B

B.Arch. Degree I & II Semester Supplementary Examination July 2024

AR 1109 SURVEYING AND LEVELLING
(2014 Scheme)

Time: 3 Hours   Maximum Marks: 100

PART A
(Answer ALL questions)

(8 × 5 = 40)

I.   Answer the following:

(a)   Define
       (i)   Survey lines
       (ii)   Check lines
       (iii)   Survey stations.

(b)   Describe briefly, the use of various accessories of a plane table.

(c)   Explain the terms:
       (i)   Centering
       (ii)   Telescope normal
       (iii)   Transiting
       (iv)   Line of collimation
       (v)   Changing face.

(d)   Give a brief description on any three components of a transit theodolite.

(e)   List the uses of a distomat.

(f)   Write a short note on aerial photography.

(g)   Describe different methods of levelling.

(h)   Mention the different uses of contour gradient.

PART B

(4 × 15 = 60)

II.   (a)   Explain clearly the principle of chain surveying.   (3)

    (b)   How would you orient in direction a chain survey plot on the drawing sheet?   (7)

    (c)   Set out clearly the precautions a surveyor should observe in booking the   (5)
        field work of a chain survey.

OR

III.   What are the different sources of errors in plane tabling? How are they   (15)
    eliminated?

IV.   Explain how you would measure the following with a theodolite.   (15)
    (i)   Horizontal angle by repetition
    (ii)   Vertical angle.

OR

V.   Describe in detail, the temporary adjustment in a transit theodolite.   (15)

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VI.	(a)	What are the fundamental parameters that can be measured using Total Station?	(5)
	(b)	What are the advantages and applications of Total Station?	(10)

OR

VII.	(a)	Difference between digital level and Auto level.	(4)
	(b)	Advantages of total station survey.	(5)
	(c)	Explain principle of EDM.	(6)

VIII.	(a)	What is reciprocal levelling? How is it accomplished?	(6)
	(b)	The following consecutive readings were taken with a level and 4 m levelling staff on a continuously sloping ground at common interval of 20 m. 0.602, 1.234, 1.860, 2.574, 3.450, 0.235, 1.285, 2.820, 3.255, 0.525, 1.824, 2.722, 2.985. The reduced level of the first point was 228.225m. Calculate the reduced levels of the points and also find the gradient of the line joining first and last points.	(9)

OR

IX.	Explain in detail the different methods for locating contour.	(15)

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C

B.Arch. Degree I & II Semester Supplementary Examination July 2024

AR 1108 MECHANICS OF STRUCTURES
(2014 Scheme)

Time: 3 Hours   Maximum Marks: 100

PART A
(Answer *ALL* questions)

(8 × 5 = 40)

I.   Write short notes on the following.
(a)   Explain different system of forces with sketches.
(b)   State and explain Lami's theorem.
(c)   Explain principal axis and principal moment of inertia.
(d)   State the laws of friction.
(e)   Describe point of contraflexure with sketches.
(f)   Draw SFD and BMD of a cantilever beam subjected to couple moment at free end.
(g)   Elaborate on composite sections with examples.
(h)   Define
         (i)   Poisson's ratio
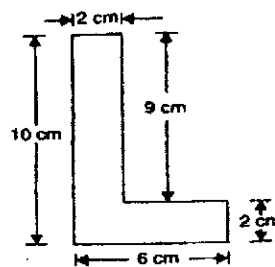   (ii)   Bulk modulus.

PART B

(4 × 15 = 60)

II.   The forces 20 N, 30 N, 40 N, 50 N and 60 N are acting on one of the angular points of a regular hexagon, towards the other five angular points, taken in order. Find the magnitude and direction of the resultant.

OR

III.   Determine the center of gravity of the section shown in figure.

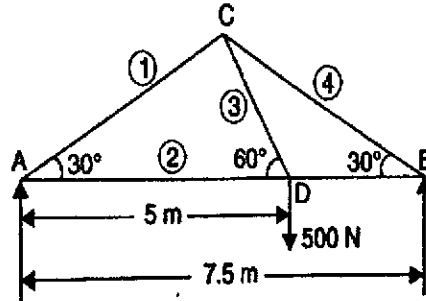IV.   Determine the moment of inertia about the centroidal XX and YY axes of the section shown in figure.
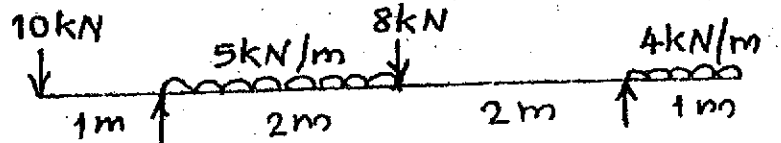

OR
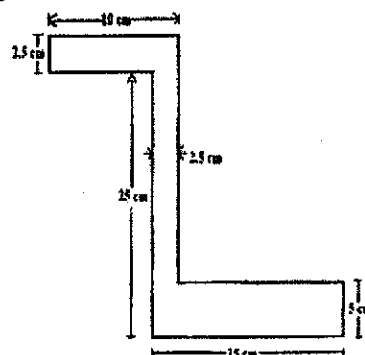
V. Analyse the truss shown in figure and find the forces in all the members.

VI. Draw the SFD and BMD of a simply supported beam of span 8 m carrying a U.D.L of 6 kN/m for the left half span.

OR

VII. Draw SFD and BMD of the overhanging beam loaded as shown in figure.

VIII. A weight of 200 kN is supported by three short pillars each of 600 mm^2 in cross-section. The central pillar is of steel and outer pillars are of copper. The pillars are so adjusted that at a temperature of 25°C each pillar carries equal load. If the temperature is raised to 125°C, compute the stresses induced.

$E_s = 200$ GPa, $E_c = 80$ GPa, $\alpha_s = 12 \times 10^{-6}$/°C and $\alpha_c = 18 \times 10^{-6}$/°C.

OR

IX. A cantilever beam of span 6 m has a rectangular cross section 100 mm × 150 mm. Find the U.D.L it can carry, if the maximum bending and shear stresses are limited to 8 N/mm^2 and 2 N/mm^2 respectively.

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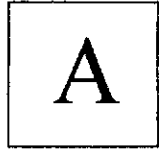
B.Arch. Degree I & II Semester Supplementary Examination July 2024

AR 1107 GEOMETRICAL DRAWING
(2014 Scheme)

Time: 4 Hours   Maximum Marks: 100

Instructions: (i)   Answer **Part A** in the answer book provided.
                (ii) Answer **Part B** in the drawing sheet provided.
                (iii) Assure suitable scale/data wherever necessary.

PART A
(Answer *ALL* questions)

(8 × 5 = 40)

I. (a) Construct a plain scale to show meters when 1cm represents 4 meters and long enough to measure upto 50 meters and show on it 34 meters. Find the Representative fraction (RF).

    (b) Define the following with respect to conic sections.
         Double ordinate, Focal chord, Latus rectum, Abscissa.

    (c) What are Platonic Solids?

    (d) Define Trace of a plane. Describe with example.

    (e) A point B is located 30 mm behind VP and 90 mm below HP. Draw its Orthographic Projection.

    (f) Draw a Parabola of base 900 mm and axis 60 mm using Tangent method.

    (g) Explain the cutting plane method of drawing intersection of surfaces.

    (h) The length of the top view of a line parallel to VP and inclined at 45° to HP is 50 mm. One end of the line is 12 mm above HP and 25 mm infront of VP. Draw the projections of the line and determine its true length.

PART B

(4 × 15 = 60)

II.   Two fixed points are 150 mm apart. A point X moves in such a way that the sum of its distances from the fixed points always a constant and equal to 350 mm. Trace the path of the point. Also draw the tangent at any point on the curve.

                                OR

III. Draw the projections of a line AB 120 mm long inclined at 30° to HP and 45° to VP. The end A of the line is 70 mm below the HP and 35 mm behind VP.

IV.   A triangular pyramid, base 70 mm side and axis 100 mm long, is freely suspended from one corner of the base. Draw the projections of the pyramid if the top view of the axis makes an angle of 60° with the XY line.

                                OR

V.   The frustrum of a cone of base diameter 50 mm, top face diameter 40 mm and length of axis 60 mm is resting centrally on the frustrum of a hexagonal pyramid having base 60 mm side, top face 50 mm and height 30 mm. Draw the isometric projection of the compound solid.

                                                        (P.T.O.)

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VI.   A pentagonal pyramid, side of base 40 mm and axis length 80 mm is resting on its base on HP, with one base edge 40° inclined to VP, It is cut by the section plane perpendicular to VP, inclined 30° to HP and passing through the middle of the axis. Draw development of the bottom portion of the pyramid.

OR

VII.   The development of the lateral surface of a right circular cone is a semi circle of radius 90 mm. Inscribe a largest possible circle to semi circle. Draw the front and Top views of the cone and locate the inscribed circle in both the views.

VIII.   A line AB 50 mm long has its end A 20 mm above HP and 25 mm infront of VP. The end B is 50 mm above HP and 40 mm infront of VP. Draw its projections and find its true inclinations with HP and VP. What are the lengths of front and top view?

OR

IX.   A Sphere of radius 30 mm is kept on the top face of a square prism of base side 30 mm and height 25 mm. The latter is placed on the top face of a cylinder of 60 mm diameter and 20 mm height. All these solids have a common axis. Draw the isometric projection of the combination of solids.

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July 2024

AR 1106 MATHEMATICS
(2014 Scheme)

Time: 3 Hours   Maximum Marks: 100

PART A
(Answer *ALL* questions)

$(8 \times 5 = 40)$

I.   (a)   Solve the exact equations $\left(x^2 - ay\right)dx = \left(ax - y^3\right)dy$.

(b)   Solve $(D^2 + 2D + 1)\,y = \cos 2x + e^{2x}$.

(c)   If $u = \sqrt{xy}$, $v = \sqrt{\dfrac{x}{y}}$, Prove that $JJ^* = 1$.

(d)   If $u = e^x(x \cos y - y \sin y)$, prove that $u_{xx} + u_{yy} = 0$.

(e)   The mean and variance of a binomial distribution are 4 and $\dfrac{16}{5}$ respectively. Find $P(X \geq 1)$.

(f)   If X is uniformly distributed random variable with mean 1 and variance $\dfrac{4}{3}$, find $P(X < 0)$.

(g)   Distinguish between point estimation and interval estimation.

(h)   Define the following terms.
(i)   Type I error
(ii)   Type II error
(iii) Power of a set.

PART B

$(4 \times 15 = 60)$

II.   (a)   Solve $(D^2 - 5D + 6)y = e^x \cos 2x$.   (7)

(b)   Solve $\dfrac{dx}{dt} + 5x - 2y = t;\ \dfrac{dy}{dt} + 2x + y = 0$.   (8)

OR

III. (a)   Solve $x^2 \dfrac{d^2y}{dx^2} + 4x\dfrac{dy}{dx} + 2y = \log x$.   (7)

(b)   Solve $(D^2 + 4D + 7)y = \cos^2(2x) + x^2 e^x$.   (8)

(P.T.O.)

IV. (a) If $v = \dfrac{x^3 y^3}{x^3 + y^3}$, shown that $x\dfrac{\partial v}{\partial x} + y\dfrac{\partial v}{\partial y} = 3v$. (7)

(b) Find the minimum value of $x^2 + y^2 + z^2$ when $x + y + z = 3a$. (8)

OR

V. (a) If $x = r\cos\theta$, $y = r\sin\theta$, prove that $\dfrac{\partial^2 \theta}{\partial x^2} + \dfrac{\partial^2 \theta}{\partial y^2} = 0$. (7)

(b) Show that all rectangular parallelepiped with given volume, the cube has the least surface area. (8)

VI. (a) In a lot of 500 solenoids, 25 are defective, find the probabilities of a sample of 20 solenoids chosen at random may have (7)
   (i)   No defective
   (ii) Two defective
   (iii) Not more than two defective
   (iv) 2 or 3 defective.

(b) By the method of least squares find the best fitting straight line to the following data: (8)

x	5	10	15	20	25
y	15	19	23	26	30

OR

VII. (a) From the following data obtain the two regression equations (7)

x	6	2	10	4	8
y	9	11	5	8	7

(b) In a normal distribution 5% of the items are under 60 and 40% are between 60 and 65. Find the mean and standard deviation of the distribution. (8)

VIII. (a) Find the least sample size required if the length of the 95% confidence interval for the mean of normal population with standard deviation 5 should be less than 6. (7)

(b) Suppose that 100 tires made by a certain manufacturer lasted on the average 21,819 miles with a standard deviation 1295 miles. Test the null hypothesis $\mu = 22,000$ miles against the alternative $\mu < 22,000$ at 0.5 level of significance. (8)

OR

IX. (a) Given the following data of two distributions (7)

	Mean	SD	Size of sample
A	100	12	80
B	95	10	70

Test whether the difference between the sample mean is significant.

(b) The average number of articles produced by two machines per day are 200 and 250 with S.D 20 and 25 respectively on the basis of 25 days production. Can you regard both machine equally efficient at 1% level of significance? (8)

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B.Arch. Degree I & II Semester Supplementary Examination
July 2024

AR1103 HISTORY OF ARCHITECTURE - I
(2014 Scheme)

Time: 3 Hours   Maximum Marks: 100

PART A
(Answer *ALL* questions)
(Illustrate the answers with sketches wherever necessary)

(8 × 5 = 40)

I.   Write short notes on the following:

(a)   Catal Huyuk

(b)   Mehrgarh

(c)   Mastabas

(d)   Colosseum

(e)   The Great Stupa at Sanchi

(f)   Ladkhan and Durga temples at Aihole

(g)   Koothambalam

(h)   Miskal Masjid, Kozhikode.

PART B

(4 × 15 = 60)

II.   *"Architectural character of the early Harappan settlements in India is majorly influenced by the geographic, climatic, socio-economic and religious factors"* - Justify the statement with details and sketches.

OR

III.   Elaborate with neat sketches on Gobekli Tepe and Jericho.

IV.   Explain the different types of structures constructed in ancient Egypt and enumerate in detail their architectural features.

OR

V.   Illustrate with examples of Ancient Greek Architecture.

VI.   Discuss in detail with sketches
          (i)   Vedic Village
          (ii)   Tigawa and Dasavatara Temples.

OR

VII.   Describe the principles of design and construction of Dravidian temple architecture.

VIII.   *"Padmanabhapuram Palace Complex is a supreme example of royal residential style buildings in traditional Kerala Architecture"* – Explorate the statement with justification statements and sketches.

OR

IX.   Explain in detail with sketches
          (i)   Evolution of religious architectural forms in Kerala temples
          (ii)   St. Mary's Church, Kallooppara.

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AR 1102 BUILDING MATERIALS AND CONSTRUCTION - I

(2014 Scheme)

Time: 4 Hours

Maximum Marks: 100

Instructions:
* *One drawing sheet to be supplied.*
* *Assume suitable details and dimensions wherever necessary.*
* *Illustrations in answer carry due mark*
* *Credit will be given for following standard architectural drafting and detailing conventions.*

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I.   Write short notes on the following:
 (a)   Lime mortar
 (b)   Concrete block
 (c)   Ashlar masonry
 (d)   Brick vaults
 (e)   Growth and forms of bamboo
 (f)   Air seasoning
 (g)   Joints in bamboo
 (h)   Bay window.

(2 × 10 = 20)

II.   Describe workability of concrete. How is bleeding of concrete and segregation associated with workability? Suggest a test for workability of concrete.

OR

III.   Explain various aspects of ashlar masonry and rubble masonry.

IV.   Which are the common defects in timber? Why is seasoning required for timber? Explain the various methods of seasoning of timber.

OR

V.   Sketch the different joinery of bamboo and explain in detail the same. Also explain the step by step bamboo treatment.

PART B

(2 × 20 = 40)

VI.   Draw to a suitable scale the elevation of a pointed arch of span 120 cm and rise 90 cm. indicate the important parts of the arch.

OR

VII.   Draw to a suitable scale the plan of odd and even courses of 1 ½ thick in L-junction of a brick wall in English bond.

VIII.   Draw to a scale of 1:10 plan, elevation and section of a wooden panelled door for masonry opening of 100 × 210 cm for a residence. Label the drawing fully with dimensions, names and sizes of parts. Show fixing details.

OR

IX.   Draw to a suitable scale plan, section and elevation of a wooden framed glazed window to fit an opening of size 150 × 150 cm. label the parts and their sizes.

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