GATE 2024 Architecture and Planning

Time Allowed :3 Hour	**Maximum Marks :**100	**Total Questions :**65

General Instructions

Please read the following instructions carefully:

1. This question paper is divided into three sections:
   - **General Aptitude (GA):** 10 questions (5 questions × 1 mark + 5 questions × 2 marks) for a total of 15 marks.
   - **Architecture and Planning:**
     - **Part A (Mandatory):** 39 questions (18 questions × 1 mark + 21 questions × 2 marks) for a total of 60 marks.
     - **Part B (Optional):** Candidates can choose either Part B1 (Architecture) or Part B2 (Planning). Each part contains 16 questions (7 questions × 1 mark + 9 questions × 2 marks) for a total of 25 marks.
2. The total number of questions is **65**, carrying a maximum of **100 marks**.
3. The duration of the exam is **3 hours**.
4. Marking scheme:
   - For 1-mark MCQs, $\frac{1}{3}$ mark will be deducted for every incorrect response.
   - For 2-mark MCQs, $\frac{2}{3}$ mark will be deducted for every incorrect response.
   - No negative marking for numerical answer type (NAT) questions.
   - No marks will be awarded for unanswered questions.
5. Ensure you attempt questions only from the optional section (Part B1 or Part B2) you have selected.
6. Follow the instructions provided during the exam for submitting your answers.

General Aptitude (GA)

1. If '→' denotes increasing order of intensity, then the meaning of the words [sick → infirm → moribund] is analogous to [silly → _____ → daft].
Which one of the given options is appropriate to fill the blank?

(A) frown
(B) fawn
(C) vein
(D) vain

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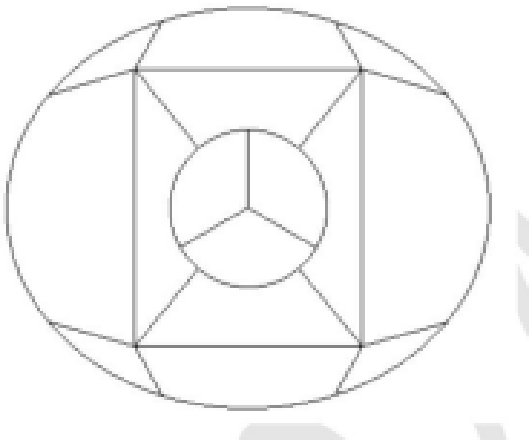
2. The 15 parts of the given figure are to be painted such that no two adjacent parts with shared boundaries (excluding corners) have the same color. The mini-

mum number of colors required is:



(A) 4
(B) 3
(C) 5
(D) 6

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3. How many 4-digit positive integers divisible by 3 can be formed using only the digits {1, 3, 4, 6, 7}, such that no digit appears more than once in a number?

(A) 24
(B) 48
(C) 72
(D) 12

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4. The sum of the following infinite series is:

$$2+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{8}+\frac{1}{9}+\frac{1}{16}+\frac{1}{27}+\cdots$$

(A) $\frac{11}{3}$
(B) $\frac{7}{2}$
(C) $\frac{13}{4}$
(D) $\frac{9}{2}$

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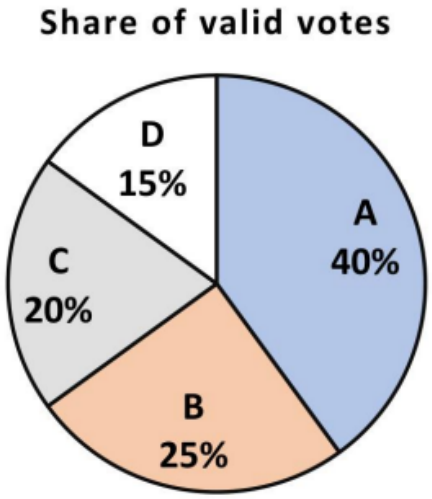
5. In an election, the share of valid votes received by the four candidates A, B, C, and D is represented by the pie chart shown. The total number of votes cast in the election were 1,15,000, out of which 5,000 were invalid.



Based on the data provided, the total number of valid votes received by the candidates B and C is:

(A) $45,000$
(B) $49,500$
(C) $51,750$
(D) $54,000$

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6. Thousands of years ago, some people began dairy farming. This coincided with a number of mutations in a particular gene that resulted in these people developing the ability to digest dairy milk.
Based on the given passage, which of the following can be inferred?

(A) All human beings can digest dairy milk.
(B) No human being can digest dairy milk.
(C) Digestion of dairy milk is essential for human beings.
(D) In human beings, digestion of dairy milk resulted from a mutated gene.

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7. The probability of a boy or a girl being born is $\frac{1}{2}$. For a family having only three children, what is the probability of having two girls and one boy?

(A) $\frac{3}{8}$
(B) $\frac{1}{8}$
(C) $\frac{1}{4}$
(D) $\frac{1}{2}$

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8. Person 1 and Person 2 invest in three mutual funds A, B, and C. The amounts they invest in each of these mutual funds are given in the table below.

	Mutual Fund A	Mutual Fund B	Mutual Fund C
Person 1	10,000	20,000	20,000
Person 2	20,000	15,000	15,000

At the end of one year, the total amount that Person 1 gets is 500 more than Person 2. The annual rate of return for the mutual funds B and C is 15% each. What is the annual rate of return for the mutual fund A?

(A) 7.5%
(B) 10%
(C) 15%
(D) 20%

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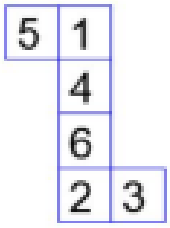
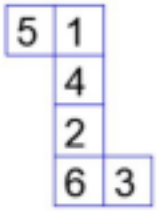
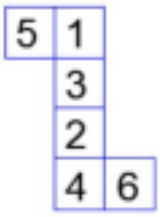
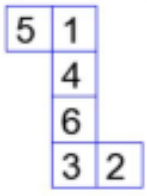
9. Three different views of a dice are shown in the figure below.

The piece of paper that can be folded to make this dice is:

(A)


(B)


(C)


(D)


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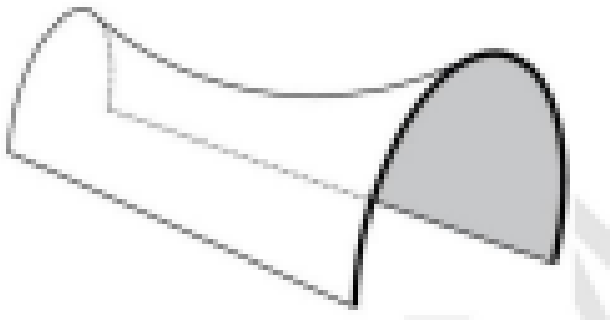
10. Visualize two identical right circular cones such that one is inverted over the

other and they share a common circular base. If a cutting plane passes through the vertices of the assembled cones, what shape does the outer boundary of the resulting cross-section make?
(A) A rhombus
(B) A triangle
(C) An ellipse
(D) A hexagon

Part A

11. The nature of curvature of the following structural form is



(A) monoclastic
(B) synclastic
(C) anticlastic
(D) möbius

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12. As per the Ekistics Logarithmic Scale, the "world city" is referred to as

(1) Megalopolis
(2) Conurbation
(3) Acropolis
(4) Ecumenopolis

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13. In *Manasara Silpasashtra*, a bow-shaped town plan is known as:
(A) Dandaka
(B) Prastara
(C) Kārmuka
(D) Nandyāvarta

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14. The value of a property when sold at a lower price than its open market price is called

(A) Distress Value
(B) Accommodation Value
(C) Speculative Value
(D) Replacement Value

15. In a traffic survey, Enoscope is used to measure

(1) Volume to Capacity ratio
(2) Sight distance
(3) Spot speed
(4) Intersection delay

16. The author of the book *Human Aspects of Urban Form* is

(A) Cliff Moughtin
(B) Amos Rapoport
(C) Peter Katz
(D) Lewis Mumford

17. Which of the following statements is correct for Urban Cool Island (UCI)?
(A) The UCI and Urban Heat Island (UHI) cannot happen in a city at the same time.
(B) Air temperature of surrounding rural areas is warmer than that of the urban areas.
(C) Air temperature of surrounding rural areas is cooler than that of the urban areas.
(D) UCI happens only in a snow-clad mountain.

18. Which of the following statements is correct for an oxidation pond to treat wastewater?

(A) It is an aerobic pond.
(B) It is an anaerobic pond.
(C) It does not require sunlight.
(D) It does not remove Biological Oxygen Demand (BOD).

19. The conservation architect of the Maitreya Buddha Temple at Basgo, Ladakh, which won the 2007 UNESCO Asia-Pacific Heritage Award is

(A) Abha Narain Lambah
(B) Vinod Kumar M. M.
(C) Rahul Mehrotra
(D) Saima Iqbal

20. Which of the following options is/are the right sequence(s) in the water treatment process?

(A) Coagulation → Flocculation → Sedimentation
(B) Sedimentation → Filtration → Disinfection
(C) Sedimentation → Flocculation → Coagulation
(D) Disinfection → Filtration → Flocculation

21. Which of the following is/are associated with Gentrification in a neighbourhood?

(A) Wealthier households displace poor households
(B) Poor households displace wealthier households
(C) Real estate value increases
(D) Real estate value decreases

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22. Which of the following sites is/are included in the UNESCO World Heritage List as on December 2022?

(A) Capitol Complex, Chandigarh
(B) Moti ki Masjid, Delhi
(C) Keoladeo National Park, Bharatpur
(D) Paradesi Synagogue, Kochi

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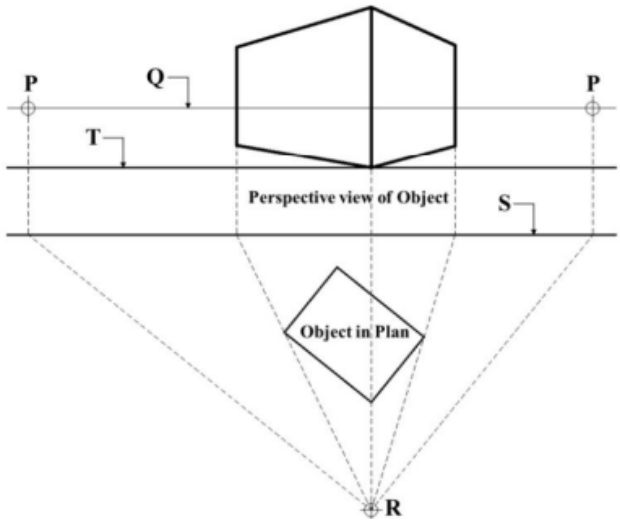
23. The reference points, lines, and planes for drawing a two-point perspective of an object are marked in the Figure below. Select the correct option(s) that match(es) with the corresponding nomenclature.



(A) R – Station point, S – Picture plane
(B) R – Vanishing point, T – Picture plane
(C) P – Vanishing point, T – Ground line
(D) Q – Ground line, S – Horizon line

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24. India's intended Nationally Determined Contribution to the United Nations Framework Convention on Climate Change in 2022 include(s):
(A) reduction of emissions intensity of India's GDP by 45% by 2030 from 2005 level
(B) achieving about 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030
(C) achieving the target of net-zero emission by 2030
(D) reduction of total projected carbon emission by one billion tonnes from 2022 to 2025

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25. As per the Census of India 2011, non-notified slums are categorised as:
(A) Recognised
(B) Identified

(C) Unrecognised
(D) Authorised

26. Which of the following is/are under the purview of the Energy Conservation Building Code of India 2017?
(A) Indoor Lighting
(B) Outdoor Lighting
(C) Plug Loads
(D) Embodied Energy

27. Which of the following is/are used for municipal fiscal resource mobilization?

(A) Property tax
(B) Development charges
(C) Income tax
(D) Salary of municipal staff

28. A ramp with a slope of 1:12 is required for wheelchair access. Intermediate landings of length 1.5 m each have to be provided after every 9 m running length. The running length of a straight ramp including landing, to negotiate a level difference of 900 mm vertical height, in m, is (rounded off to two decimal places):

29. Match the *features* in Group–I with the corresponding *software tools* in Group–II.

Group-I		**Group-II**	
(P)	Raster Graphics Editing	(1)	OpenStudio
(Q)	Energy Modeling	(2)	GIMP
(R)	Visual Programming Interface	(3)	STAAD
(S)	Structural Analysis	(4)	Grasshopper
		(5)	Radiance

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

30. Match the elements in Group-I with the corresponding buildings in Group-II.

Group-I		**Group-II**	
(P)	Lightweight Structure	(1)	Taipei 101, Taipei by Lee and Wang
(Q)	Base Isolator	(2)	The Gherkin, London by Foster & Partners
(R)	Tuned-mass Damper	(3)	Museum of New Zealand Te Papa Tongarewa, Wellington by Ivan Mercep
(S)	Diagrid	(4)	Paper Log Houses, Kobe by Shigeru Ban
		(5)	Metropolitan Cathedral of Christ the King, Liverpool by Lutyens and Gibberd

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

(D) P – 3, Q – 2, R – 1, S – 5

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31. Match the following concepts in Group-I with their corresponding description in Group-II.

Group–I	**Concepts**	**Group–II**	**Descriptions**
(P)	NIMBY	(1)	Resisting physical intervention by public or private enterprises in their neighborhood
(Q)	Form-based code	(2)	Regulating development primarily through urban form
(R)	Tactical urbanism	(3)	Short-term, low-cost interventions to change a neighborhood
(S)	Suburbanization	(4)	Establishment of residential areas on city outskirts
		(5)	Providing a clear view of the water-front to abutting streets

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

Q.32 Match the urban renewal projects in Group–I with the corresponding cities in Group–II.

Group–I	**Urban Renewal Projects**	**Group–II**	**Cities**
(P)	Cheonggyecheon	(1)	New York
(Q)	The High Line	(2)	London
(R)	False Creek South	(3)	Seoul
(S)	Canary Wharf	(4)	Vancouver
		(5)	Tokyo

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

Q.33 Match the Biosphere Reserves in Group–I with their corresponding features in Group–II.

Group–I	Biosphere Reserves	Group–II	Features
(P)	Gulf of Mannar	(1)	Ridge, Glacier
(Q)	Sunderbans	(2)	Sub-tropical/Tropical Forest, Stepped Hill
(R)	Nanda Devi	(3)	Swamp forest, Mangrove
(S)	Nilgiri	(4)	Coral Reefs, Seagrass bed
		(5)	Salt Marsh, Flat Terrain

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

Q.34 Match the terminologies in Group–I with their descriptions in Group–II.

Group–I	Terminologies	Group–II	Descriptions
(P)	Edge City	(1)	Rapid expansion of geographical areas of towns or cities
(Q)	Synoecism	(2)	Violence against the city
(R)	Urbicide	(3)	A secondary CBD on the edge of the city
(S)	Urban Sprawl	(4)	Rebuilding core city area
		(5)	Union of several small urban settlements under one rule

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

Q.35 Match the items in Group–I with their corresponding items in Group–II.

Group–I	Items	Group–II	Items
(P)	Floating floor	(1)	Overflow control
(Q)	Float valve	(2)	Delay not affecting a project
(R)	Metal float	(3)	Acoustical buffer
(S)	Free float	(4)	Plastering equipment
		(5)	Traffic flow control

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

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36. As per the URDPFI Guidelines 2015, match the type of educational facilities in Group-I with the corresponding minimum population to be served per facility in Group-II.

Group-I	Group-II
(P) Integrated school	(4) 1,250,000
(Q) Senior secondary school	(3) 90,000
(R) College	(2) 2,500
(S) Primary school	(5) 7,500

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

Q.37 Which of the following statements is/are true?

(A) Physiological Equivalent Temperature is used in outdoor thermal comfort evaluation.
(B)Thermal Performance Index is computed using outside surface temperature of building envelope.
(C) Reynolds number less than 2000 refers to laminar wind flow.
(D) Reynolds number greater than 4000 refers to turbulent wind flow.

Q.38 Which of the following statements is/are correct?

(A) Yellow, blue-violet, and red-violet are split complementary hues.
(B) Orange, green, and violet are analogous combinations.
(C) CMYK is a subtractive colour system.
(D) Blue, green, orange, and red are tetrad combinations.

Q.39 Which of the following statements is/are correct?

(A) The Royal Botanical Garden is in Kew, England.
(B) The Villa d'Este is in Tivoli, Italy.
(C) Indira Gandhi Memorial Tulip Garden is in Srinagar, J&K, India.
(D) Shinjuku Gyoen National Garden is in Beijing, China.

Q.40 Which of the following statements is/are correct?

(A) Hibiscus or china rose (*Hibiscus rosa-sinensis*) is a shrub which has red, pink, white, and yellow blossoms.

(B) Frangipani, champa, and plumeria also are names of the same flowering tree.

(C) Jacaranda (*Jacaranda mimosifolia*), gulmohar (*Delonix regia*), and amaltas (*Cassia fistula*) are flowering trees.

(D) The fruit of the Kadamb/cadamba tree (*Neolamarckia cadamba*) is conical in shape and poisonous for consumption.

Q.41 Which of the following is/are component(s) of Right of Way (RoW) of a road?

(A) Building line
(B) Kerb
(C) Carriageway
(D) Sidewalk

Q.42 As per the National Building Code of India 2016, terminologies associated with *fire fighting* in a building is/are

(A) Refuge area
(B) Water sprinkler system
(C) Panic bar
(D) Atrium

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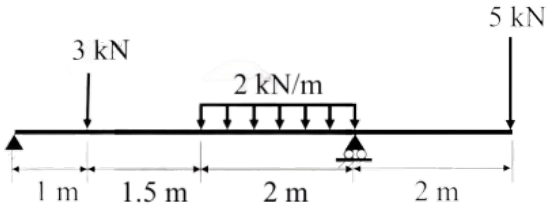
43. For the beam shown below, ignoring the self-weight, the *maximum hogging moment* (in kN-m) generated for the loads indicated is _____ (rounded off to one decimal place).



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44. At present, the cost of a new office equipment is 50,000 (in Indian Rupees). It has 15% salvage value after a useful life of 5 years. Using the straight line method of depreciation, the book value of the equipment 3 years from now, in Indian Rupees, will be ____ (in integer).

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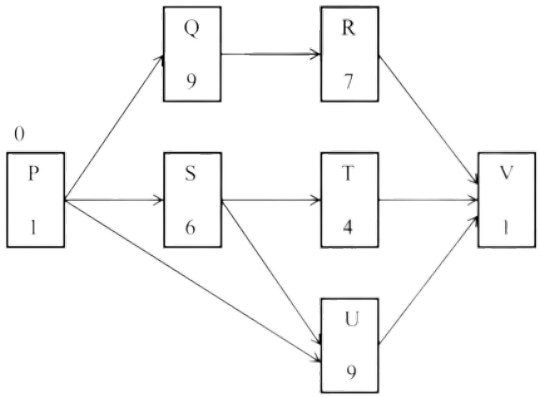
45. The network diagram of a construction project is shown in the following figure. The duration of each activity, in days, and the early start time of the project are denoted in the diagram. The *total project duration* along the critical path, in days, is _____ (in integer).



46. The design of a 1200 capacity concert hall considers 1/3 female audience and 2/3 male audience. The table below shows the guideline for calculating Water Closet requirements. Using the above guideline, the number of Water Closets required for the total audience is ____ (in integer).

Table: Water Closet Requirements

Fixture	Male	Female
Water closet	1 per 100 up to 400 Over 400, 1 per every 250	3 per 100 up to 200 Over 200, 2 per every 100

47. A declining Industrial Town has proposed to improve water sustainability by reducing stormwater runoff through change of land use land cover (LULC), as shown in the Table below, to attract new residents. Considering a flat topography and zero additional runoff from the adjoining areas, the reduction in runoff generation for a 400 mm rainfall event in the industrial town due to the proposed intervention, in cubic meters, is ____ (rounded off to two decimal places).

Table: LULC Changes and Runoff Coefficients

LULC	Runoff Coefficient	Existing Area (ha)	Proposed Area (ha)
Industrial	0.7	1500	800
Residential	0.5	1000	1200
Park and Playgrounds	0.25	1200	1000
Forest	0.15	300	1000

48. A real estate developer is developing a township on a PPP mode. The total area of the site is 2.627 hectares with an allowable FAR of 2.25, of which 20% is earmarked for MIG category. The gross area of each MIG unit including common areas and services is 72 m^2. Assuming super built up area to be same as FAR, the maximum number of MIG apartments that can be constructed is ____ (in integer).

49. A municipal town requires a volume of 70,000 m^3 compacted solid waste to fill a low lying land. The city has a total of 10,000 households. Using the information as shown in the Table above, the estimated minimum number of days required to fill the low lying land is ____ (in integer).

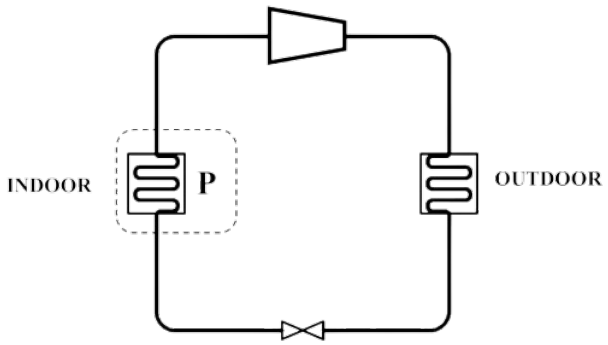
Type of House	Percentage of Households	Equivalent volume of compacted solid waste generated/ household/ day
LIG	30%	0.10 m^3
MIG	60%	0.15 m^3
HIG	10%	0.20 m^3

For Architecture Candidates Only

Q.50 Rose window is a characteristic feature of:

(A) Great Temple of Ammon, Karnak, Egypt
(B) Temple of Jupiter, Baalbek, Lebanon
(C) Notre-Dame, Paris, France
(D) Humayun Tomb, Nizamuddin, Delhi

Q.51 The schematic diagram of a unitary air-conditioner operating in cooling mode is shown in the following Figure. The component P marked in the figure represents:

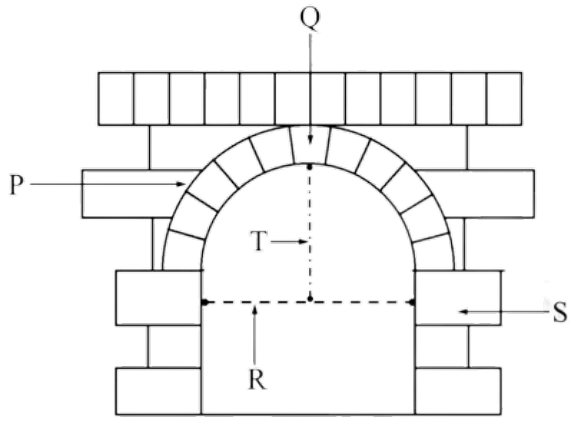


(A) Condenser
(B) Evaporator
(C) Compressor
(D) Expansion valve

Q.52 *Titan Integrity Campus*, Bengaluru is designed by:

(A) Christopher C. Benninger
(B) Sanjay Mohe
(C) Raj Rewal
(D) Anant Raje

Q.53 With reference to the Figure below, which of the following labelling is/are correct?



(1) P – Extrados, Q – Key, R – Span, T – Rise
(2) Q – Key, S – Abutment, T – Rise
(3) P – Abutment, R – Rise, T – Extrados
(4) Q – Key, S – Span, T – Extrados

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54. Which of the following buildings has/have pendentives as a structural element?
(A) St. Mark's Basilica, Venice, Italy
(B) Westminster Cathedral, London, UK
(C) Dilwara Temple, Mount Abu, India
(D) Hagia Irene Museum and Concert Hall, Istanbul

Q.55 Polytetrafluoroethylene (PTFE) coated fiberglass has been used as a roofing membrane in which of the following?

(A) Jawaharlal Nehru Stadium, New Delhi
(B) Eden Gardens Stadium, Kolkata
(C) Melbourne Cricket Ground Stadium, Melbourne
(D) Beijing National Stadium, Beijing

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56. A non-stop express elevator directly connects the observatory level at the 80^{th} floor of a tower with the podium at the 2^{nd} floor level. The tower has a uniform floor-floor height of 4 m. The elevator attains a maximum speed of 8 m/s. Assume 2 m/s^2 as net vertical acceleration and net vertical deceleration (incorporating gravity). If the elevator starts from a state of rest from the podium, the time taken to reach the observatory, in seconds, is _____ (rounded off to one decimal place).

Q.57 Match the elements in Group–I with the corresponding religious buildings in Group–II.

Options:

Group-I		Group-II	
(P)	Bell capital	**(1)**	Mosque
(Q)	Mehrab	**(2)**	Hindu Temple
(R)	Gopuram	**(3)**	Greek Temple
(S)	Pediment	**(4)**	Romanesque Church
		(5)	Egyptian Temple

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

Q.58 Match the museums in Group-I with their architects in Group-II.

Group-I	Museum	Group-II	Architect
(P)	Indira Gandhi Rashtriya Manav Sangrahalaya, Bhopal	(1)	Charles Correa
(Q)	Bihar Museum, Patna	(2)	Ram Sharma
(R)	Gandhi Memorial Museum, Ahmedabad	(3)	Romi Khosla
(S)	Museum of Art and Photography, Bengaluru	(4)	Soumitro Ghosh & Nisha Mathew
		(5)	Fumihiko Maki

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

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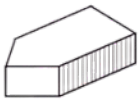
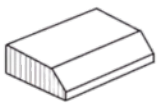
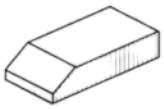
59. Match the specially shaped bricks in Group-I with their corresponding nomenclature in Group-II.

Group–I		Group–II	
(P)		(1)	Plinth Header
(Q)		(2)	Bird's mouth
(R)		(3)	Squint
(S)		(4)	Double cant
		(5)	Plinth stretcher

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

(D) $P-4, Q-1, R-2, S-5$

Q.60 Which of the following statements is/are correct?

(A) The unit of Lighting Power Density is $\mathrm{W/m^2}$.
(B) The unit of Lighting Power Density is $\mathrm{cd/m^2}$.
(C) The unit of Sound Power is W.
(D) The unit of Energy Performance Index is $\mathrm{kWh/m^2/year}$.

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61. Which of the following statements is/are correct?

(A) Kath-kuni construction comprises layers of stone and timber.
(B) Nalukettu houses have a courtyard.
(C) Ihra is a two-storeyed house with stone masonry and a flat-roof.
(D) Bhunga has a circular plan.

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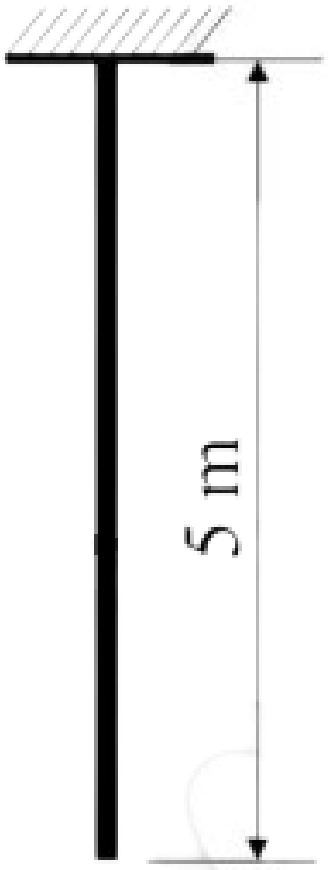
62. A $5\,\mathrm{m}$ long Aluminium tie rod of cross-section $0.20\,\mathrm{m} \times 0.04\,\mathrm{m}$ is subjected to a tensile force induced by its self-weight of $21.20\,\mathrm{kg/m}$ considering gravitational acceleration of $10\,\mathrm{m/s^2}$. If tensile Young's modulus of Aluminium is $70,000\,\mathrm{MPa}$, the maximum tensile strain in the rod is _____ $\times 10^{-6}$ (rounded off to two decimal places).



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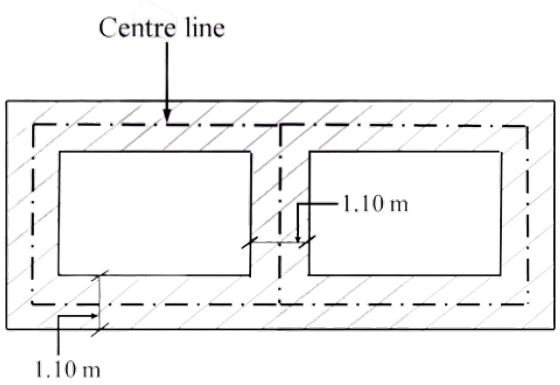
63. The following figure shows the excavation plan of a two-room structure, where the trench has a uniform width of $1.10\,\mathrm{meters}$. If the cumulative center line

length of the trench is 41.10 meters and the required depth of concrete to be poured is 0.30 meters, the *volume of concrete in the foundation*, in cubic meters, will be _____ (rounded off to two decimal places).



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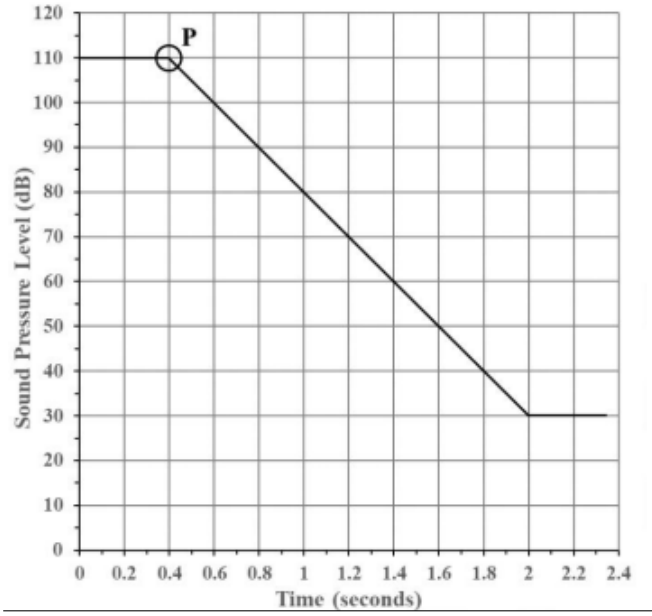
64. The decay of sound in an enclosed lecture hall of volume $3500\,\mathrm{m}^3$ is shown in the figure below. The sound source is switched off at point P. Using the Reverberation Time (RT_{60}) obtained from the figure, the calculated total sound absorption of the hall, in Sabins, is _____ (rounded off to the nearest integer).



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65. A 2 TR window air-conditioner of Energy Efficiency Ratio (EER) 3.1 is catering to a room of volume $40\,\mathrm{m}^3$. The air-conditioner is operational for 600 hours during summer on cooling mode. The compressor is also operational for the complete duration. The *total energy consumption* of the air-conditioner during the above-mentioned period, in kWh, is _____ (rounded off to the nearest integer).

Part B2: For Planning

66. Which of the following aims is set under the SVAMITVA scheme of the Ministry of Panchayati Raj, Government of India?

(A) Provide tap water connection to all households in rural areas.

(B) Provide 'right to work' to the rural people falling Below Poverty Line.

(C) Establish clear ownership of property in rural inhabited (Abadi) areas, by mapping of land parcels using improvised technology.

(D) Provide effective and efficient institutional platforms to enable the rural poor to increase their household income by means of sustainable livelihood enhancement.

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67. Mass Rapid Transit System is a

(A) Fixed Route and Fixed Schedule service.
(B) Fixed Route and Flexible Schedule service.
(C) Flexible Route and Fixed Schedule service.
(D) Flexible Route and Flexible Schedule service.

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68. Which of the following initiatives of the Government of India is also known as the National Master Plan for Multi-modal Connectivity?

(A) PM Gati Shakti
(B) Bharatmala
(C) Parvatmala
(D) Sagarmala

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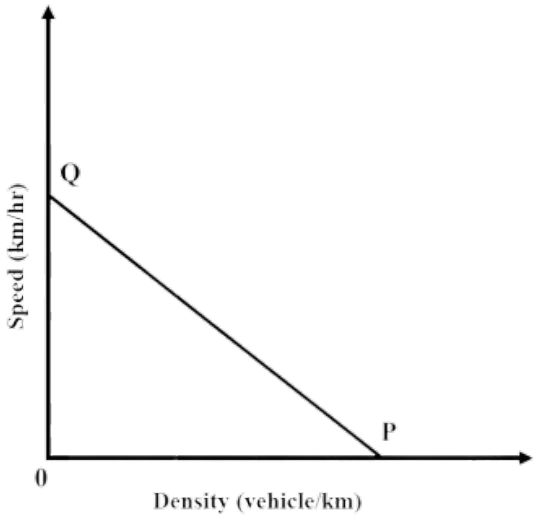
69. With reference to the Speed-Density diagram given below, which of the following statements is/are correct?



(A) Point P represents Maximum Flow.
(B) Point P represents Jam Density.
(C) Point Q represents Space Mean Speed for Free Flow condition.
(D) Point Q represents Time Mean Speed.

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70. Which of the following statements correctly represent(s) the Demographic dividend of a country?

(A) Share of working age population is larger than dependent population.
(B) Share of working age population is lesser than dependent population.
(C) Demographic dividend demands more job creation.
(D) Demographic dividend can never lead to demographic disaster.

Q.71 As per the URDPFI Guidelines 2015, choose the option(s) which indicates the appropriate hierarchy of plans from higher to lower order.

(A) Perspective Plan $\gg$ Development Plan $\gg$ Local Area Plan
(B) Development Plan $\gg$ Special Purpose Plan $\gg$ Annual Plan
(C) Local Area Plan $\gg$ Development Plan $\gg$ Annual Plan
(D) Special Purpose Plan $\gg$ Perspective Plan $\gg$ Local Area Plan

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72. In 2021, a city survey report revealed a sex ratio of 940 with an estimated increase of 2.16% over the next 20 years. In 2041, the total population of the city is projected to be 150,000. The estimated female population in the year 2041 will be (in integers).

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73. Match the terms in Group-I with their descriptions in Group-II.

Group-I	Group-II
(P) Landfill site	(1) Development on previously developed site
(Q) Greenfield development	(2) Land to dispose solid waste
(R) Green Belt	(3) Development on previously undeveloped land
(S) Brownfield development	(4) Policy to protect livestock
	(5) A buffer to control urban development

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

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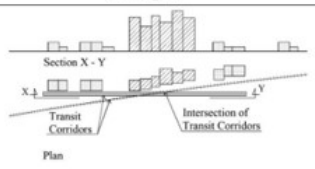
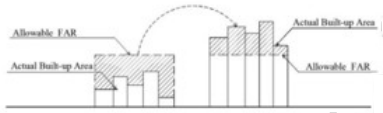
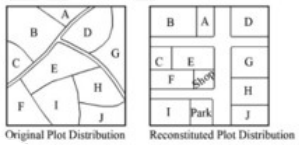
74. Match the following illustrations in Group–I with their corresponding concepts in Group–II.

Group–I	Group–II
(P) 	(1) Figure Ground Relationship
(Q) 	(2) ing Scheme (TPS)
(R) 	(3) Transit Oriented Development (TOD)
(S) 	(4) Transferable Development Rights (TDR)
	(5) Cul-de-Sac

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

Q.75 Match the following planning theories/concepts in Group-I with their corresponding proponents in Group-II.

Group-I	**Group-II**
(P) Valley Section	(1) McGee and Gemburg
(Q) Third Place Theory	(2) Oscar Newman
(R) Defensible Space	(3) Ray Oldenberg
(S) Desakota Model	(4) Patrick Geddes
	(5) C. A. Doxiadis

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

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76. Which of the following methods is/are used in traffic survey to measure the *Running Speed* and *Journey Speed*?

(A) Moving Observer Method
(B) Registration Number Method
(C) Elevated Observer Method
(D) Hardy Cross Method

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77. In the context of regional planning, which of the following terms represent(s) a region?

(A) Formal
(B) Functional
(C) Isometric
(D) Planning

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78. In a one-way single lane traffic stream, the observed average time headway is 2.5 seconds. The *traffic flow* of the above-mentioned lane, in vehicle/hr, is _____ (in integer).

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79. The demand of an EcoCity theme park is estimated as $P = 1500 - 7.5Q$, where P (in Indian Rupees) is the price of a ticket for single entry, and Q (in integer) is the number of tickets sold per hour. The *maximum revenue per hour* along the demand curve, in Indian Rupees, is _____ (in integer).

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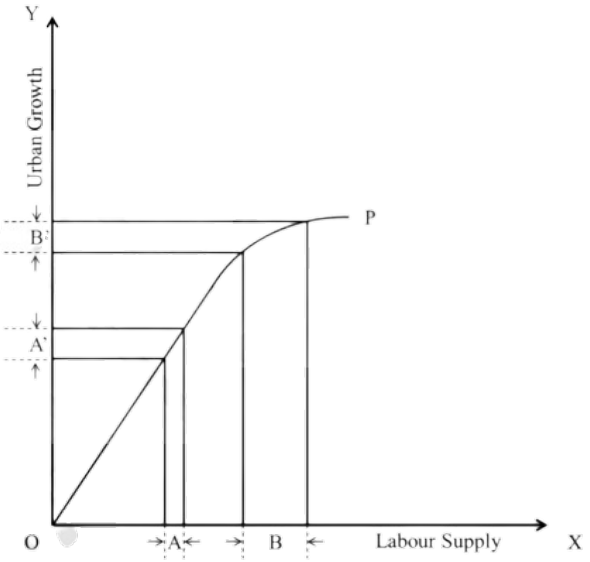
80. Labour supply and urban growth are represented in X and Y axes of the figure below. Curve OP represents the relationship between labour supply and urban growth. The ratios $A : A'$ and $B : B'$ are $1 : 1.2$ and $3 : 1.2$, respectively. If 6 units of labour is supplied in B, then the number of units of urban growth in B' will be _____ (rounded off to one decimal place).



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81. A city with a present population of $1,75,000$ is expecting an annual population growth rate of 0.85%. In a traffic assessment study, the trip generation model has been developed as $Y = 142 + 0.675X$, where Y is the number of daily trips generated within the city and X is the population of the city. The *number of daily trips* to be generated within the city after 10 years is _____ (in integer).