baging unit a half-century later. The s a Europe after World War II coupled w abological advancements in high-str ed see made prestressed concrete the and of choice during European pos manuruction, North America's first p acree structure, the Walnut Lane M a Phladelphia, Pennsylvania, howeve

GATE 2020

outside and mud plass opping of grass and h cooling and imgating

the inside, the natural v





Figure: The Tribal Life Gallery shows the importance of everyday things like having a tree in the courtyard and cattle inside the premises. – © Michael Turtle



Figure: Shrines for the goddess Shitala, one of the main deities of the Bastar region, who protects villages from diseases and other troubles. – © Michael Turtle

of Museum of Tribal Hay

Cholamandal Artists' Village, Chennai Cholamandal Artists' Village, established in 1966, is the largest artists' commune in India,



at the museum shows the excellent ambiance on the shores of Bengal sea.



children's games was made nmunities to take photos ada hael Turtle

whose artists are credited for the Madras Movement of Art, which brought modernism to art in the South India. It has earned reputation world over and is now, one of the major tourist attractions in the Coastal city. The initial design was made by a visiting Dutch couple, the design for the art centre was made by architects Sheila Sri Prakash of Shilpa Architects and M. V Devan. The original Artists Handicrafts Association is still in charge of the colony, and Paniker's son, sculptor S. Nandagopal, is the secretary of the village. Out of the original 40 artists, many are no more, and some have moved out, only 21 remain today. This co-operative artists colony started as a joint effort of more than 30 painters and sculptors. The creative work is is happening there in an ongoing basis and all the paintings by different artists ranging from classical to modern art are displayed for viewing and for sale also. This is the first of its kind in the world where a colony of artists are formed in an



Scan this to go to learn about architect Sheila Sri Prakash

Q51. Match the plant forms in Group I with the botanical names in Group II. as per 'A Handbook of Landscape', CPWD 2013, Government of India

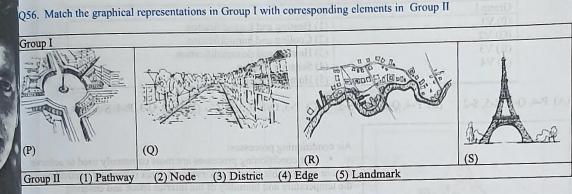
Group I	Group II
(P) Columnar	(1) Pinus roxburghii
(Q) Globular	(2) lpomoea grandiflora
(R) Weeping (S) Pyramidal	(3) Juniperus chinensis
	(4) Salix babylonica
	(5) Mimusops elengi

(A) P-3. Q-4, R-2, S-1 (B) P-1, Q-3, R-4, S-5 (C) P-3, Q-5, R-4, S-1 (D) P-1, Q-5, R-2, S-3

Juniperus chinensis, commonly called Chinese juniper, is a dioecious evergreen conifer that is native to China, Japan, Mongolia and the Himalayas. It is often seen in the wild as a conical tree to 50' tall and 20' wide, but also appears in much shorter shrubby or spreading forms. Foliage is dark green. Brown bark on mature stems peels in strips. Although species plants are rarely sold in commerce, a large number of cultivated varieties ranging in size from large trees to large/small shrubs to low-growing groundcovers have become popular ornamental landscape plants. Chinese juniper leaves come in two types: scale-like (adult) and awl/needle-like (juvenile). Cones (pollen and seed-bearing) appear on different plants. Male plants produce catkin-like pollen cones. Female plants produce fleshy, berry-like, whitish-blue seed cones that usually acquire violet-brown tones as they mature over two years.

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(C) P-2, Q-3, R-4, S-5 (D) P-2, Q-1, R-4, S-5 re: Gerrit Thomas Rietvells (A) P-1, Q-2, R-3, S-5 (B) P-4, Q-1, R-3, S-2



source: Wikipedia

go to rietveldschroderhuise walk.

The City Image and Its Elements - Kevin Lynch

Kevin Lynch was an American urban planner and author. His ideas about city and its perception can be seen in his work 'The Image of the City.' Which I will try to summarize in this post.

According to Lynch, the city is about the way the people perceive it. He called it as imageability. Some elements in the city gives people more than only information. In the book those elements called as paths, edges, districts, nodes and landmark. First element that is mentioned is paths. Paths are the channels that helps observer to move along to city. They can be streets, canals, railroads or so on. Paths are linear and continuous channels. They are important since the way we observe city depends on the ways we

to learn more about Schride Second element is edges. He basically defined edges as a boundary of two phases. They are linear elements that in between city and sea for example. Opposite from the paths, the edges broke the continuity of a is slatted chair, in unstand phases and from the edges there is another phase that began.

is was the beginning of Riget Third one is districts. It is like the sections of the city. The observer can go inside of the districts. Districts can be defined with different

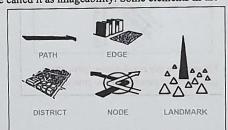
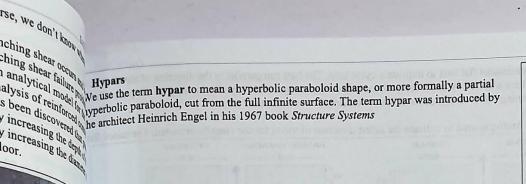


Figure: This famous depiction is called imageability. A city is known by this 5 elements as per Kevin Lynch

35

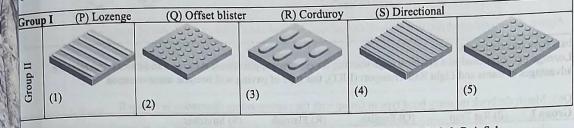






Scan this to go to illinois.edu and learn about the 3D visualization of the Hypars)

260. Match the names of tactile paving in Group I with their patterns in Group II



(D) P-3, Q-2, R-4, S-1 (C) P-2, Q-5, R-1, S-4 (A) P-4, Q-2, R-3, S-1 (B) P-3, Q-5, R-4, S-1

Blister

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Figure: There is slight difference in the layout of

blisters that makes Blister and Offset Blister

+ 67 e

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12

+ 67+

paving distinct.

The key element with tactile paving is that different surface profiles are intended to denote different hazards, and these



ow, the steel rebaristen There are two types of Blister paving: the most common type features 6mm high 'blisters' in a square pattern and these re sudden.

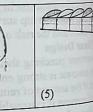
Offset Blister

are used to indicate pedestrian crossings with dropped kerbs. Normally, the red-coloured units are used with light-controlled crossings, and buff for those crossings with no traffic lights. However, when natural stone units are used, this colour-coding is disregarded.

The Offset Blister units are used to indicate the edge of the platform at Rail and Tram stations, also referred to as off-street applications. Note that the orientation of the offset blister units is critical - the rows of blisters MUST be parallel to the platform edge, and they are generally placed approximately 500mm back from the edge.

Hazard Warning units use continuous half-rods, raised 6mm higher than the surface of the paving, to denote a hazard, such as the top/bottom of a flight of steps. Again, the rods should be parallel to the edge of the hazard.

oup II d



André Le Nôtre is known for the finesse of his formal flowerbed compositions and for optical illusions without we of large, sweeping perspectives allows for **impressive panoramas**. In reality, however, it's nearly mpossible to see the Versailles domaine all at once, a fact which bears witness to the talent of Le Nôtre. Indeed, thanks o a series of flat parterres the gardens unveil themselves with every step. As a result, as the visitor advances so does **he landscape reveal itself slowly but surely**, much like the succession of theatre scenes that end up creating a complete story.



Figure: Jardins de Vaux le Vicomte, created by Le Nôtre. The embroidery parterre, or a formal flowerbed garden, is a theme specific to French gardening that harks back to a veritable tradition. This type of garden is geometric in nature and traces symmetric, **arabesque lawns** in front of buildings. There's no such thing as a French-style garden without an embroidery parterre! Those that currently exist at Versailles are reconstructed ones that date from the 1920s and are therefore not entirely faithful to the originals. Old etchings show that rather than lawns bordered by a hedge of small bushes, as is the case today, parterres were the outlines of lawns traced directly onto gravel.



Scan to watch on Youtube to learn more about The Gardens of Versailles.

most famous and influent on every side from a term terrace is the Latona For ain depicts the events of the Figure Stepped larout of the Arts at Bagh, vision Bagh is a terraced Wrighed gaveen 5. Dot Lake, close to Sciangen in the UT of Jaronne and Kashonic, finding the he seewed for Kashonti Fattes. The largest in site is the Scalinger Bage, which is also for alled on the in **nulative** and retained to geodesic dome consists of a network of triangles that are joined together to create a roughly spherical surface. If a retained to geodesic dome approximates a true sphere. Furthermore, different geodesic tortly large number of triangles are used, the geodesic dome approximates a true sphere. Furthermore, different interview of the second ufficiently large number of triangles are used, the geodesic dome approximates a true sphere. Furthermore, different include a sphere a sphere is the geodesic dome to be divided symmetrically by 31 different great circles. A great circle is the argest circle that can be drawn around a sphere. On Earth, for example, the equator represents the only latitude line hat is a great circle. On the other hand, all longitude lines are great circles. Because of these properties of symmetry, eodesic domes get their name from the Latin word geodesic, meaning "Earth-dividing".

the benefits of a geodesic dome structure can be realized by examining the properties of a sphere. For example, a phere represents a shape that has the highest volume to surface area ratio. This means that material costs can be nimized without sacrificing interior space. Furthermore, a half-sphere (the shape used for most residential domes) llows for a maximum amount of floor space for a given surface area. Compared with a traditional 1500 square foot iows a 1500 square foot geodesic structure (with a 23-foot high ceiling) uses almost 20% less building materials. since they have less surface area, geodesic domes are able to reduce heating costs by as much as 50% when compared vith traditional buildings. Because the spherical shape also tends to absorb the most external light, additional energy avings can be realized by reducing the need for artificial lighting.



was designed as an do ildings. The geodesic to latively unnoticed in It turing techniques have



and distributors. Then, Figure: Expo 67 in Montreal, Quebec, Canada. The museum's geodesic dome was designed by Buckminster Fuller. Photo credit - aquigabo!

https://www.flickr.com/photos/138047837@N02/24356393675/sizes/l

Geodesic domes are extremely stable structures. This is partly due to the fact the triangles, which are naturally stable polygons, are used throughout. This is one of the reasons



Figure: The sphere would remain open to the public for nine years until an accident involving some routine welding maintenance caused the acrylic covering to catch fire, engulfing the entire sphere in a spectacular ball of fire with flames that burned for 30 minutes. When the flames subsided, there was no sign of the acrylic walls to be seen, but the steel trusses of the dome remained. After the fire, the dome was closed to the public for over fifteen years. (Photo credit - collectionscanada)

triangles are so popular in homes, buildings, and bridges. In a geodesic dome, these triangles eliminate the need to include load-bearing walls without sacrificing stability. In addition, its curved surface offers a natural layer of protection from high winds and other environmental stresses. Geodesic domes have been used in such places as Antarctica where wind speeds can reach 200 miles per hour. Bucky Fuller built many domes using geodesic principles, including a 250-foot diameter dome for the 1967 World's Fair in Montreal, Canada. Answer (C)

Q.39 The abrupt change or junction between two ecological zones is termed as (C) Ecotype (D) Ecotone (C) and (C) an (A) Ecological niche (B) Ecosystem

Notes: An ecotone acts as the boundary or barrier between two biomes. It is the area where two distinct types of environments merge and blend.

Ecotones could be the border where forestland and grassland meet or the boundary where wetlands meet prairie. Many things form a sharp boundary such as natural formations. The area where the land meets water such as where the mangrove fields meet the ocean is also considered an ecotone. The estuary between freshwater and saltwater is also a natural ecotone.

An ecotone can be a narrow or wide area of the ecostyem. It is considered a zone of tension.

The word 'ecotone' was derived from the word ecology and the Greek word tonos, which means tension. The ecotone often shares many of the animal and plant species that both areas contain but it is also unique because it is the blending of two distinct areas.

Plants and trees tend to live along an ecotone and stretch as far into the other area as possible but because of the transition the plants or trees cannot survive past the ecotone.

The Make in India' program is an initiative launched to encourage The Mark to increase manufacturing in India. Prime Minister Narendra Modi launched the Make in India initiative on September 25, 2014, with Modi launched of making India a global manufacturing hub. This not only the primary goal of making companies to set up show in the tracting overseas companies to set up show in the tracting to set up show in the set of t the primary overseas companies to set up shop in India, but also includes and domestic companies to increase production within the country. Make in India' aims at increasing the GDP and tax revenues in the country, Make in and products that meet high quality standards, and minimising the by producing products that meet high quality standards, and minimising the impact on the environment.



rostering innovation, protecting intellectual property, and enhancing skill development are the other aims of the program according to the 'Make in India' website.

Policies under 'Make in India' initiative:

There are 4 major policies under the 'Make in India' program:

I New Initiatives: This initiative is to improve the ease of doing business in India, which includes increasing the speed with which protocols are met with, and increasing transparency.

- Here's what the government has already rolled out
- Environment clearances can be sought online.
 - All income tax returns can be filed online.
 - Validity of industrial licence is extended to three years.
 - Paper registers are replaced by electronic registers by businessmen.
 - Approval of the head of the department is necessary to undertake an inspection.

Foreign Direct Investment (FDI):

The government has allowed 100% FDI in all the sectors except Space(74%), Defence (49%) and News Media (26%). FDI restrictions in tea plantation has been removed, while the FDI limit in defence sector has been raised from the earlier 26% to 49% currently.

Intellectual Property Facts:

The government has decided to improve and protect the intellectual property rights of innovators and creators by upgrading infrastructure, and using state-of-the-art technology.

The main aim of intellectual property rights (IPR) is to establish a vibrant intellectual property regime in the country, according to the website.

These are the various types of IPR:

- Patent: A patent is granted to a new product in the industry.
 - Design: It refers to the shape, configuration, pattern, colour of the article. •
 - Trade mark: A design, label, heading, sign, word, letter, number, emblem, picture, which is a representation of . the goods or service.
 - Geographical Indications: According to the website, it is the indication that identifies the region or the country where the goods are manufactured.
 - Copyright: A right given to creators of literary, dramatic, musical and artistic works. .
 - Plant variety Protection: Protection granted for plant varieties, the rights of farmers and plant breeders and to encourage the development of new varieties of plants.
 - Semiconductor Integrated Circuits Layout-Design: The aim of the Semiconductor Integrated Circuits Layout-Design Act 2000 is to provide protection of Intellectual Property Right (IPR) in the area of Semiconductor.

National manufacturing:

Here the vision is,

- to increase manufacturing sector growth to 12-14% per annum over the medium term. .
 - to increase the share of manufacturing in the country's Gross Domestic Product from 16% to 25% by 2022. to create 100 million additional jobs by 2022 in manufacturing sector.
 - to create appropriate skill sets among rural migrants and the urban poor for inclusive growth.
 - to increase the domestic value addition and technological depth in manufacturing.
 - to enhance the global competitiveness of the Indian manufacturing sector.
 - to ensure sustainability of growth, particularly with regard to environment.

25 major 'Make in India' focus areas:

- 1. Automobiles
- 2. Automobile Components
- and coestel areas and a population of around 5000 to 15000 in desert, hilly or tribal areas as fat at 4. Biotechnology and the second and a substantiant solution and linder should algorize an ed the enables to enable 3. Aviation
- 5. Chemicals

121

based employment ess to credit.

to access gainful tell

nprovement in the

nes in Group-II

poor including urba la

sages mobilisation of the

ion focuses on providing mployment or better uter

stance to individuals put s, suited to their skills, m

approach is planned for , state and town/city Indi are also created to suppris

market, credit enablement development. It also setur emes of Government. sheltersequipped with set

tiatives in the form of me nes to urban livelihoodtm

Mission (Ministry of Hos of Rural Development) and Solution: **Option** (i) From the graph, we see that the curve flattens at around 100 min (37° C), while this happens at Solution. If the solution of t around 160 min for 37°C and 180 min for 25°C. So, even the stop in the growth occurs earlier at the higher temperature; (i) is true.

temperature, the concentration of 0.8 is attended at round 85 min. At 25°C, it is attained at around 125 min. This is (ii) At 37°C, the twice 85 min: it is false much less than the twice 85 min; ii is false. Hence, the correct option is (A)

0.29 Match the architectural movements in Group-I with their proponents in Group-II.

GROUP I	GR	OUP II
P. Deconstruction	1.	Joseph Paxton
O Historicism	2.	Kenzo Tange
R. Metabolism	3.	Walter Gropius
S. Art Nouveau	4.	Victor Horta
0.	5.	Frank O. Gehry

(A) P-5, Q-1, R-2, S-4 (B) P-5, Q-4, R-2, S-3 (C) P-5, Q-2, R-3, S-3 (D) P-2, Q-4, R-1, 5-5 (A) is the victor Horta, the question could have been so easy.

Art Nouveau is a French word meaning "New Art". Belgium was an early center of the art nouveau, thanks largely to the architecture of Victor Horta, who designed the first art nouveau houses, the Hôtel Tassel in 1893, and the Hôtel Solvay in 1894.

o 30 The Pritzker Architectu	re prize for the year	2016 has been awarded to	
(A) Alejandro Aravena	(B) Frei Otto	(C) Stephen Breyer	

Answer: (A)

(D) Yung Ho Chang

GATE 2017

Figure: There are two photographs here. Aravena provided a concrete frame, with kitchen, bathroom and a roof (left), which were designed to allow families to fill in the gaps (right). So, the architect provided a basic concrete frame, complete with kitchen, bathroom and a roof, allowing families to fill in the gaps, and stamp their own identity on their homes in the process. Photograph: Cristobal Palma, Source: www.theguardian.com



Figure: Pritzker Architecture Prize 2016 Alejandro Aravena

The architect Alejandro Aravena is from Chile. Runs a design firm ELEMENTAL. He is known his pioneering social Answer: (A) housing projects in Latin America.

GR	OUP I	GR	OUP II	
P .	Concentric Zone Model	1.	Beny and Horton	Carries Provide Dance (CEI)
Q.	Sector Model	2.	Homer Hoyt	Production & malandag
R.	Multiple Nuclei Model	3.	Ernest Burgess	
S.	Factorial Ecology	4.	Shevky and Bell	grander ware rest.
	and support drawing as a real burger drawit wa	5.	Harris and Ullman	and the second sec
-4.0)-1, R-3, S-5 (B) P-3, O-2, R-3, S-5	and the	(C) P-2, O-4, R-5, S-1	(D) P-3, Q-2, R-5, S-1

(A) P-4, Q-1, R-3, S-5

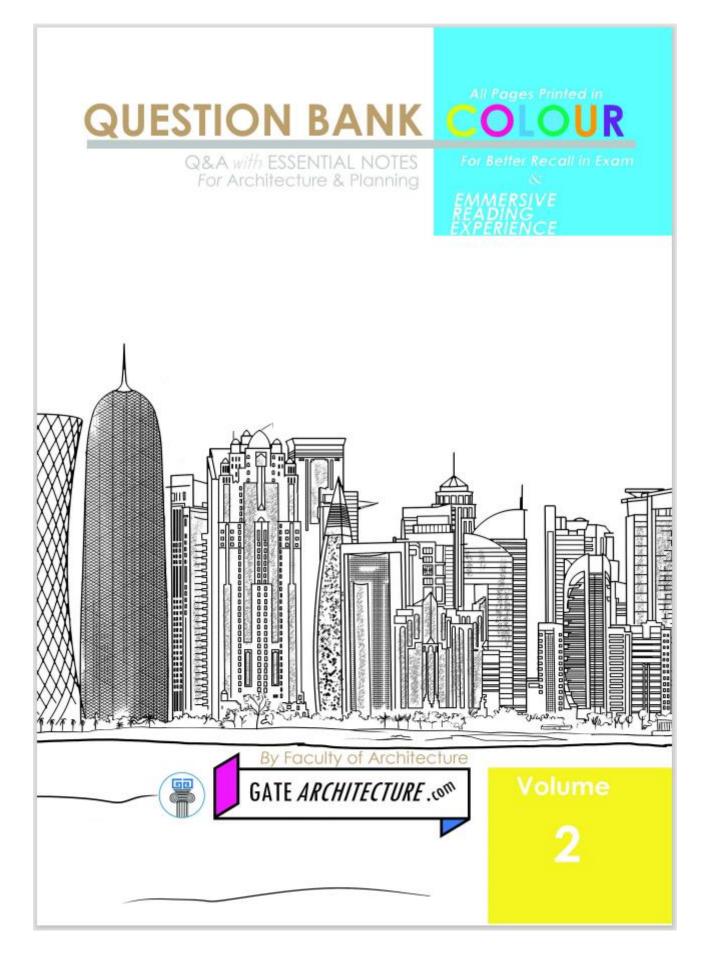
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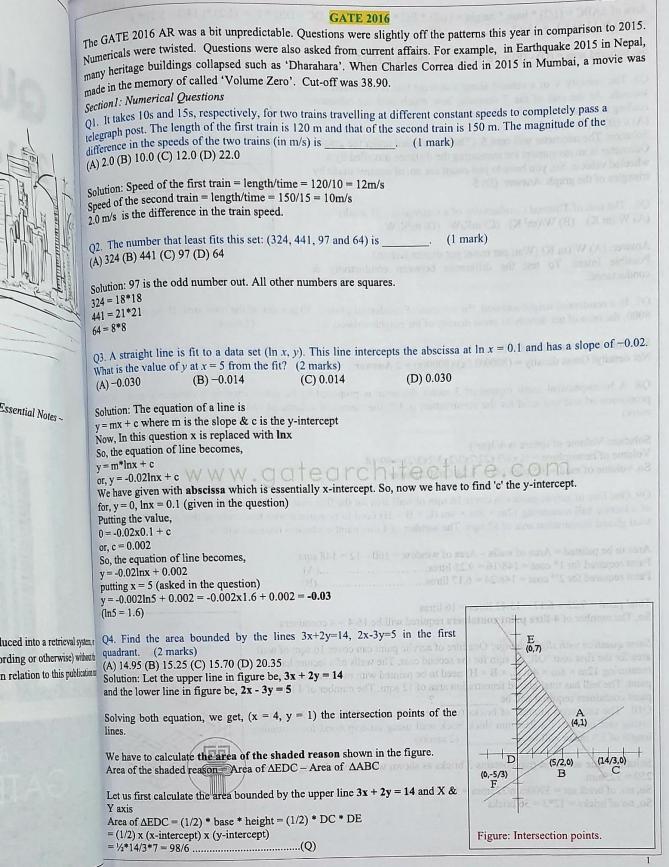
P 10

ed. Answer (D)

Time (min) f bacteria (lactobacilita)a ent temperatures.

(B) P-3, Q-2, R-3, S-5 (C) P-2, Q-4, R-5, S-1





- Basic principle of phy: superposition by phic cross sections § ared with the project
- ntal gardening. La y trimming bushes ed n for geodata collecto
- e of making means ver, it may be used to a on its components and



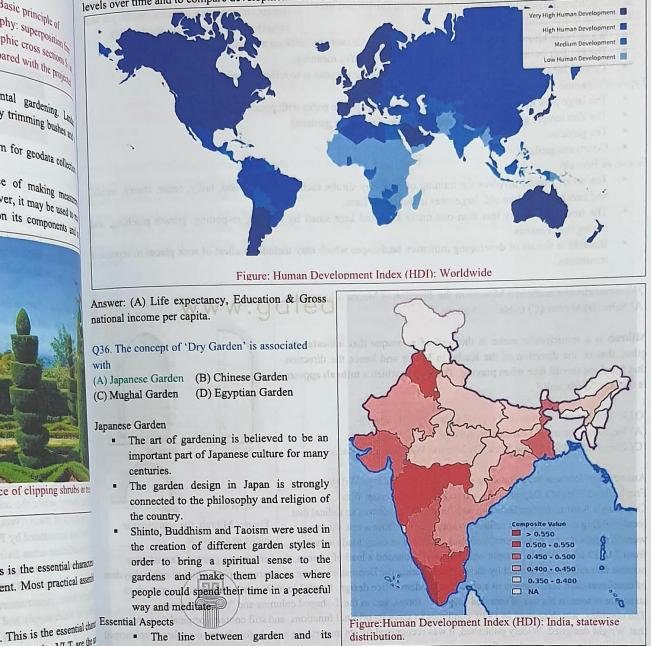
ce of clipping shrubs or the

s is the essential character ent. Most practical assert

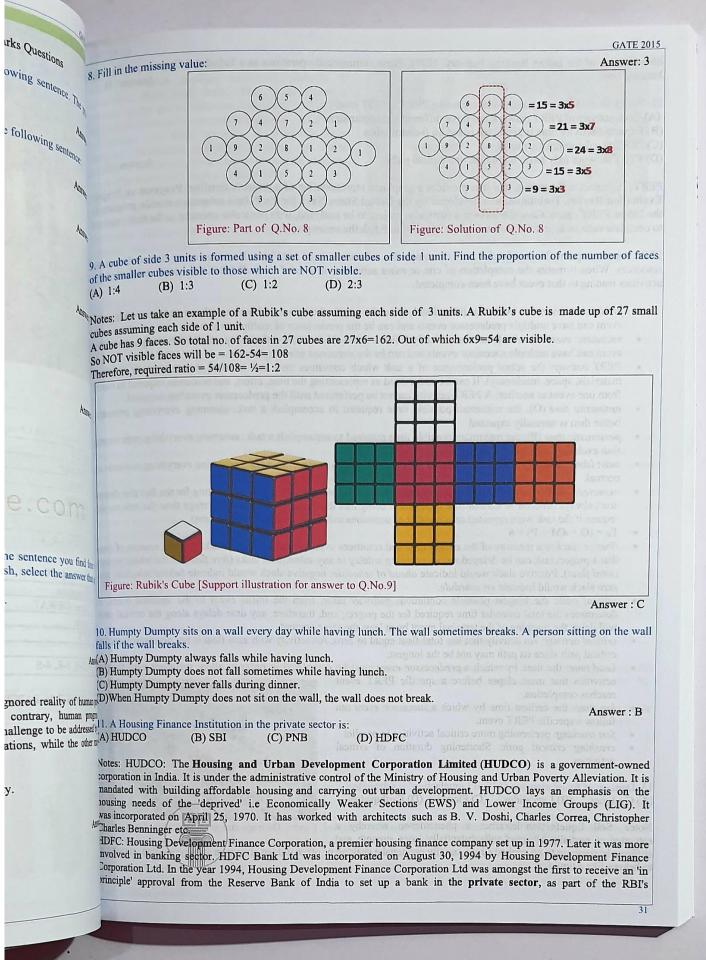
GC and the VLT are the dows, the SHGC is almo sivity or lowE and are used

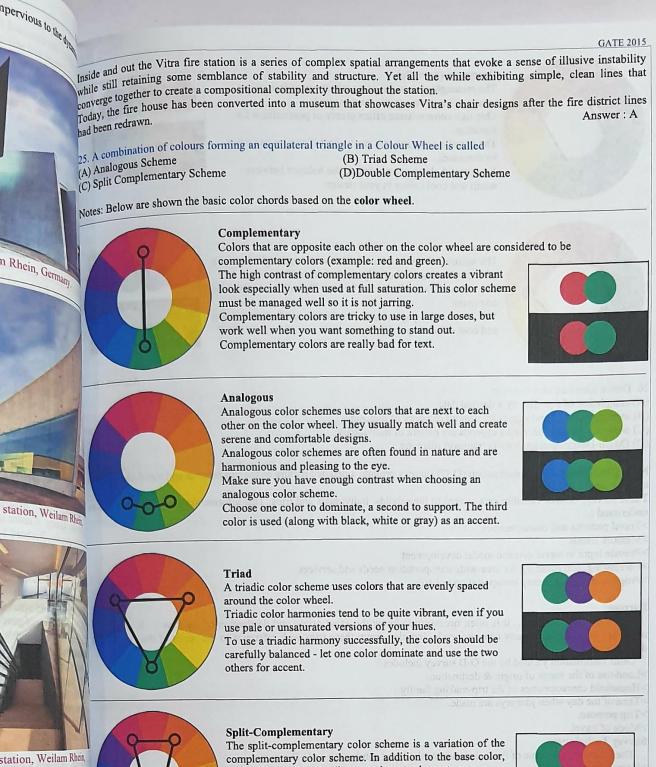
- Q35. The components measuring Human Development Index (HDI) of a nation are (1 mark)
- (A) Life expectancy, Education and Per Capita Income
- (B) Life expectancy, Economy and Housing
- (C) Health, Development and Per Capita Income
- (D) Housing, Health and Hygiene

The Human Development Index (HDI) is a tool developed by the United Nations to measure and rank countries' levels of social and economic development based on four criteria: Life expectancy at birth, mean years of schooling, expected years of schooling and gross national income per capita. The HDI makes it possible to track changes in development levels over time and to compare development levels in different countries.



surrounding landscape is not distinct. Gardens incorporate natural and artificial elements and thus, fuse the elements of nature and architecture.





nbody a heavy, opaque¢ ng.

rior of the building life he program that is said which creates a sense ing to program, visitore



JUIN

The split-complementary color scheme is a variation of the complementary color scheme. In addition to the base color, it uses the two colors adjacent to its complement. This color scheme has the same strong visual contrast as the complementary color scheme, but has less tension. The split-complimentary color scheme is often a good choice for beginners, because it is difficult to mess up.

ophia has always bee ment originally built ue huge entrance pylon is actually unfinished, as attested by the unequal height of its upper regions, the uncut clocks he huge for its undecorated surfaces and the remains of the mud-brick construction ramp that is still present on its nich project from its undecorated surfaces and the remains of the mud-brick construction ramp that is still present on its terior side. Originally, it stood some 40 meters high (131 feet). This structure may have been built as late as the 30th vnasty by Nectanebo I, who at least constructed the temenos walls to which the pylon is attached. However, this is unasty of it is possible that an earlier pylon once stood on the same spot. High upon this gate is an inscription left by

a fact, it is perturned it is possible that an earlier pyron once steed on an area that was originally outside of the temple, as apoleon's Expedition, which is still visible. apoleon's Expedition, which is still Constructed any idenced by a number of cryosphinxes like those outside that were displaced from their original positions along the This vast, and ocessional route. Inside this courtyard to the left is the granite and sandstone triple barque chapel of Seti II, which demonstrate chambers for the barques of Mut (left), Amun (center) and Khonsu (right). Opposite this shrine is a small This vast, and constraines the chambers for the barques of Mut (left), Amun (center) and Khonsu (right). Opposite this shrine is a small sphink with the features of Tutankhamun.



Figure: Remains the Temple of Karnak.

Centered within the courtyard are the remains of the kiosk of Taharqa, which was later usurped by Psammetichus II and later still, restored during Egypt's Greek Period. It originally consisted of ten huge papyrus columns linked by a low screening wall and open at its eastern and western ends. Now there is only one great column and a large, altar-like block of calcite (Egyptian alabaster). The function of this structure has been assumed to be a barque shrine but, because it is open to the sky, it has been suggested that the structure may have served another



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Femple of Karnak.

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Figure: Rea

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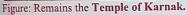
ith smaller domes,

complicated, by

At Karnak in li (Ancient)

eat Hypostyl Court

oach the of a quay g ancient oris (393ds to and ple's first mun, and



itual purpose. Notre Dame Cathedral is widely considered one of the finest examples of French Gothic architecture in the world. It vas restored and saved from destruction by Eugène Viollet-le-Duc, one of France's most famous architects. The name Note Dame means "Our Lady" in French, and is frequently used in the names of Catholic church buildings in rancophone countries. The Notre Dame Cathedral was one of the first Gothic cathedrals, and its construction spanned the Jothic period. Its sculptures and stained glass show the heavy influence of naturalism, unlike that of earlier Romanesque

uchitecture.

Iderpinning: Pile and Beam

derpinning with pile and beams is another great and preferred method to alleviate footing. Using this system requires derpinning the must be installed on either side of the affected wall. After the piles have been installed, then brickwork is it a min-pile wall and reinforced concrete needle beam is used to it a min-pile take wall and reinforced concrete needle beam is used to connect the piles and support the wall. Reducing noved below the walle beams can accommodate very bigh loads. The piles and support the wall. loved below the piles and support the wall. Reducing distance between needle beams can accommodate very high loads. The bearing capacity of the underlying strata will distance between diameter, depth and spacing of piles word the distance between diameter, depth and spacing of piles used. Augered piles or case driven piles can be used with this termine underpinning. The advantages of underpinning with pile and beams are:

itable for restricted access ster than traditional underpinning gh load capability ss disruption, less spoil generated and completed quickly

foundations. This nine aderpinning: Piled Raft maged. One visible in derpinning: Piled Raft pair some cracks, on derpinning with piled raft, must be used when the whole structure need to be underpinned. It is recommended when the cracks, on derpinning with piled raft, must be used when the whole structure need to be underpinned. It is recommended when the cracks, on derpinning with piled raft, must be used when the whole structure need to be underpinned. It is recommended when the cracks, on derpinning with piled raft, must be used when the whole structure need to be underpinned. It is recommended when the cracks, on derpinning with piled raft, must be used at determined locations by loading conditions; then pockets below pair some cracks, is aderpinning with piled raft, must be used when the whole structure need to be underpinned. It is recommended up to require depth. Piles are placed at determined locations by loading conditions; then pockets below undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are too deep for other underpinning methods or in areas where the soil is so hard that small equipment could be undations are placed at determined locations by loading conditions; then built to link all a solution areas are placed to be are the wall's load. A ring beam is then built to link all a solution areas are placed to be areas area buckled walls and to create the service of the serv edles and the structure is poured with concrete.

in sequence to a pre-toe affected area has been

1. Match following Scientific Names in Group-I with their common Indian Names in Group-II

Group-I	Group-II
P Lagerstroemia speciosa	1 Amaltas
Q Cassia fistula	2 Neem
R Azadarachta indica	3 Jarul
S Acacia auriculiformis	4 Babul
bine a property be build a barry	5 Peepal

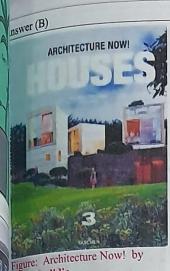
(1) P-2, Q-4, R-3, S-4 (B) P-5, Q-3, R-2, S-4 (C) P-3, Q-1, R-4, R-2 (D) P-3, Q-1, R-2, S-4

totes: Lagerstroemia speciosa, also known by the common name Pride-of-India, is a shrub to large tree with multiple unks or stems diverging from just above ground level. This species can grow up to 15 m in height and has a wide preading crown.

Partial underpinning f installation, little noise



in India, the wood is used for railroad sleepers and the construction of furniture, wagons, and buildings. The wood is resistant to waterlogging and therefore is valuable for the construction of boats. In the Philippines, it is used as a folk medicine for the treatment of diabetes and kidney diseases. In laboratory experiments leaf extracts are reported to stimulate glucose uptake in a dose-dependent manner in similar ways to insulin.



Philip Jodidio

The Architecture Now! series is an ongoing project documenting the work of the most innovative and influential architects across the globe. This special edition of selection from Volume 5 features famous names and newcomers alike, and this time around a number of designers are also included, reflecting the new ways in which design and architecture are coming together. Since architecture also extends beyond walls, landscape architecture makes its appearance as well. Easy-to-navigate illustrated A-Z entries include current and recent projects, biographies, contact information, and web sites.

The author: Philip Jodidio studied art history and economics at Harvard, and edited Connaissance des Arts for over 20 years. His books include TASCHEN's Architecture Now! series, and monographs on Tadao Ando, Norman Foster, Richard Meier, Jean Nouvel, and Zaha Hadid. He is internationally renowned as one of the most popular writers on the subject of architecture.

Norberg-Schulz is a practicing architect ;his buildings stand in several countries; and he elucidates the nature of architectural reality with a practiced eye and from a practicalviewpoint. Although

he methods and theory that his book develops are uncompromisingly rigorous and ightly formed, they are everywhere related to actual building, through specific ramples and through the use of over 100 photographs. The structure that Norbergschulz has fashioned is surely one of the most impressive intellectual edifices that my architect has ever produced. The materials that are organically worked into it include Gestalt psychology, the mechanics of perception, information theory, modern analytic philosophy, and in particular, linguistic analysis, and the general heory of signs and symbols. The result, however, is not an eclectic hodge-podge all these materials have their place and purpose ;none is applied extraneously for "show" or purely decorative effect. And all this divergent material had to be joined according to plan within formal bounds in order to produce a theory with equally divergent applications: one that can treat not only of the aesthetics of architecture but equally well of its social, psychological, and cultural effects. The chief focus of the book is on the symbolic and linguistic. The purpose is to develop an integrated theory of architectural description and architectural intention (and this includes the intention of the user as well as that of the designer), insofar as te ratio (D) Water-platice, 'Complexity and contradiction in architecture' expresses in the most compelling and original terms the postmodern architecture is an art.

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and a lot	1		
i	22.20		
Sec. 2	-		

-3, Q-5, R-1, S-2



3, Q-1, R-4, S-2

INATURE Figure: Design with Nature by Ian Mc Harg

Q.

rebellion against the purism of modernism. Three hundred and fifty architectural photographs serve as historical comparisons and illuminate the author's ideas on creating and experiencing architecture.

The first book to describe an ecologically sound approach to the planning and design of communities, Design with Nature has done much over the past 25 years to shape public environmental policy. This paperback edition makes this classic accessible to a

Figure: Intentions in Architecture by Christian Norberg Schulz CONTRADICTION IN ARCHITECTURE Figure: 'Complexity and contradiction in architecture' by Robert Venturi

annun annun annun annun annun

Intentions in

Architecture

wider audience than ever before. Lavishly illustrated with more than 300 color photos and line drawings.

2.64	Match the common names of	the trees in (Group J	I with their botanical names in Group II	

Group I	Group II
P. Gulmohar	1. Dalbergia Sissoo
Q. Palash	2. Ficus Benghalensis
R. Indian Mahogany	3. Delonix Regia
S. Banyan	4. Toona Ciliata
	5. Butea Monosperma

(A) P-5, Q-3, R-4, S-2 (B) P-4, Q-5, R-2, S-1 (C) P-3, Q-5, R-4, S-2 (D) P-3, Q-1, R-5, S-2

Jav. f the

ouri), Ficus

न्टोरी shna

हर. enus

nyx, tree



for to habitat destruction.

common name: Flame of the Forest • Hindi: Palash पलाश, Dhak ढाक, Tesu टेसू • Manipuri: ार्थ शर गेर्थ Pangong • Marathi: पळस Palas

no stries has lent its name to the town of Palashi, famous for the historic Battle of Plassey

ought the state of Jharkhand Palash is associated with the folk tradition. Many folk literary a the state of state balash as the forest fire. The beauty of the state of the s ought there. a the state of a state spressions of their height when most trees have fallen their leaves and Palash is in its barkhand reach is also the State Flower of Ibarkhand harking Palash is also the State Flower of Jharkhand.

ull bloom. I date the tree is a form of Agnidev, God of Fire. It was a punishment given to Him tis said that the tree is a form of Agnidev, God of Shiva's privacy. y Goddess Parvati for disturbing Her and Lord Shiva's privacy.

y Goddess 1 and region of Andhra Pradesh, these flowers are specially used in the worship n the Telangue on occasion of Shivratri. In Telugu, this tree is called Modugu chettu.



Figure: Palash (Butea monosperma)



Figure: Palash (Butea monosperma)

In Kerala, this is called 'plasu' and 'chamata'. Chamata is the vernacular version of Sanskrit word 'Samidha', small piece In Kerala, this is called plasu and chamata . Chamata is the verhacenal vertex of the old namboodiri (Kerala Brahmin) houses, one can find ndu • Telugu: Nandichen to this tree because this is widely used for their fire ritual.

W.W.
No And

0.65 Associate the plans in Group I with the options in Group II

Group I	Group II	
P. City Development Plan	1. PMGSY	
Q. Slum Free City Plan	2. JNNURM	
R. Transport Network Plan	3. RAY	-
S. Disaster Management Plan	4. NDMA	
	5. RSVY	1000

(A) P-2, Q-3, R-1, S-4 (B) P-2, Q-1, R-5, S-4 (C) P-1, Q-3, R-2, S-5 (D) P-3, Q-2, R-1, S-4

Answer (A)

PMGSY The primary objective of the PMGSY is to provide connectivity, by way of an all-weather to the eligible unconnected habitations in the rural areas.

JnNURM

JNURM is a state sector scheme for Urban Renewal initiated by Govt. of India (GOI) to be implemented over a 7-year period. The scheme envisages providing financial assistance to urban local bodies (ULBs) & parastatal agencies of the order of Rs. 50,000 crores, spread over 7 years

INNURM covers 63 cities across India. The cities have been divided into 3 categories, namely, A, B and C. This classification is based on population.

Group I with the appropriate example from Group II

ISACSEDAN PROPERTY AND	time from Group I with the up	Sie Sinte one
A CALLER	Match the organism type from Group T with the up	Group II
and the second	Croup	1. Nitrifying Bacteria
US (S) CENTRE	a Autotroph	2. Grasshopper
Contraction of the second	Heterouroph	3. Grass
C Line a Three Chi	n Chemotroph	4. Vulture
Due the In St. The		5. Fungus
rystal Palace was a glass and can the Great Exhibition of Iger can a architect act		
the Great Exhibition of 1851. At the construction and a gardener.	P-5, Q-4, R-1, S-2 (B) P-2, Q-1, R-5, S-4 (C) P- p-5, Q-4, R-1, S-2 (B) P-2, Q-1, R-5, S-4 (C) P-	1, Q-2, R-4, S-5 (D) P-3, Q-2, R-1, S-5
n, an architect and gardent, and can to construction and designed	p-5, Q-4, R-1, S-2 (D) f-feeding", from the Greek	1, Q-2, R-4, S-5 (D) P-3, Q-2, R-1, S-5 c autos "self" and trophe "nourishing") or "producer". Example- pla ind usesorganic carbon for growth. This contrasts with autotrophs, suc
Const architect	s: An autotroph series that cannot fix carbon a	c autos "self" and trophe "nourishing") or "producer". Example- pla and usesorganic carbon for growth. This contrasts with autotrophs, suc sunlight (photoautotrophs) or inorganic compounds (lithoautotrop
and garde and garde	terotroph is an organized can use energy from	sunlight (photoautotrophs) or inorganic compounds (introautorio)
and designer, and	s and algae, that obtain energy by the	oxidation of electron donors in their environments. These molecules can

P-5, Q-4, R-1, S-2 (B) P-2, Q-1, R-5, S-4 (C) P-1, Q-2, R-4, S-5 (D) P-3, Q-2, R-1, S-5 p-5, Q-4, K-1, S-5 s: An autotroph("self-feeding", from the Greek autos "self" and trophe "nourishing") or "producer". Example- plants. 1, an architect and gardener, and reve s: An autorophic nourising) or producer". Example- plants. terotroph is an organism that cannot fix carbon and usesorganic carbon for growth. This contrasts with autotrophs, such as terotroph is an organic compounds (lithoautotrophs). s and algae, which can use energy from sunlight (photoautotrophs) or inorganic compounds (lithoautotrophs). s and algae, intrograms that obtain energy by the oxidation of electron donors in their environments. These molecules can be notrophis are only orinorganic (chemolithotrophs). The chemotroph designation is in contrast to phototrophs, which otroph, a term used for organisms which obtain nutrients from dead organic matter.

ver (D)

concepts in Group I with their corresponding authors in Group II

Match the concepts in	Group II	
Group I P. Proxemics Theory	1. Gordon Cullen	
P. Proxemics meory Q. Serial Vision	2. Edward T. Hall	
Q. Serial Vision R. Urban Imageability	3. Oscar Newman	
R. Urban Imageaonity S. Defensible Space	4. Paul Zucker	-
S. Defensione opace	5. Kevin Lynch	

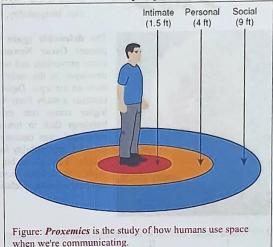
P-2, Q-1, R-5, S-3 (B) P-2, Q-1, R-3, S-4 (C) P-4, Q-1, R-5, S-2 (D) P-3, Q-5, R-2, S-1

T. Hall – Proxemics /Personal Space in Different Cultures

ard T. Hall (*16.04.1914) was the most popular founder of Intercultural Communication. He put up three theories: High / Low text, Monochrone / Polychrone Conception of Time and Intimate

xemics. Personal Space varies depending on the culture.

- Intimate distance 6 to 18 inches (15-45cm) This level of physical distance often indicates a closer relationship or greater comfort between individuals. It often occurs during intimate contact such as hugging, whispering, or touching.
- Personal distance 1.5 to 4 feet (45-120cm) Physical distance at this level usually occurs between people who are family members or close friends. The closer the people can comfortably stand while interacting can be an indicator of the intimacy of the relationship.
- Social distance 4 to 12 feet (1,20m-3,50m) This level of physical distance is often used with individuals who are acquaintances. With someone you know fairly well, such as a co-worker you see several times a week, you might feel more comfortable interacting at a closer distance. In cases where you do not know the other person well, such as a postal



delivery driver you only see once a month, a distance of 10 to 12 feet may feel more comfortable. Public distance - 12 to 25 feet (3,50-7,50m)

Physical distance at this level is often used in public speaking situations. Talking in front of a class full of students or giving a presentation at work are good examples of such situations.

ordon Cullen studied architecture at the Royal Polytechnic Institution, but never qualified as an architect. He started his career orking as a draughtsman in various architectural practices. He then returned to Britain and joined the Architectural Review as ssistant Editor in 1946. He later became a writer on planning policy and contributed numerous editorials and case studies in urban id rural planning.

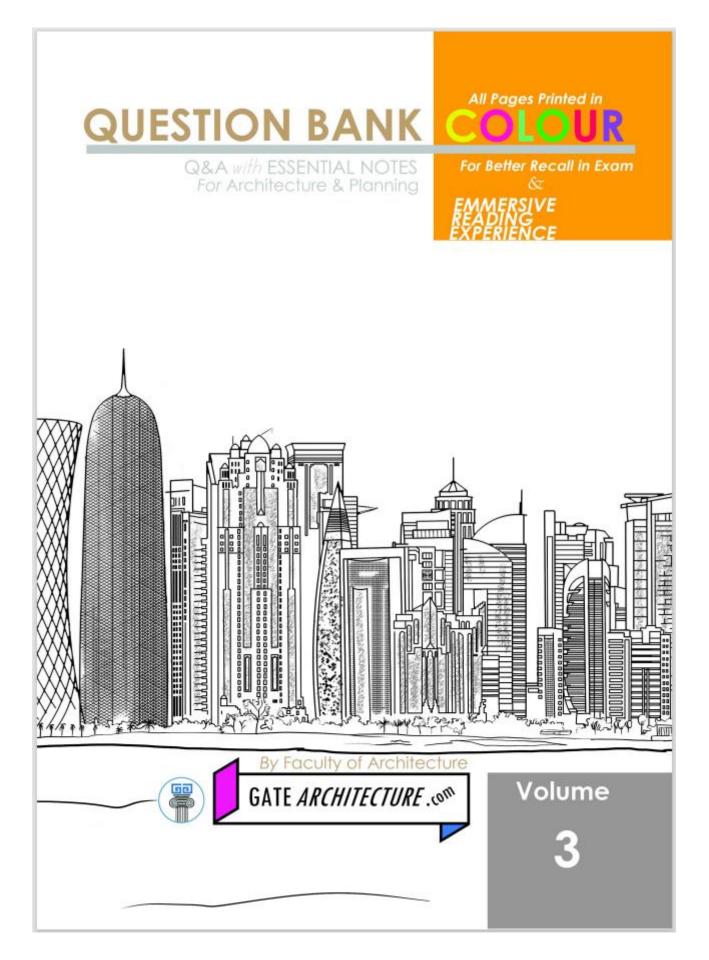


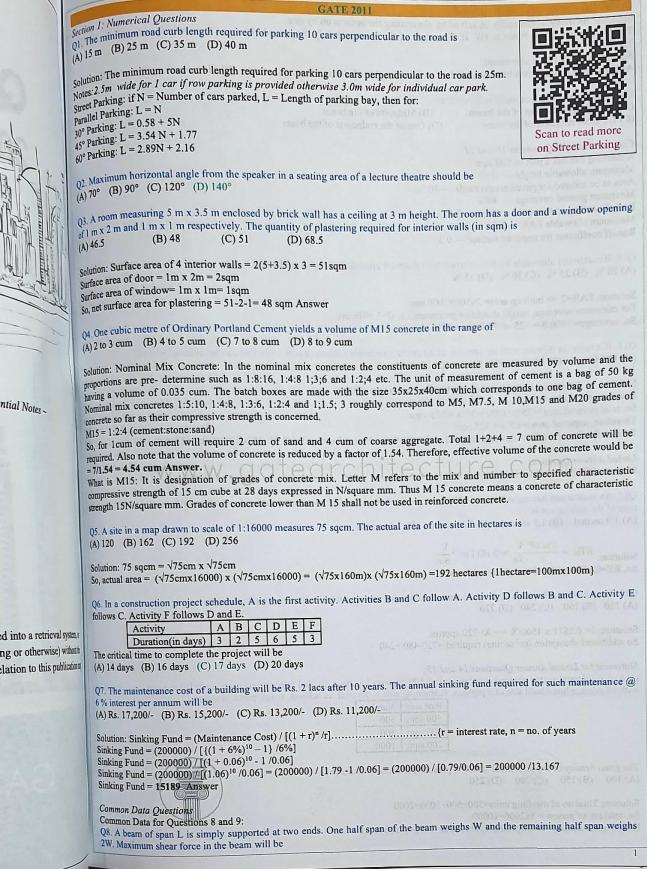
Law Olmsted, Sr., erica's most beloved rk's Central Park, apitol grounds. His plitionist stance: by o show the inherent long-held sentiment nstead insisting that career, beginning in eated the first park ties in this country. the movement to such as Yosemite, at White City of the erald Necklace" of green space.

Figure Fr



Figure: Multipurpose activities and





ntial Notes -

5

5. Mewada, who

GATE 201

ge" architecture ee design allowing concrete walls A eing hidden behind ated spaces. Thus order to facilitate a ided glass, steel

ary 2001, and it is s as well.

allowing energy saving.



Torre Caja Madrid, Spain

This is a skyscraper with 250 meters in height, and it easily earns its place on the Top 200 Tallest Buildings in the World. It was completed in 2009, and it took 6 years to complete. Currently, the building serves as the main office space for the largest banking institution in Spain (Caja Madrid). It is a highly modern structure not only on the outside, but offering great flexibility and large comfortable office spaces and conference rooms inside.

Clyde Auditorium Glasgow

This beautiful, contemporary style building is a very popular concert venue of Glasgow Scotland, also known as "The Armadillo" (because of its resemblance to the armadillo mammal). It has been opened to public

The design of the building heavily borrows from the design of the Reichstag Dome in Berlin, with its helical stairway structure and the oval/rounded shape of the building. Also, thanks to the materials used and the overall design, the building is a symbol for "transparency", just like Reichstag is.



Figure: Torre Caja Madrid. Spain

in 1997, and it has 30,000 seats. The shape of the building was not only chosen for pure design, but it also has a very practical side: to get the best acoustic experience.



n of a glass cupola, m ugh a conical structure andmarks of Berlin to m all around the world he interior uses min and spread it within environmentally fish ficient.

slightly tilted structure and it was built follow Foster and associates as £65 million, and it g. It has a bulbous str actual surface area, b

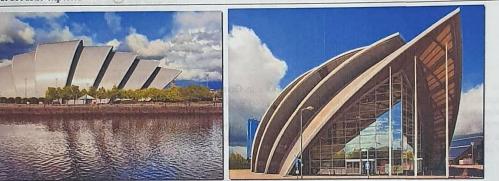


Figure: Torre Caja Madrid, Spain

Many critics have compared the Clyde Auditorium with the Sydney Opera House; there are indeed many similarities, however the Sydney structure did not serve as a prime model for the architects to design the Scottish Auditorium. The exterior shell-like structure is made of titanium alloy, which is the sole material that allows the creation of such beautiful, perfectly sleek and curved designs.

30 St. Mary Axe London

Known as the Gherkin Building (or even sometimes the "Cucumber"), this wonderful architectural landmark is not only beautiful but also a very environmentally friendly building. It was completed in 2003 based upon the master plans of Norman Foster and associates. The building is very famous for its natural ventilation system - which thanks to the huge shafts or cylinders placed on each floor the natural air can circulate in the building. With the use of passive solar heating system, in winter the building warms up the air it subtracts from the outside. In summer

periods, the shafts work as huge warm air pumps, thus creating a cool atmosphere within the building. Energy is also being saved, because these huge shafts also have the purpose of letting natural light into the building.

- The properties of the internal and external faces of the constructional element under scrutiny need to be allowed for. These are called external resistances and are fixed values.
 - The U value is defined as being reciprocal of all the resistances of the materials found in the building element.
 - The resistance of a building material is derived by the following formula:
 - $R = (1/k) \times d$

builders who w

RECEIVING

nt types of plans for h

g towns. They are bu

ng components

g and cooling loads

11 aspects of home dea

is needlessly escaping

pical U-value of 28

igh a one square me

ts of Watts per Meters

vatts of energy for each

- where k is the conductivity of the building material and d is the material thickness.
- The formula for the calculation of a U value is

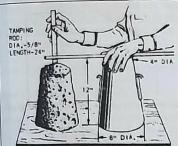
U(element) = 1 / (Rso + Rsi + R1 + R2 ...)

- where Rso is the fixed external resistance where Rsi is the fixed internal resistance
- and R1... is the sum of all the resistances of
- the building materials in the constructional element. Answer (B)

O34. Consistency of cement is measured by (A) Pycometer (B) Slump cone (C) Universal Testing Machine

rmation of small (C) University (D) Vicat's apparatus

and the male drive Vicat's apparatus: a device for determining the normal consistency and time of setting of portland cements that consists of a rod weighing 300 grams, having a needle in each end, and supported in a frame with a graduated scale to measure the distance to which the needle penetrates the cement.



The concrete slump test is an empirical test that measures the workability of fresh concrete.

Figure: Infrared imaging.

More specifically, it measures the consistency of the concrete in that specific batch. This test is performed to check the consistency of freshly made concrete. Consistency is a term very closely related to workability. It is a term which describes the state of fresh concrete. It refers to the ease with which the concrete flows. It is used to indicate the degree of wetness. Workability of concrete is mainly affected by consistency i.e. wetter mixes will be more workable than drier mixes, but concrete of the same consistency may vary in workability. It is also used to determine consistency between individual batches.

A h

Figure: Vicat's apparatus for determining consistency of cement.

A universal testing machine, also known as a universal tester, materials

testing machine or materials test frame, is used to test the tensile stress and compressive strength of materials. It is named after the fact that it can perform many standard tensile and compression tests on materials, components, and structures.

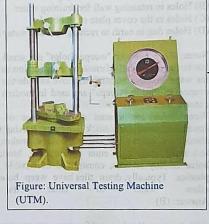
A pcynometer or specific gravity bottle is a flask with a stopper that has a capillary tube through it, which allows air bubbles to escape. The pycnometer is used to obtain accurate measurements of density. Answer: (D)

Q35. The appropriate material for flooring of an external ramp of a building would be

(A) Polished granite (C) Glazed ceramic tile (B) Wax polished marble (D) Rough finish sandstone

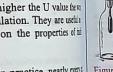
Sandstone would be non-slippery in rain and add more friction in comparison to other options available here.)

Q36. Which of the following is NOT a member of a Steel Truss? (A) Gusset Plate (B) Wall Plate (C) Fish Plate (D) Anchor Bolts



Answer: (D)

Figure: Slump test.



n practice, nearly event e. Knowledge of how u a project. It allows the with regulatory frame

ding project is obtaining stic work is obligatory. A U value can be derived

cnow the build up of the building material also is This is a measure of is s for materials can be free

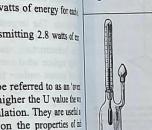


Figure: Pcynometer. .000 people, it used to be the largest Christian church in the world, but in 1989 it was exceeded in size by the church in moussoukro, Cote d'Ivoire.

terior Decoration: Nave, Chapels, Sculpture

been repeated.

grins entering the basilica are monitored by church officials and members of The Swiss Guard. Inside, the basilica is cruciform shape, with an elongated nave in the form of a Latin cross. The nave is framed by wide aisles giving access to a number of snape, that include: the Chapel of the Presentation of the Virgin, the Clementine Chapel, the Chapel of the Madonna of lonna, the Gregorian Chapel, the Chapel of the Pieta and several other altars. In addition, beneath the high altar, is the Chapel of

e interior of Saint Peter's contains a number of priceless treasures in marble and bronze by the greatest Renaissance sculptors rks such as Pieta (1500) by Michelangelo - as well as Baroque sculpture - such as the baldachin or ceremonial canopy over the in altar, and the traditional Chair of St Peter (Cathedra Petri), both designed by Bernini - and works by the greatest neoclassical lptors such as the marble statue of Pope Pius VI by the Italian genius Antonio Canova (1757-1822). It also contains numerous al tombs ornamented with marble statues and reliefs - such as the Tomb of Pope Leo XI (1634-44) by Alessandro Algardi 98-1654) - as well as mosaics and precious metalwork. Ironically, the huge and aggressive fund-raising campaign required to for the cost of the basilica and its contents (46 million ducats), led to protest across Europe and became an important factor in gering the Reformation and the birth of Protestantism.



Exterior Architecture: Facade, Dome

Saint Peter's is approached via St. Peter's Square, an elliptical forecourt encircled by a Doric colonnade, derived from Greek architecture. It ends at the facade of Saint Peter's which is 376 feet wide and 150 feet high. Designed by Carlo Maderno, the facade features a giant order of Corinthian columns (each 90 feet high) and is topped by thirteen statues -Christ flanked by eleven of the Apostles (excluding Peter) plus John the Baptist. At ground level it is approached by steps guarded by two 18-feet high statues of Saints Peter and Paul.

The Basilica of St. Peter is one of four Major Basilicas of Rome, the others being Santa Maria Maggiore, St. Paul and St. John Lateran, but it is the dome of Saint Peter's - the tallest dome in the world - that dominates the skyline of Rome. Designed largely by Michelangelo, and built during the short but active papacy of Sixtus V (1585-1590) by Michelangelo's pupil Giacomo della Porta, the dome rests on four pendentives and massive piers, each 60 feet thick. It was Michelangelo

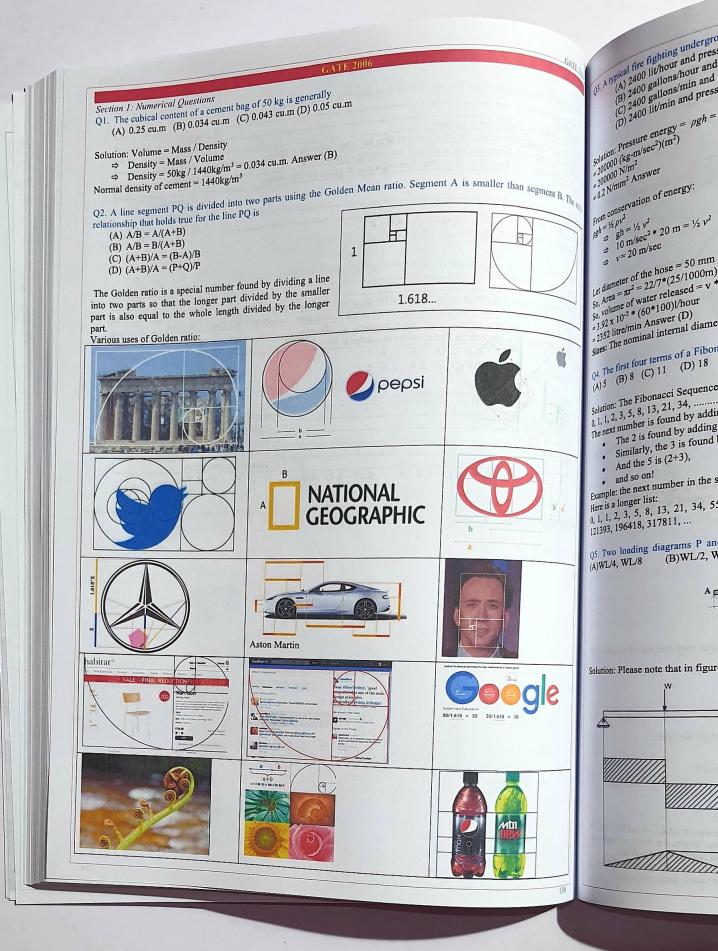
increased the size and strength of the load-bearing structure without destroying the central unity of Bramante's original design. rediate rivals of St Peter's dome include Florence Cathedral of the Early Renaissance, designed by Filippo Brunelleschi and pleted in 1434 - for details, see Florence Cathedral, Brunelleschi and the Renaissance (1420-36); Constantinople's Hagia hia church, completed in 537; and the dome designed by Christopher Wren for St Paul's Cathedral, finished in 1710. St Peter's lica is maintained by the Sampietrini, a specialist group of workers who continually scale and inspect the building's surfaces. ibs and Relics

e 100 tombs are to be found within St. Peter's Basilica, including a number located in the Vatican grotto, underneath the lica. They contain 91 popes, the Holy Roman Emperor Otto II, St. Ignatius of Antioch and Pope John Paul II. In a subterranean t, directly below the dome and the main altar, is the tomb of St. Peter himself.

tioned in niches set into the four piers supporting the dome are a number of statues associated with the holy relics of the



bout 50,000 square feet), and a



Rem Koolhaas Rem Koolhaas has built a reputation as one of the top architects of the Known for his striking, often gravity-defying structures, Rem Koolhaas has built a reputation as one of the top architects of the Known for his screenwriter has been in Rotterdam, the Netherlands, Koolhaas worked as a journalist and screenwriter has Ren for his striking, often generative of the relation of the top architects of the Known for his striking. Rotterdam, the Netherlands, Koolhaas worked as a journalist and screenwriter before attending the list contract Association School in London. After graduating in 1972, he conducted research in the United States attending the list contract Association New York: A Retroactive Manifester (1972), he conducted research in the United States attending the Known worked as a journalist and screenwriter before attending the list century. Born in Kontana, in contact, in the united states, during the list century. Association School in London. After graduating in 1972, he conducted research in the United States, during which Architecture Delirious New York: A Retroactive Manifesto for Manhattan. In 1975 he founded the Office of the office of the test of test of the test of test 21st control Association Sender in Sender inter graduating in 1972, he conducted research in the United States, during which Architecture Delirious New York: A Retroactive Manifesto for Manhattan. In 1975 he founded the Office for Metropolitan time write or OMA, along with fellow architects. time he wrote DOMA, along with fellow architects.



Mayne (born January 19, 1941)

r of the 2002 Pritzker Prize, Glean Ver

The De Rotterdam complex, located in the Dutch city of the same name, was devised as a vertical city and is composed of three towers that house apartments, offices, shops, restaurants, and a hotel. At nearly 500 feet tall and with 1.7 million square feet of floor space across the towers, the building is the largest in the country. Designed by Rem Koolhaas



Zaha Hadid's projects are characterized by their dynamic formal qualities of sinuously, curving shapes, or crystallized strata. This sums up as a kind of new Baroque, a sensuous, more vibrant and engaging type of architecture.

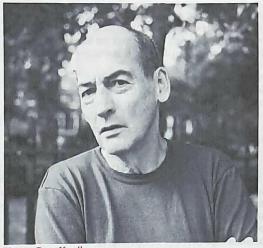
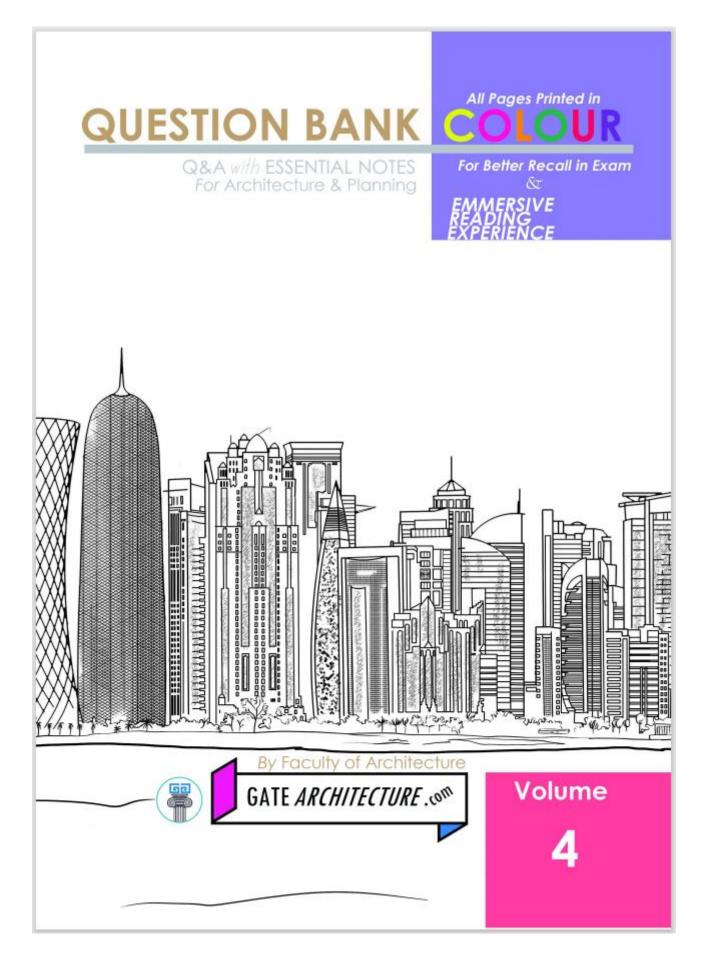


Figure: Rem Koolhaas



Koolhaas reinvented the skyscraper with his Beijing headquarters for CCTV. The building's two towers are connected by a 246-foot cantilevered section known as the Overhang. The exterior is sheathed in sun-shaded glass with a striking pattern of triangulated steel tubes, which form part of the support structure. Designed by Rem Koolhaas

Zaha Hadid, (born October 31, 1950, Baghdad, Iraq-died March 31, 2016, Miami, Florida, U.S.), Iraqi-born British architect known for her radical deconstructivist designs. In 2004 she became the first woman to be awarded the Pritzker Architecture Prize. Hadid began her studies at the American University in Beirut, Lebanon, receiving a bachelor's degree in mathematics. In 1972 she traveled to London to study at the Architectural Association, a major centre of progressive architectural thought during the 1970s. There she met the architects Elia Zenghelis and Rem Koolhaas, with whom she would collaborate as a partner at the Office of Metropolitan Architecture. Hadid established her own London-based firm in 1979.



Section 1: Numerical Questions

Q1. The value of runoff coefficient C in Q = CIA that represents a completely impervious and wetted surface from which there is total runoff is (A) 0 (B) 1 (C) 10 (D) 1%

Notes: **Runoff coefficient (C)** is a dimensionless coefficient relating the amount of runoff to the amount of precipitation received. It is a larger value for areas with low infiltration and high runoff (pavement, steep gradient), and lower for permeable, well vegetated areas (forest, flatland). *Formula:*

 $\begin{array}{l} Q = CIA \\ Q = Runoff in cubic feet per second (cfs) \\ C = Runoff coefficient (dimensionless) \\ I = Rainfall intensity (inches per hour) \\ A = Drainage area (acres) \end{array}$

Runoff Coefficient (C): Pavement = 0.9 Business area = 0.8 Playground = 0.2 Sandy soil = 0.1

h Essential Notes -

Area constant at the end of day $2 = 3500 \times 2 = 7000$ Area constant at the end of day $3 = 2000 \times 2 = 1400$ So, the context ansater is (C) 3 days

solution: Population in 1 has $i \ge 30 = 250$

4. 200,000 and above: 14010/capacity/day

Example1: Calculate the peak stormwater runoff rate from a watershed of 15 acres, with a runoff coefficient of 0.35, from a storm of intensity 2.4 in/hr. Solution:

This requires simply substituting into the equation (Q = CIA), thus: Q = (0.35)(2.4)(15) = 12.6 cfs

Example2: The catchment area is of 300 hectares. The surface cover in the catchment can be classified as given below:

Type of cover	Coefficient of runoff	Percentage
Roofs	0.90	15
Pavements and yards	0.80	15
Lawns and gardens	0.15	25
Roads	0.40	20
Open ground	0.10	15
Single family dwelling	0.50	10

Calculate the runoff coefficient and quantity of storm water runoff, if intensity of rainfall is 30 mm/h for rain with duration equal to time of concentration. If population density in the area is 350 persons per hectare and rate of water supply is 200 LPCD, calculate design discharge system. Assume 80% becomes waste water.

Solution: Estimation of storm water discharge for storm water drain of separate system, Overall runoff coefficient C = [A1.C1+A2.C2+...+An.Cn] / [A1+A2+...+An]= (0.15 x 0.90 + 0.15 x 0.80 + 0.25 x 0.15 + 0.20 x 0.4 + 0.15 x 0.1 + 0.10 x 0.5) / (0.15 + 0.15 + 0.25 + 0.20 + 0.15 + 0.10) = 0.44 Therefore quantity of storm water, $Q = C.I.A = 0.44 \times (0.03m/3600Sec) \times (30 \times 10000 \text{ m}^2)$ = 0.44 x 30 x 300/360 = 11 m³/sec Estimation of sewage discharge for sanitary sewer system:

Quantity of sanitary sewage = $300 \times 350 \times 200 \times 0.80 = 16800 \text{ m}^3/\text{day}$ = 0.194 m³/sec

Auced into a retrieval see Q2. A sector has a gross area of 65 hectares and a residential area of 50 hectares. If net residential density is 325 pph, what is the gross density of the sector (A) 275 pph (B) 225 pph (C) 300 pph (D) 250 pph n relation to this publicat

Answer: Net density = population / Residential area $\Rightarrow 325 = x / 50$ $\Rightarrow x = (50 * 325)..... population$ Gross density = population / Gross area $\Rightarrow y = 50*325 / 65 = 250$ Answer (D)

Q3. A plot of land measuring 25 m x 40 m has a Ground +4 storeyed building with uniform floor areas. If the land has been utilised to its fullest and FAR is 2.5, calculate the permissible ground coverage? (A) 50% (B) 5% (C) 25% (D) 40%

Answer: FAR = total built up area / plot area $\Rightarrow 2.5 = x / 25 * 40$ GATEN

tour lines are lines map connecting por vation. If you walk tour line you neither to

nstitution, which deals with

ted as the Twelfth Scheh cal Bodies, as follows:

lly retarded.

administration, % of employment in Non-agricultural activities and other factors. Further, a Governor may also if, he fits it administration and the industrial establishments, can specify the Industrial Townships by public notice. Its tenure is five years.

Municipal councils are created for smaller urban areas. Its tenure is five years. Municipal corporations are created for larger urban areas. Its tenure is 5 years. (Source: http://www.yourarticlelibrary.com/law/74th-amendment-act/highlights-of-74th-amendment-act-1992-in-india/66687/)

	inthesis between Indo-Arvans	and Dravidian stylistic feature	es in an temple is	
Q.28 The best example of sy (A) Hoysaleshwar	nthesis between Indo-Aryans (B) Maduri	(C) Konark	(D) Dilwara	
ATTO				

The Indo-Aryan style prefers a tower with rounded top and curvilinear outline while the tower of the Southern or Dravidian style is usually in a shape of a rectangular truncated Pyramid. The north Indian or Orissa style or nagara style is referred to as Aryan style and the vimana style is so called Dravidian style

Dravidian Style

From 12th century, under the Dravidian Style, it became usual to fortify the temple often with three square concentric walls with gates on four sides. The gates were surmounted by watch towers or gate houses further developed into soaring towers or Gopuram generally much taller than the modest Sikhara over the central shrine.

The entrance tower was usually in the form of an oblong pyramid with its broadest side parallel to the wall. This new style is often called Pandyan style. This style introduced more elaborate ornamentation and the use of animal forms is pilasters and columns including the rampant horses and leographs that further give a distinctive character of Dravidian architecture. The platforms and walls are covered with narrow carved friezes of elephants, horsemen, monsters and scenes of mythology and legend.

Every important temple in South India there was provisions of a building for amman the God's chief wife which was often nearly as large as the main shrine itself and a marriage hall or Kalyanmandapam wherein the icons of god and goddess were ceremonially united on festival days.

Another feature in the Vijayanagar style is the profusion of string yet delicate carving which adorns the pillared halls, the columns

of which are so decorated that they become sculptures in their own right. Prancing horses, vigorous and energetic leap from the stone with leogryphs and other fantastic monsters. For brilliancy of decorative imagination the Vijayanagar style of architecture was never surpassed in Hindu India.

Indo-Aryan Style

Most of the original structures of this type do not exist today due to wave on Non-Hindu conquests in the Northern parts of India except in Gujrat, Khajurao, Bihar and Odisha. Even the great temples at Varanasi and Mathura are reconstructions and do not have the original structures built. Some of the existing excellent examples are of Khajurao Temple, Konark Sun Temple, Lingaraj Temple and Jagantha Temple at Puri.

The North Indian Sikhara was a tower which begins to curve inwards at about one third of its heights with rounded top crowned by a flat stone disc and final Kalasa. The Lingaraj like most Indo-Aryan Style is built as a series of four halls-a hall of offerings, (bhog mandap), dancing hall (natmandir), a assembly hall (Jagmohana) and a sanctuary (Garvagriha or deul). The Odia architects were lavish with their exterior decoration, and their sculptures produced works of great merit but the interiors are unadorned. In the larger temples the carbelled roofs of the halls rested on large pilasters but pillars were not generally used and roofs were often partly supported by iron girders.

Q.29 Urushringa is the design component used in Shikhara of one of the following temple styles (A) Bhubaneshwari (B) Dravidian

(C) Khajuraho (D) Deccan



Figure: The figure shows the Mcenakshi Amman Temple at Madurai the quintessential example of the Dravidian Architecture.



Figure: The figure shows the Lingaraja temple at Bhubaneswar the quintessential example of the Indo-Aryan Architecture.

a to Urban areas. "Govern" evenue generated for local

1.10 The duct size for an air conditioning system is dependent on amount of airflow and its

- (A) velocity (B) temperature
- (C) relative humidity
- (D) latent heat

The air inside AC duct can be treated as a fluid. If the duct size is decreased the flow will increase as per law of continuity.

- 1.11 The botanical name of 'Neem' tree, used for roadside landscaping is
- (A) Lagerstroemia speciosa
- (B) Ficus benghalensis
- (C) Kleinhamia hospita
- (D) Azadirachta Indica

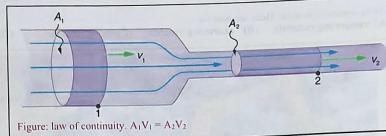


Figure: Lagerstroemia speciosa, Common name: Hindi: Jarul जरुल • Manipuri: Jarol • Tamil: கதலி Kadali • Marathi: Taman

This is a beautiful tropical flowering tree with flowers that are are pink, purple or purplish - pink. leaves are used against diabetes mellitus and for weight loss. Leaves are able to lower blood sugar, effective in weight loss. Source:

https://toptropicals.com/catalog/uid/Lagerstroemia_speciosa. htm

(Source: http://www.flowersofindia.net/catalog/slides/Queen%20Crape %20Myrtle.html)

as developed as reliquary mon uddha himself, or of later Bat 1.12 Symbolic representation of water by sand is frequently any stupas contain only symbolic found in ains. The dome is filled with (A) Mughal Garden exterior, and topped by a sum (B) English Garden

at encloses a royal parasol ((C) Japanese Garden development, the dome is the (D) Moorish garden

h stairs leading clockwise from

Toranas

walkway, where the worships 1.13 Kenzo Tange developed the concept of lome. Finally, the whole sum (A) Deconstruction elaborate gates (torana) art hal (B) Arcology (C) Metabolism

Chattres

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nal points. (D) Anamorphosis

cteristics of planar cross section 1.14 The maximum slope in a ramp for wheel chair movement is (A) 1:8 (B) 1:12 (C) 1:20 (D) 1:25



Figure: Azadirachta Indiaca [Neem]. Leaves, flowers and its fruits are edibles.

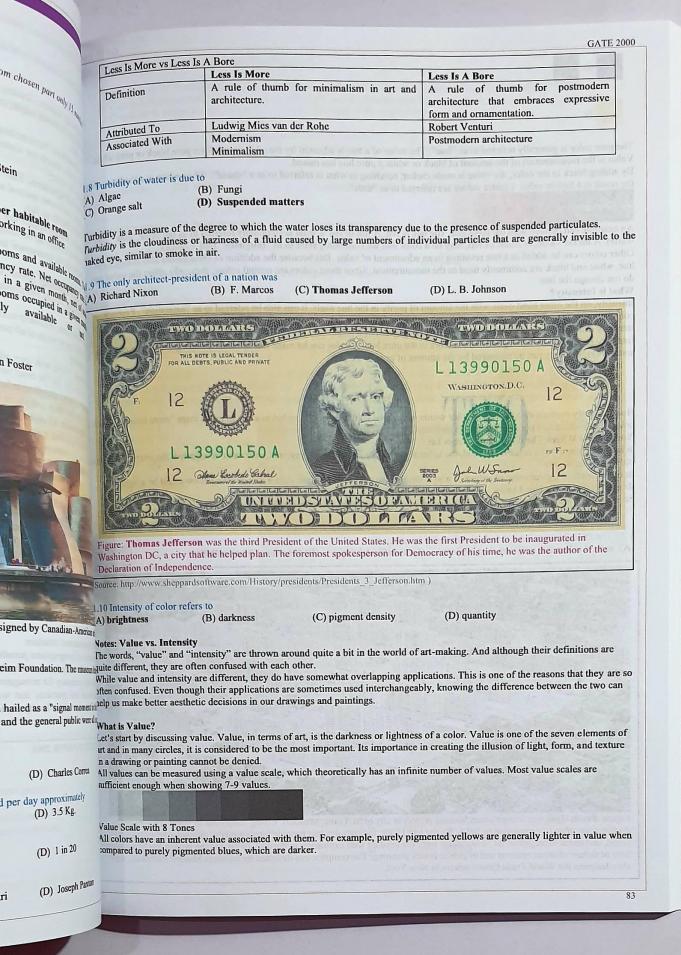


Figure: Ficus benghalensis, Barh or Banyan, a remarkable tree of India and tropical Africa sends down from its branches great numbers of shoots, which take root and become new trunks.

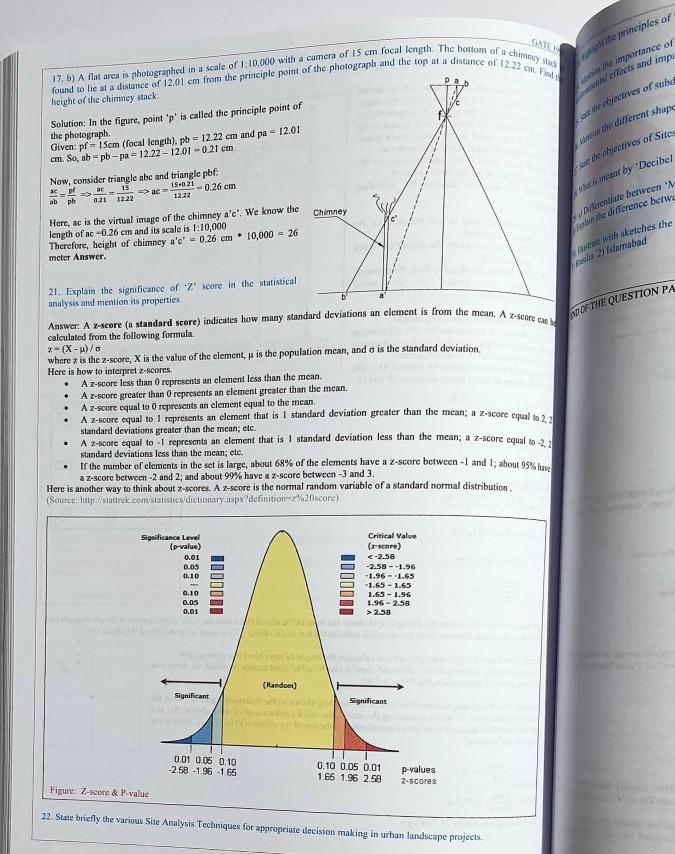


Figure: sand and gravel had long been a feature of Japanese gardens. In the Shinto religion, it was used to symbolize purity, and was used around shrines, temples, and palaces. In zen gardens, it represents water.

d cost



1.15 The pH scale runs from 0-14, the (A) 0 (B) 4.5 (C) 7.0	nearest value of drinking water is	4100 06
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	Figure. preed	ka ni i is an organisa ntrol ntrol
1.17 According to architecture of Man	isara a	is an organ
building is called 'female' when its plan	n is (B) Rectangular (D) Square	ntrol
(A) Octagonal	(D) Square	control
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1.18 The unit of measurement for intensi	(B) Decibel	a atri
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(C) Hertz (Source: http://www.animations.physics.)	unsw.cou.au jwicesmeet	Intion Contraction www.cpcb.nic.in ome is used to heric pressure
	ween wall and window which creates glare, the ratio of wall to window area should be s	me is used to
1.19 To prevent excessive contrast betw	veen wan and wheely wheely area should be wheelood	heric pressure
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(A) 1:1		
(C) 3:1	O Sun Part	n of light yer dome was riod
1.20 Permissible stress in bending compre (A) 3.0 (C) 7.0	ession (N/mm2) for M20 grade concrete is (B) 5.0 (D) 8.5	nod ance period ley civilizatio civilization
1.21 Non-degradable pollutant is	. Vitch the	following
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(C) Detergents	(D) DDT	
DDT, plastics, polythene, bags, insecticide glass objects, iron products and silver foils 1.22 Maximum airflow at body level in a ro	oom can be achieved through (B) High inlet and low outlet	rinciples and ite planning he city in His
(A) High inlet and high outlet	(D) Low inlet and low outlet	our books of
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GATE 1991						
1. Ratio 'Golden Mean' is: (A) 1: 2.216 (B) 1: 1.618	(C) 1: 1.50	(D) 1: 1.44 Answer: (B)				
 2. 'Mihrab' is found (A) inside wall of a mausoleum (C) on the west wall of a mosque 	(B) on the crown of (D) in the stepped w	minaret vell of Gujarat				
3. Which one falls under Indo-Sarasanic architecture? (D) Bahai Temple (A) Qutab Minar (B) Taj Mahal (C) Sher Shah's tomb						
4. Which of the following is not a function of a good mulch:(A) Aid in water retention(B) Prevent soil temperature fluctuations(C) Encourage weed growth(D) Improve landscape appearance						
5. Byzantine architecture is famous for:(A) Stone carving (B) Pointed arches	(C) Fluted columns	(D) New type dome construction				
6. 'Gopuram' refers to (A) Temple (B) Gateway	(C) Village	(D) Brick dome				
7. Most efficient arch in transferring load:(A) Semi circular (B) Flat	(C) Pointed	(D) Catenary				

Average power outp Notes: The catenary curve is interesting because there are many examples of it in the world around us. The best way to visualize a crowatt is a power r catenary curve is to imagine the shape of a hanging chain. (The word comes from the Latin word catena meaning "chain.") ar. The microwatt is Catenaries are used in engineering and architecture, for example in the shape of hanging bridges, or when inverted, in the shape of some arches. One of the most impressive examples is the St. Louis Gateway Arch. Catenaries can also be found in nature, for Principal determina example in the curve of a spider web. ULanduse compositio

At first glance, catenaries might look like parabolas, but they have a completely different formula. The formula gives a shape that has a special structural property when used as an arch. When the chain shape is inverted into an arch and divided into building blocks, the blocks can support each other by gravity alone. To fully understand how catenaries differ from parabolas and why chains take the shape of catenary curves, we need some calculus background which is out of syllabus.



8. Dimension of Corbusier's modular human scale are in:

(A) Arithmetic progression (C) Unrelated natural order

- (B) Geometric Progression (D) None of the above
- 9. Find odd one out of the following: (A) T-trap (B) Q- trap

(C) S- trap

(D) P- trap

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End of Preview. Thank you for your time.