B.Arch. Degree I Semester Regular/Supplementary Examination November 2023

AR 1102 BUILDING MATERIALS AND CONSTRUCTION - I
(2021 Scheme)

Time: 4 Hours   Maximum Marks: 100

PART A
(Answer **ALL** questions)

(8 × 5 = 40)

I.   Write short notes on the following.

(a)   Span-Loading correlation.

(b)   Support and supported elements.

(c)   Fine and coarse aggregate.

(d)   Quarrying process of building stones.

(e)   Load bearing and composite structure.

(f)   Sub system with respect to stability.

(g)   Rat trap bond.

(h)   English bond.

PART B

(4 × 10 = 40)

II.   Discuss the building material – stones: (i) natural stones (ii) artificial stones. Also discuss any two applications of each.

OR

III.   Elaborate on the utility and criteria for the selection in design and construction of various elements of buildings.

IV.   Define various methods of manufacturing glass, its forms and applications in day-to-day life.

OR

V.   With the aid of neat sketches discuss:
(i)   Manufacturing of lime
(ii)   Setting time of cement and the importance and need for curing.

VI.   Detail out:
(i)   Load bearing structures
(ii)   Frame structures
(iii)   Composite structures.

OR

VII.   Elaborate on your understanding of various subsystems, with respect to utility and its application in building design and construction.

(P.T.O)

2

B.Arch-I(R/S)-11-23-3075

VIII.   Describe the different types of bonds with neat sketches and point out the most efficient bond while stating the reason for the same.

OR

IX.   Explain the advantages of brick masonry over other masonry and mention the disadvantages of each of the other masonry over brick masonry.

PART C

$(1 \times 20 = 20)$

X.   Draw to a suitable scale; the plan of alternate courses and elevation of an L-shaped 1 brick thick rat trap bond.

OR

XI.   Draw to a suitable scale; the plan of alternate courses and elevation of an L-shaped 1½ brick thick English bond.

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B.Arch. Degree I Semester Regular/Supplementary Examination November 2023

AR 1103 HISTORY OF ARCHITECTURE I – ANCIENT CIVILIZATIONS
(2021 Scheme)

Time : 3 Hours   Maximum Marks : 100

(Illustrate your answers with sketches)
PART A
(Answer *ALL* questions)

$(8 \times 5 = 40)$

I.   Write short notes on the following.
   (a)   Dolmen
   (b)   Stonehenge
   (c)   Hanging Garden of Babylon
   (d)   Palace of Assyria
   (e)   Mastabas
   (f)   Cult Temples
   (g)   Great Granary
   (h)   Planning Pattern of Harappan city.

PART B

$(4 \times 15 = 60)$

II.   Describe with neat sketches the architectural features of Gobekli Tepe.
OR
III.   Explain with neat sketches the evolution of residential architectural character in the Neolithic period.

IV.   Elaborate on the Revolutionary innovations that emerged in Mesopotamia.
OR
V.   Explain the salient features of Assyrian Architecture with the help of neat sketches.

VI.   Explain with an example the importance of Funerary architecture in Ancient Eqypt and the reasons why most of the historical structures built during the period were dedicated to dead.
OR
VII.   Describe the Egyptian royal pyramids quoting the example" Great Pyramid of Cheops Giza".

VIII.   Explain the, socio cultural, religious and political system that influenced the planning system of Indus valley cities. Describe with neat sketches.
OR
IX.   Explain about the settlement planning pattern of Indus valley cities. Describe with neat sketches the prominent Public buildings like Great Bath and Granary.

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B.Arch. Degree I Semester Regular/Supplementary Examination November 2023

AR 1104 ARCHITECTURAL GRAPHICS AND DRAWING - I
(2021 Scheme)

Time: 4 Hours   Maximum Marks: 100

(One A2 drawing sheet is to be supplied)

$(4 \times 25 = 100)$

I.   Make a composition of a street with trees, houses, human beings etc. Render in pencil with light and shade effect.

OR

II.   Make a still life composition with kitchen utensils. Light, shade and shadow should be maintained.

III.   Explain the principle of 'Rhythm' in art. Illustrate how rhythm can be achieved in a painting/design.

OR

IV.   What are the Principles of Art/Design? Explain it with examples.

V.   Explain in detail the importance of Space and Texture in art.

OR

VI.   Explain the importance of Shape and Form in visual art.

VII.   Make a coloured composition of Fruits or Vegetables. (Any colour medium can be used).

OR

VIII.   Draw an interior space of an architectural college staff room with appropriate furniture and human figures. Render it with light and shade in pencil.

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B.Arch. Degree I Semester Regular/Supplementary Examination November 2023

AR 1105 GEOMETRICAL DRAWING

(2021 Scheme)

Time: 4 Hours   Maximum Marks: 100

(Illustrate answers with sketches wherever necessary)

PART A
(Answer ALL questions)

(8 × 5 = 40)

I.   Write short notes on the following:

    (a)   Superscribe a circle on a regular hexagon of side 30 mm.

    (b)   Types of conic sections.

    (c)   Define orthographic projection and explain the application of the same in architecture.

    (d)   Section planes – properties and types.

    (e)   Explain method of constructing isometric scale.

    (f)   Define following terms based on perspective projection:

        (i)   Station point

        (ii)   Picture plane

        (iii) Vanishing point.

    (g)   Importance and application of Sciography in pictorial views

    (h)   Difference between shade and shadow.

PART B

(4 × 15 = 60)

II.   An ant moves along the second hand of the clock with a velocity of 2 mm/sec. If the ant is initially at a distance of 20 mm from the centre of the clock, draw the path traced by ant. Also name the curve.

OR

III.   A fish pond of Elliptical shape is inscribed inside a rectangular plot of size 100 mm × 60 mm. Draw the boundary line of the fish pond.

IV.   A hexagonal prism of base 30 mm and height 60 mm is resting on one of its base edges with the axis inclined at 30° with HP and 40° with VP. The nearest point of the solid is at a distance of 10 mm away from VP. Draw its projections.

OR

V.   Draw the development of bottom portion of a pentagonal prism of base 30 mm and height 60 mm is resting on one of its base with one base edge parallel to VP. A cutting plane at 30° with HP and perpendicular to VP and passing through a point on the axis 25 mm above HP cuts the solid.

(P.T.O.)

B.Arch-I(R/S)-11-23-3078

VI.   A cylindrical slab, 60 mm in diameter and 16 mm thick, is surmounted by a cube of 30 mm side. On the top of the cube rests a square pyramid of altitude 30 mm and side of base same as the base of the cube. The axes of the solids are in the same straight line. Draw the Isometric drawing of the solid.

OR

VII.   Draw the perspective view of a rectangular block 30 mm × 40 mm × 50 mm resting on the ground with one of the rectangular plane making an angle of 45° with PP. The observer is at a distance of 120 mm from the picture plane and assume the eye level is at 150 mm.

VIII.   Draw sciography for following conditions:
        (i)   Square plane 50 mm side perpendicular to both the planes, 20 mm above HP and 40 mm away from VP.
        (ii)   Cuboid of 60 mm × 45 mm × 30 mm, the side plane which is nearer to the VP is 30 mm away from VP and the base plane is 60 mm above HP.
        (iii)   Rectangular niche with arch, rear face parallel to the front face. (rectangular base 900 mm × 300 mm, total height of the niche is 1200 mm and arch starts at 750 mm).

OR

IX.   Draw sectional perspective of a room of size 300 cm × 300 cm × 300 cm. Add furniture such as sofa set, table, fan and wall hangers etc.

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B.Arch. Degree I Semester Regular/Supplementary Examination November 2023

AR 1106 MATHEMATICS
(*2021 Scheme*)

Time: 3 Hours

Maximum Marks: 100

PART A
(Answer *ALL* questions)

(8 × 5 = 40)

I.   (a)   How do you solve an elementary transformation matrix? Give an example.

(b)   Find the rank of the matrix reduce it in to Echelon matrix using elementary operations.

$$\begin{pmatrix} 2 & 4 & 1 & 5 \\ 6 & 3 & 2 & 9 \end{pmatrix}$$

(c)   Solve the differential equation $\left(3x^2 + 6xy^2\right)dx + \left(6x^2y + 4y^3\right)dy = 0$.

(d)   Solve the equation $\dfrac{d^4y}{dx^4} - 5\dfrac{d^2y}{dx^2} + 4y = 0$

(e)   A die is tossed until an odd number appears. Obtain the probability distribution of the number of tosses.

(f)   Find the value k for which $f(x) = \begin{cases} kx(1-x); & 0 \le x \le 1 \text{ is a pdf} \\ 0; & \text{otherwise} \end{cases}$

Find Mean and Standard Deviation.

(g)   If an average rainfall on 10 days in every 30 days. Obtain the probability that rain will fall at least 3 days of a given week.

(h)   If X is a Poisson variant, such that $P(X = 2) = 9P(X = 6)$. Find the Standard Deviation.

PART B

(4 × 15 = 60)

II.   (a)   Find the inverse of the matrix by Gauss-Jordan Method.   (7)

$$\begin{pmatrix} 8 & 4 & 3 \\ 2 & 1 & 1 \\ 1 & 2 & 1 \end{pmatrix}$$

(b)   Solve the following systems of equation by matrix method.   (8)

$3x + 3y + 2z = 1$

$x + 2y = 4$

$10y + 3z = -2$

$2x - 3y - z = 5$

OR

(P.T.O.)

III.   (a)   Find the rank of the matrix.   (7)

$$\begin{pmatrix} 1 & -1 & 2 & -3 \\ 4 & 1 & 0 & 2 \\ 0 & 3 & 1 & 4 \\ 0 & 1 & 0 & 2 \end{pmatrix}$$

   (b)   Solve the following systems of equations by matrix method.   (8)

$$x+y+z=6$$

$$x+2y+3z=10$$

$$x+2y+\lambda z = \mu$$

IV.   (a)   Solve the exact equation.   (7)

$$(\cos x \tan y + \cos(x+y))dx + (\sin x \sec^2 y + \cos(x+y))dy = 0$$

   (b)   Solve the differential equation $2\dfrac{dy}{dx} = \dfrac{y}{x} + \dfrac{y^2}{x^2}$.   (8)

OR

V.
   (a)   Solve $\dfrac{dy}{dx} + \dfrac{x}{1-x^2}y = x\sqrt{y}$.   (7)

   (b)   Solve $\dfrac{d^2 y}{dx^2} + 2y = x^2 e^{3x} + e^x \cos 2x$.   (8)

VI.   (a)   A continuous random variable X has the probability density function.   (7)

$$f(x) = 3x^2; 0 \le x \le 1$$

Find 'a' and 'b'. Such that

   (i) $P(x \le a) = P(x \ge a)$

   (ii) $P(x \ge b) = 0.05$

   (b)   A continuous random variable X has a p.d.f. given by   (8)

$$f(x) = \begin{cases} 2x, 0 \le x \le 1 \\ 0 \quad \text{elsewhere.} \end{cases}$$ Find:

   (i) $F(x)$

   (ii) $P(x \le \dfrac{1}{2})$

   (iii) $P(\dfrac{1}{4} \le x \le \dfrac{3}{4})$

OR

VII.   (a)   Examine whether the following is a density function.   (7)

$$f(x) = 2x \quad \text{if } 0 \le x \le 1$$

$$= 4 - 2x \text{ if } 1 \le x \le 2$$

$$= 0 \quad \text{elsewhere}$$

   (b)   The probability density function of a random variable X is given by   (8)

$$f(x) = \begin{cases} \dfrac{k}{4}, -2 < x < 2 \\ 0, \quad otherwise \end{cases}$$

Obtain the value of $k, P(X<1), P(|X|>1)$ and $P((2X+3)>5)$

VIII. (a) In a lot of 500 solenoids 25 are defective. Find the probabilities of a   (7)
sample of 20 solenoids chosen at random may have.

    (i)   No defective
    (ii)   Two defective
    (iii)   Not more than 2 defective
    (iv)   2 or 3 defective.

(b) Use the method of least squares to determine a and b in the formula   (8)
$y = ax + bx^2$ for the following data.

x	1	2	3	4	5
y	1.8	5.1	8.9	14.1	19.8

OR

IX. (a) Compute the coefficient of co-relation from the following data:

x	77	54	27	52	14	35	90	20	56	60
y	35	58	60	40	50	40	35	56	34	42

    (7)

(b) Fit the Poisson distribution of the following: (8)

x	0	1	2	3	4
y	192	100	24	3	1

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