AR:ARCHITECTURE AND PLANNING

Duration: Three Hours *Maximum Marks*:100

Please read the following instructions carefully:

General Instructions:

1. Total duration of examination is 180 minutes (3 hours).

2. The clock will be set at the server. The countdown timer in the top right corner of screen will display the remaining time available for you to complete the examination. When the timer reaches zero, the examination will end by itself. You will not be required to end or submit your examination.

3. The Question Palette displayed on the right side of screen will show the status of each question using one of the following symbols:

You have not visited the question yet.

You have not answered the question.

You have answered the question.

You have NOT answered the question, but have marked the question for review.

You have answered the question, but marked it for review.

The Marked for Review status for a question simply indicates that you would like to look at that question again. ***If a question is answered and Marked for Review, your answer for that question will be considered in the evaluation.***

Navigating to a Question

4. To answer a question, do the following:

   a. Click on the question number in the Question Palette to go to that question directly.
   b. Select an answer for a multiple choice type question. Use the virtual numeric keypad to enter a number as answer for a numerical type question.
   c. Click on **Save and Next** to save your answer for the current question and then go to the next question.
   d. Click on **Mark for Review and Next** to save your answer for the current question, mark it for review, and then go to the next question.
   e. **Caution: Note that your answer for the current question will not be saved, if you navigate to another question directly by clicking on its question number.**

5. You can view all the questions by clicking on the **Question Paper** button. Note that the options for multiple choice type questions will not be shown.

Answering a Question

6. Procedure for answering a multiple choice type question:
    a. To select your answer, click on the button of one of the options
    b. To deselect your chosen answer, click on the button of the chosen option again or click on the **Clear Response** button
    c. To change your chosen answer, click on the button of another option
    d. To save your answer, you MUST click on the **Save and Next** button
    e. To mark the question for review, click on the **Mark for Review and Next**button**.** ***If an answer is selected for a question that is Marked for Review, that answer will be considered in the evaluation.***

7. Procedure for answering a numerical answer type question:
    a. To enter a number as your answer, use the virtual numerical keypad
    b. A fraction (eg.,-0.3 or -.3) can be entered as an answer with or without '0' before the decimal point
    c. To clear your answer, click on the **Clear Response** button
    d. To save your answer, you MUST click on the **Save and Next**button
    e. To mark the question for review, click on the **Mark for Review and Next**button**.** ***If an answer is entered for a question that is Marked for Review, that answer will be considered in the evaluation.***

8. To change your answer to a question that has already been answered, first select that question for answering and then follow the procedure for answering that type of question.

9. Note that ONLY Questions for which answers are saved or marked for review after answering will be considered for evaluation.

Paper specific instructions:

1. There are a total of 65 questions carrying 100 marks.Questions are of multiple choice type or numerical answer type. A multiple choice type question will have four choices for the answer with only **one** correct choice. For numerical answer type questions, the answer is a number and no choices will be given**. A number as the answer should be entered** using the virtual keyboard on the monitor.
2. Questions Q.1 – Q.25 carry 1mark each. Questions Q.26 – Q.55 carry 2marks each. The 2marks questions include two pairs of common data questions and two pairs of linked answer questions. The answer to the second question of the linked answer questions depends on the answer to the first question of the pair. If the first question in the linked pair is wrongly answered or is not attempted, then the answer to the second question in the pair will not be evaluated.
3. Questions Q.56 – Q.65 belong to General Aptitude (GA) section and carry a total of 15 marks. Questions Q.56 – Q.60 carry 1mark each, and questions Q.61 – Q.65 carry 2marks each.
4. Questions not attempted will result in zero mark. Wrong answers for multiple choice type questions will result in **NEGATIVE** marks. For all 1 mark questions, ⅓ mark will be deducted for each wrong answer. For all 2 marks questions, ⅔ mark will be deducted for each wrong answer. However, in the case of the linked answer question pair, there will be negative marks only for wrong answer to the first question and no negative marks for wrong answer to the second question. There is no negative marking for questions of numerical answer type.
5. Calculator is allowed. Charts, graph sheets or tables are **NOT** allowed in the examination hall.
6. Do the rough work in the Scribble Pad provided.

Q. 1 – Q. 25 carry one mark each.

Q.1 In case of residential apartments, the effective floor area available for use within an apartment, is known as

(A) Carpet Area (B) Built-up Area
(C) Plinth Area (D) Super Built-up Area

Q.2 Star Rating of an Air Conditioner is determined by its

(A) Power Consumption (B) Energy Efficiency Ratio
(C) Cooling Capacity (D) Power of Compressor

Q.3 V7 concept given by Le Corbusier refers to

(A) Neighbourhood Planning (B) Housing Typologies
(C) Architecture Design Principle (D) Hierarchy of Roads

Q.4 In AUTOCAD, a line of infinite length in the direction defined by starting point and through point, is known as

(A) RAY (B) LINE (C) PLINE (D) XLINE

Q.5 Orbit Tower built at the London Olympic Park has been designed by

(A) Foster & Partners (B) Anish Kapoor & Cecil Balmond
(C) Zaha Hadid & Antony Gormley (D) Richard Rogers & Renzo Piano

Q.6 As per National Building Code 2005, the minimum size of a habitable room in m^2 is

(A) 9.5 (B) 10.5 (C) 11.5 (D) 12.5

Q.7 The urban form of Srirangam town in Tamil Nadu refers to

(A) Dandaka (B) Swastika (C) Nandyavarta (D) Sarvotabhadra

Q.8 PMGSY, a programme of Government of India, deals with

(A) Urban Employment Generation (B) Rural Employment Generation
(C) Rural Electrification (D) Rural Road Development

Q.9 Beam or lowest division of the entablature which extends from column to column, is known as

(A) Arabesque (B) Arcade (C) Architrave (D) Arbour

Q.10 The information that is **NOT** essential to be submitted for sanction of any building plan is

(A) Site Plan (B) Floor Plans (C) Title Deed (D) Land Cost

Q.11 The tendency of an ecosystem to maintain its balance by regulatory mechanisms when disrupted, is known as

(A) Homeostasis (B) Entropy (C) Succession (D) Evolution

Q.12 Gantt Chart **DOES NOT** provide information about

(A) List of Jobs (B) Duration of Jobs
(C) Interdependency of Jobs (D) Progress of Work

Q.13 If threshold of hearing has a sound level of zero decibels and the sound level in a broadcasting studio is 100 times the threshold of hearing, its value in decibels would be

(A) 0 (B) 10 (C) 20 (D) 100

Q.14 The width to height ratio of the front facade of Parthenon (without the pediment) is

(A) 9:4 (B) 4:9 (C) 1:1.618 (D) 1.618:1

Q.15 The face of an Icosahedron is

(A) Equilateral Triangle (B) Isosceles Triangle
(C) Square (D) Pentagon

Q.16 The term 'Zeitgist', used in contemporary architecture, refers to

(A) Iconicity (B) Spirit of Times (C) Kinesthetics (D) Semantic Associations

Q.17 Alhambra, a UNESCO world heritage site, is classified as an example of

(A) Moorish Architecture (B) Mudejar Architecture
(C) Mozarabic Architecture (D) Tudor Architecture

Q.18 Wythenshawe and Becontree are examples of

(A) Factory Town (B) Satellite Town
(C) Garden City (D) Vertical Neighborhood

Q.19 National Ceremonial Plaza at Thimpu in Bhutan has been designed by

(A) Christopher Charles Benninger (B) Charles Correa
(C) Karan Grover (D) I. M. Pei

Q.20 Physiochemical process of removing micro-organisms, colour and turbidity from sullage and sewage is known as

(A) Putrefaction (B) Clarification
(C) Liquefaction (D) Infiltration

Q.21 Identify which is **NOT** a green building rating system

(A) LEED (B) CASBEE (C) ENERGY BUILD (D) BREEAM

Q.22 In 3DS Max, smooth 3D surfaces, by blending a series of selected shape curves, can be created by

(A) Lofting (B) Sweeping (C) Filleting (D) Extruding

Q.23 Travel behavior characteristics of an urban area can be derived from

(A) Parking Survey (B) Demographic Survey
(C) Socio Economic Survey (D) Origin & Destination Survey

Q.24 In GIS, the set of entities representing vector data type is

(A) Point, Line, Polygon, TIN (B) Pixel, Voxel
(C) DEM, DSM, DTM (D) Coordinates, Elevation, Slope

Q.25 A common flowering shrub is

(A) Tectona grandis (B) Mimusops elengi (C) Dalbergia sisso (D) Ixora coccinea

Q. 26 to Q. 55 carry two marks each.

Q.26 The correct arrangement of the height of towers given below in **descending** order is

P. Burj Khalifa, Dubai
Q. Petronas Tower, Kuala Lumpur
R. Taipei 101, Taiwan
S. Bank of China Tower, Hong Kong

(A) P, Q, R, S
(B) P, Q, S, R
(C) P, R, S, Q
(D) P, R, Q, S

Q.27 Match the buildings in **Group I** with their corresponding architects in **Group II**

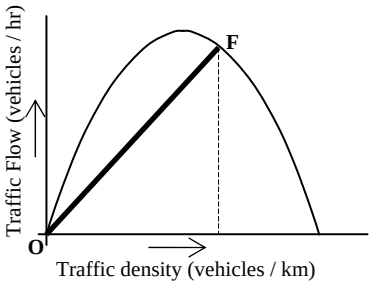
Group I	**Group II**
P. Khalsa Heritage Complex, Anandpur Sahib	1. Philip Johnson
Q. Lisbon Ismaili Centre, Lisbon	2. Charles Correa
R. Neuroscience Centre, Cambridge, USA	3. Raj Rewal
S. National Centre for Performing Arts, Mumbai	4. B. V. Doshi
	5. Moshe Safdie

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

Q.28 The term 'Working head' in context of water supply system means

(A) Height of a body of water falling freely under the force of gravity to acquire a certain velocity
(B) Rate of increase of velocity with respect to distance normal to the direction of flow
(C) Total head with deduction for velocity head or losses
(D) Difference between supply and delivery water levels

Q.29 In a theoretical traffic flow relationship, as shown in the figure given below, the slope of line **OF** joining point **F** on the curve and the origin **O** represents



(A) Corresponding space mean speed
(B) Speed at maximum flow
(C) Travel time at corresponding density
(D) Average headway at corresponding flow

Q.30 Match the CAD terms in **Group I** with their corresponding functions in **Group II**

Group I	**Group II**
P. Tiled viewport	1. Boolean operator
Q. UCS	2. Solid model
R. DXF	3. Coordinate system
S. Extrude	4. Drawing interchange format
	5. Model space

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

Q.31 Match the historic periods in **Group I** with their corresponding examples of towns in **Group II**

Group I	**Group II**
P. Egyptian	1. Miletus
Q. Greek	2. Montpazier
R. Medieval	3. Kahun
S. Renaissance	4. Versailles
	5. Timgad

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

Q.32 Match the components of an Indian urban land use map in **Group I** with their corresponding colour codes as per UDPFI guidelines in **Group II**

Group I	**Group II**
P. Public / Semipublic	1. Violet
Q. Industry	2. Grey
R. Transportation	3. Red
S. Commercial	4. Blue
	5. Yellow

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

Q.33 Match the books in **Group I** with their corresponding authors in **Group II**

Group I	**Group II**
P. Design of Cities	1. Amos Rapoport
Q. On the Cultural Origin of Settlements	2. Leo Jacobson and Ved Prakash
R. Urbanization and National Development	3. Edmond Bacon
S. Planning Theory	4. Christopher Alexander
	5. Andreas Faludi

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

Q.34 Match the temples in **Group I** with their corresponding historical periods in **Group II**

Group I	**Group II**
P. Vaikuntha Perumal Temple, Kancheepuram	1. Vijaynagara
Q. Meenakshi Temple, Madurai	2. Chalukya
R. Durga Temple, Aihole	3. Chola
S. Brihadeshwara Temple, Thanjavur	4. Pandya
	5. Pallava

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

Q.35 Match the theories in **Group I** with their corresponding propagators in **Group II**

Group I	**Group II**
P. Choice theory of planning	1. Paul Davidoff and T.A. Reiner
Q. Connurbation	2. Patrick Geddes
R. Classical theory of land use	3. Homer Hoyt
S. Central place theory	4. Richard L. Meier
	5. Walter Christaller

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

Q.36 Match the buildings in **Group I** with their corresponding structural feature in **Group II**

Group I	**Group II**
P. Yokohama Port Terminal, Yokohama	1. Geodesic Dome
Q. Stanstead Airport, London	2. Shell Structure
R. TWA Terminal, New York	3. Space Frame
S. Montreal Biosphere, Montreal	4. Folded Steel Plate Structure
	5. Pneumatic Structure

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

Q.37 Match the Five Year Plans listed under **Group I** with their corresponding feature from **Group II**

Group I	**Group II**
P. First Five Year Plan	1. Formation of HUDCO
Q. Fourth Five Year Plan	2. Establishment of TCPO
R. Seventh Five Year Plan	3. Introduction of JNNURM
S. Tenth Five Year Plan	4. Announcement of National Housing Policy
	5. Passing of Urban Land Ceiling and Regulation Act

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

Q.38 Match the landscape designers listed under **Group I** with their appropriate contribution from **Group II**

Group I	**Group II**
P. Lancelot 'Capability' Brown	1. The Well-tempered Garden
Q. Andre Le Notre	2. Kew Garden
R. Joseph Paxton	3. Versailles Garden
S. Frederick Law Olmstead	4. Crystal Palace
	5. Central Park

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

Q.39 Match the organism type from **Group I** with the appropriate example from **Group II**

Group I	**Group II**
P. Autotroph	1. Nitrifying Bacteria
Q. Heterotroph	2. Grasshopper
R. Chemotroph	3. Grass
S. Saprophyte	4. Vulture
	5. Fungus

(A) 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

Q.40 Match the concepts in **Group I** with their corresponding authors in **Group II**

Group I	**Group II**
P. Proxemics Theory	1. Gordon Cullen
Q. Serial Vision	2. Edward T. Hall
R. Urban Imageability	3. Oscar Newman
S. Defensible Space	4. Paul Zucker
	5. Kevin Lynch

(A) 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

Q.41 If the area coverage of one sprinkler is 20 m^2, with a maximum and minimum spacing of 4.6 m and 1.8 m respectively, the minimum number of sprinklers required to be arranged in a regular orthogonal grid to cover the area of a 15 m x 20 m room would be _____.

Q.42 If the slope of a hipped roof is 60 degrees and height of the roof is 3 m, span of the room, in m, would be _____.

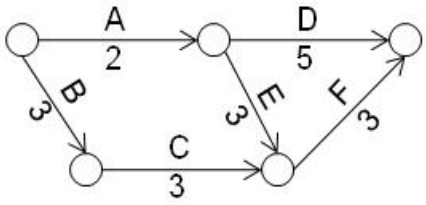
Q.43 Volume of coarse aggregate in m^3 present in 1.0 m^3 of 1 : 1.5 : 3 concrete mix made by volume batching is _____.

Q.44 A tank of internal dimension 3 m x 5 m x 4 m (Length x Breadth x Height) has 200 mm thick brick wall on all sides. Volume of brickwork in m^3 would be _____.

Q.45 Flux emitted from a 1cd light source in all directions, in lumens, would be _____.

Q.46 50 Hectare of residential sector has 65% buildable area. The FAR of the buildable area is 1.5. Within the residential sector, 60% of dwelling units are of area 100 m^2 each and 40% of the dwelling units are of area 80 m^2 each.
The gross residential density, in dwelling units per Hectare, would be _____.

Q.47 In the given project network diagram, the total slack for job A in days would be _____.



Common Data Questions

Common Data for Questions 48 and 49:
The scale of a contour map is 1:10,000 and the contour interval is 5 m. Distance between two given points on the map is 2 cm and the elevation difference between the two given points is 10 m.

Q.48 The actual distance between the two given points in m would be

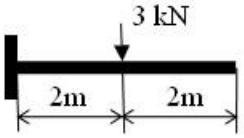
(A) 2 (B) 20 (C) 200 (D) 2000

Q.49 The slope between two given points in percentage is

(A) 5 (B) 10 (C) 15 (D) 20

Common Data for Questions 50 and 51:

A point load of 3kN acts at mid-span of a 4 m long cantilever beam as shown in figure below.



Q.50 Shearing force at free end in kN is

(A) 0 (B) 3 (C) 6 (D) 12

Q.51 Bending moment at mid-span in kNm is

(A) 0 (B) 2 (C) 4 (D) 6

Linked Answer Questions

Statement for Linked Answer Questions 52 and 53:

Cost of a new building is Rs 10,00,000 and its scrap value after 50 years is Rs. 1,00,000.
Using straight line method

Q.52 The annual depreciation of the building in Rs. would be

(A) 10,000 (B) 15,000 (C) 18,000 (D) 20,000

Q.53 The book value after 10 years in Rs. would be

(A) 1,80,000 (B) 3,60,000 (C) 6,00,000 (D) 8,20,000

Statement for Linked Answer Questions 54 and 55:

A room of size 100 m^2 is illuminated by 10 lamps of 40 W having a luminous efficacy of 50 lm/W.

Q.54 Total flux emitted by the lamps in lumens would be

(A) 2,000 (B) 5,000 (C) 10,000 (D) 20,000

Q.55 If utilization factor is 0.5, at a working height of 90 cm above the floor level, the illumination in lux would be

(A) 100 (B) 200 (C) 500 (D) 1000

General Aptitude (GA) Questions

Q. 56 – Q. 60 carry one mark each.

Q.56 A number is as much greater than 75 as it is smaller than 117. The number is:

(A) 91 (B) 93 (C) 89 (D) 96

Q.57 The professor ordered to the students to go out of the class.
I II III IV
Which of the above underlined parts of the sentence is grammatically incorrect?

(A) I (B) II (C) III (D) IV

Q.58 Which of the following options is the closest in meaning to the word given below:

Primeval

(A) Modern (B) Historic
(C) Primitive (D) Antique

Q.59 Friendship, no matter how _____it is, has its limitations.

(A) cordial

(B) intimate

(C) secret

(D) pleasant

Q.60 Select the pair that best expresses a relationship similar to that expressed in the pair:
Medicine: Health

(A) Science: Experiment (B) Wealth: Peace
(C) Education: Knowledge (D) Money: Happiness

Q. 61 to Q. 65 carry two marks each.

Q.61 X and Y are two positive real numbers such that $2X + Y \leq 6$ and $X + 2Y \leq 8$. For which of the following values of (X, Y) the function $f(X, Y) = 3X + 6Y$ will give maximum value?

(A) (4/3, 10/3)

(B) (8/3, 20/3)

(C) (8/3, 10/3)

(D) (4/3, 20/3)

Q.62 If $|4X - 7| = 5$ then the values of $2\,|X| - |-X|$ is:

(A) 2, 1/3 (B) 1/2, 3 (C) 3/2, 9 (D) 2/3, 9

Q.63 Following table provides figures (in rupees) on annual expenditure of a firm for two years - 2010 and 2011.

Category	2010	2011
Raw material	5200	6240
Power & fuel	7000	9450
Salary & wages	9000	12600
Plant & machinery	20000	25000
Advertising	15000	19500
Research & Development	22000	26400

In 2011, which of the following two categories have registered increase by same percentage?

(A) Raw material and Salary & wages

(B) Salary & wages and Advertising

(C) Power & fuel and Advertising

(D) Raw material and Research & Development

Q.64 A firm is selling its product at Rs. 60 per unit. The total cost of production is Rs. 100 and firm is earning total profit of Rs. 500. Later, the total cost increased by 30%. By what percentage the price should be increased to maintained the same profit level.

(A) 5 (B) 10 (C) 15 (D) 30

Q.65 Abhishek is elder to Savar.
Savar is younger to Anshul.

Which of the given conclusions is logically valid and is inferred from the above statements?

(A) Abhishek is elder to Anshul

(B) Anshul is elder to Abhishek

(C) Abhishek and Anshul are of the same age

(D) No conclusion follows

END OF THE QUESTION PAPER