B.Arch-I&II(S)-04.23-2367 Reg. No. | | | | | | | | |

B

B.Arch. Degree I & II Semester Supplementary Examination April 2023

AR 1101 ARCHITECTURAL DESIGN-I

(2014 Scheme)

Time: 4 Hours Maximum Marks: 100

Instructions: *(i) Drawing should be drafted A1 size white sheet.*

(ii) The drawing should be properly dimensioned, labelled in good lettering and rendered appropriately.

(iii) Importance should be given to drafting quality, correctness of drawing, and conformity with drafting standard.

*(Answer **ANY ONE** question)*

(1 × 100 = 100)

I. Prepare a neatly drafted technical drawing for the building plan given below.

(a) Floor plan with plastering line and door/ window frames showing furniture layout in 1:50. (50)

(b) South side elevation in scale 1:50. (20)

(c) Section through the section line A-A in scale 1:50. (20)

(d) Schedule of Joinery. (10)

Design Data:

(i) Height of the plinth from the ground level is 0.45 m.

(ii) Foundation and basement are made of R.R. masonry.

(iii) Lintel height is 2.1m from floor finish line.

(iv) Outer wall height of the building is 2.7 m.

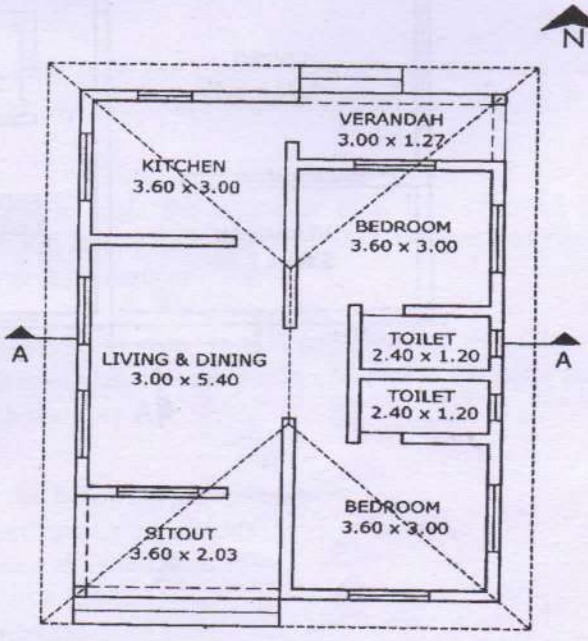
(v) Walls are made of 0.23 m thick brick masonry.

(vi) Hipped roof made of R.C.C.

(vii) Size of doors, windows and ventilators may be assumed.

(viii) Assume any other data required.

(ix) Dimension the drawings in centimeter.



OR

(1 × 100 = 100)

II. Prepare a neatly drafted technical drawing for the building plan given below.

(a) Floor plan with plastering line and door/ window frames showing furniture layout in 1:50. (50)

(b) West side elevation in scale 1:50. (20)

(c) Section through the section line A-A in scale 1:50. (20)

(d) Schedule of Joinery. (10)

Design Data:

(i) Height of the plinth from the ground level is 0.45 m.

(ii) Foundation and basement are made of RR masonry.

(iii) Lintel height is 2.1 m from floor finish line.

(iv) Floor to floor height of the building is 3.0 m.

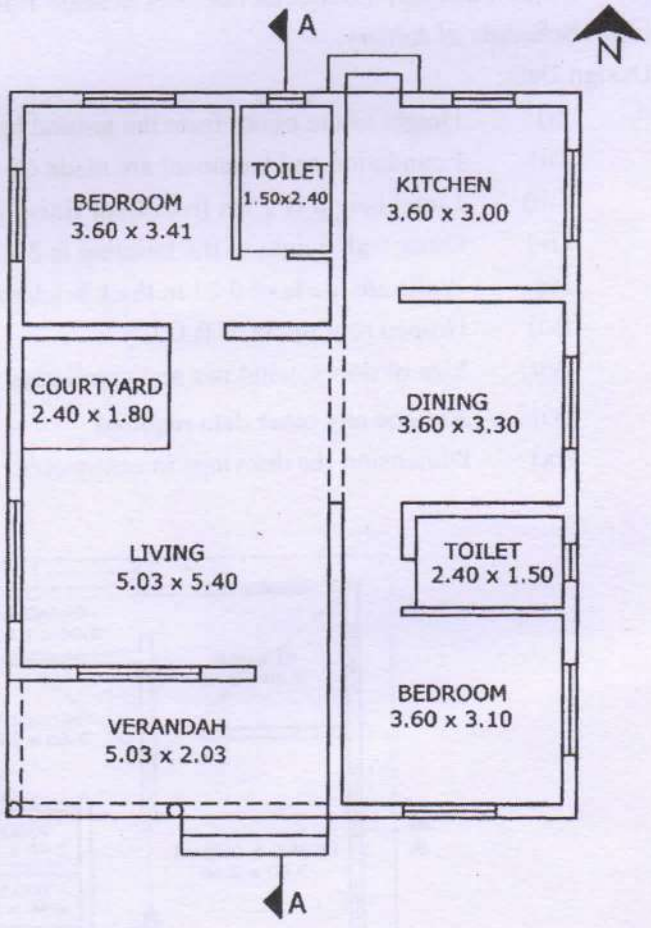
(v) Walls are made of 0.23 m thick brick masonry and half wall thickness 0.12 m.

(vi) Size of doors, windows and ventilators may be assumed.

(vii) Sunshades are provided at lintel level above all windows and ventilators

(viii) Assume any other data required.

(ix) Dimension the drawings in centimeter.



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B.Arch-I&II(S)-04-23-2368 Reg. No. | | | | | | | | |

C

B.Arch. Degree I&II Semester Supplementary Examination April 2023

AR 1102 BUILDING MATERIALS AND CONSTRUCTION - I

(2014 Scheme)

Time: 4 Hours Maximum Marks: 100

(All answers to be supported with relevant sketches)

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. Write short notes on the following:
- (a) Plain Cement Concrete
- (b) Properties of Terracotta
- (c) Garden-wall bond
- (d) Closers and Bats
- (e) Properties of Timber
- (f) Bamboo Vs Wood
- (g) Fixtures and Fastenings for Doors and Windows
- (h) Preservation of Bamboo.

(2 × 10 = 20)

II. How is Stone masonry classified? Explain, with neat sketches.

OR

III. Explain the geological, physical and chemical classification of rocks with examples.

IV. Explain in detail the various defects in timber.

OR

V. Explain bamboo as a sustainable building material. Suggest areas where it can be used in construction of house.

PART B

(2 × 20 = 40)

VI. Draw to a suitable scale the plan of alternate courses and elevation of brick walls meeting at corner with thickness of wall as 2 bricks in English bond.

OR

VII. Draw to a suitable scale the elevation of a five centered brick arch constructed of 300 mm. Thickness of Span 1500 mm and rise 400 mm. Indicate the important parts of the arch.

VIII. Draw to a suitable scale, plan, section and elevation of a Glazed window to fit an opening of size 100 cm × 120 cm. Name the parts and indicate the size of each member.

OR

IX. Draw to scale the following joints in timber:
- (i) Tongued and Grooved Joint
- (ii) Mortise and Tenon joint
- (iii) Bevelled Lap Joint
- (iv) Common Dovetail Joint.

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B.Arch-I&II(S)-04.23-2371 Reg. No. | | | | | | | | | |

B

B.Arch. Degree I&II Semester Supplementary Examination April 2023

AR 1103 HISTORY OF ARCHITECTURE-I

(2014 Scheme)

Time: 3 Hours Maximum Marks: 100

(Illustrate the answers with sketches wherever necessary)

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. Write short notes on the following:

(a) Göbekli Tepe.

(b) Jericho.

(c) Ishtar Gate.

(d) Ziggurat of Ur.

(e) Chaitya halls.

(f) Pancha-Rathas.

(g) Miskal Masjid.

(h) Varikkassery Mana.

PART B

(4 × 15 = 60)

II. Describe in detail the architectural features of the settlement at Catal Hayuk.

OR

III. Describe how the architecture of Jomon people were different with respect to the other Prehistoric cultures of the world during that time.

IV. Explain with neat sketches how the people of Indus Valley civilization designed the most sophisticated cities of their time.

OR

V. What were the salient features of Roman architecture and how was it similar yet different from their Greek counterparts?

VI. What are the differences between the temple styles of North, South and Central India?

OR

VII. Describe how the temple architecture evolved in India from the times of the Gupta rulers.

VIII. How was religious architecture in Kerala different from the rest of the world?

OR

IX. What were the salient features of traditional Kerala residential architecture, explain with examples?

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B.Arch-I&II(S)-04-23-2370 Reg. No. | | | | | | | | |

B

B.Arch. Degree I&II Semester Supplementary Examination April 2023

AR 1105 ARCHITECTURAL GRAPHICS - I

(*2014 Scheme*)

Time: 4 Hours Maximum Marks: 100

(One A2 drawing sheet is to be supplied)

(4 × 25 = 100)

I. Write in detail the contributions of Bombay Progressive Group to Indian Art.

OR

II. Briefly explain the revival which occurred in the field of Literature, Music, Science and Technology and Art during the Renaissance period.

III. Explain in detail the importance of space and shape in art.

OR

IV. What are the principles of design essential for a great composition? Explain it with illustrative sketches.

V Design a multi colour poster for the campaign against "Addictions of Mobile phones" Size: A3 (29.7 cm × 42 cm). Use any colour medium.

OR

VI. Create a colour composition with basic geometric shapes. Any colour medium can be used.

VII. Compose a one point perspective view of a street with trees, houses, human beings etc. Render in pencil with light and shade effect.

OR

VIII. Make a still life composition with fruits or vegetables. Light, shade and shadow should be maintained.

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B.Arch-I&II(S)-04-23-2372 Reg. No. | | | | | | | | |

C

B.Arch. Degree I & II Semester Supplementary Examination April 2023

AR 1106 MATHEMATICS

(*2014 Scheme*)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. Solve the following:

(a) Solve $e^x dx - y\,dy = 0;\ y(0) = 1$.

(b) Solve $x^2 \frac{d^2y}{dx^2} - 4x\left(\frac{dy}{dx}\right) + 6y = x$.

(c) If $u = \left(\sqrt{x} + \sqrt{y}\right)^5$, then find $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$ using Euler's theorem.

(d) If $x = r\cos\theta,\ y = r\sin\theta$, evaluate $\frac{\partial(x,y)}{\partial(r,\theta)}$ and $\frac{\partial(r,\theta)}{\partial(x,y)}$. Also, prove that $\frac{\partial(x,y)}{\partial(r,\theta)} \cdot \frac{\partial(r,\theta)}{\partial(x,y)} = 1$.

(e) A party of n persons take their seats at random at a round table; find the probability that two specified persons do not sit together.

(f) For a normally distributed variate with mean 1 and S.D 3, find the probabilities that (i) $3.43 \le x \le 6.19$ (ii) $-1.43 \le x \le 6.19$.

(g) A sample of 10 measurements of the diameter of a sphere gave a mean of 12 cm and a standard deviation 0.15 cm. Find 95% confidence limits for the actual diameter.

(h) Define the following terms:

(i) Tests of significance

(ii) Null hypothesis

(iii) Point estimation

(iv) Type I error.

PART B

(4 × 15 = 60)

II. (a) Solve $\left(\frac{dy}{dx}\right) - 2y\tan x = y^2.\tan^2 x$. (7)

(b) Solve $\left(D^2 - 4D + 4\right)y = \sin 2x$, given that $y = \frac{1}{8}$ and $Dy = 4$ when $x = 0$. (8)

Find the value of y, when $x = \frac{\pi}{4}$.

OR

(P.T.O.)

III. (a) Solve $(x+y)^2 \frac{dy}{dx} = a^2$ and $x\frac{dy}{dx} + 3y = x^4 e^{\left(1/x^2\right)} y^3$. (7)

(b) Solve $\frac{dx}{dt} + 2x + 4y = 1 + 4t$, $\frac{dy}{dt} + x - y = \frac{3}{2}t^2$. (8)

IV. (a) If $w = \sqrt{x^2 + y^2 + z^2}$, $x = \cos v$, $y = u \sin v$, $z = uv$. Then prove that (7)

$$u\frac{\partial w}{\partial u} - v\frac{\partial w}{\partial v} = \frac{u}{\sqrt{1+v^2}}.$$

(b) Find the points of maxima and minima of (i) $x^5 - 5x^4 + 5x^3 - 10$. (4)

(ii) $x^2 \log(x)$. (4)

OR

V. (a) If $u = \tan^{-1}\frac{xy}{\sqrt{1+x^2+y^2}}$, then prove that $\frac{\partial^2 u}{\partial x \partial y} = \frac{xy}{\left(1+x^2+y^2\right)^{3/2}}$. (7)

(b) Find the volume of the largest parallelepiped that can be inscribed in the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$. (8)

VI. (a) A product is 0.5% defective and is packed in cartons of 100. What percentage contains not more than 3 defectives? (7)

(b) The regression equations of two variables x and y are $x = 0.7y + 5.2$, $y = 0.3x + 2.8$. Find the means of the variables and the coefficient of correlation between them. (8)

OR

VII. (a) In a certain factory turning out razor blades, there is a small chance of 0.002 for any blade to be defective. The blades are supplied in packets of 10, use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets. (7)

(b) Find the parabola of the form $y = a + bx + cx^2$ which fits most closely with the observations: (8)

x :	−3	−2	−1	0	1	2	3
y :	4.63	2.11	0.67	0.09	0.63	2.15	4.58

VIII. (a) A research worker wishes to estimate mean of a population by using sufficiently large sample. The probability is 95% that sample mean will not differ from the true mean by more than 25% of the S.D. How large a sample should be taken? (7)

(b) One type of aircraft is found to develop engine trouble in 5 flights out of a total of 100 and another type in 7 flights out of a total of 200 flights. Is there a significant difference in the two types of aircrafts so far as engine defects are concerned? (8)

OR

IX. (a) A random sample of 1000 men from North India shows that their mean wage is ₹5 per day with a S.D of ₹1.50. A sample of 1500 men from South India gives a mean wage of ₹4.50 per day with a S.D of ₹2. Does the mean rate of wages varies as between the two regions? (8)

(b) In a sample of 500 people from a state 280 take tea and rest take coffee. Can we assume that tea and coffee are equally popular in the state at 5% level of significance? (7)

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B.Arch-I&II(S)-04-23-2369 Reg. No. | | | | | | | | |

A

B.Arch. Degree I&II Semester Supplementary Examination April 2023

AR 1107 GEOMETRICAL DRAWING

(*2014 Scheme*)

Time: 4 Hours Maximum Marks: 100

Instructions:

(i) Questions in Part-A should be answered in the answer book provided to the candidate.
(ii) Support your answers with relevant sketches wherever necessary.
(iii) Questions in Part B should be answered in the drawing sheet provided.
(iv) *Assume a suitable scale wherever necessary and retain all construction lines*

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. (a) Explain any two types of spirals using illustrations.
(b) Draw an ellipse and mark the following:
(i) Directrix
(ii) Latus rectum
(iii) Chord
(iv) Focus.
(c) Explain the concept of auxiliary views and outline the process involved in constructing them.
(d) Draw the orthographic projection of points.
(i) Point A 40 mm below HP and 25 mm in front of VP
(ii) Point B 30 mm above HP and 20 mm in front of VP.
(e) Explain the distinction between a true section and an apparent section by providing a diagram illustrating a sectioned square pyramid.
(f) Use sketches to visually explain the concept of solids of revolution.
(g) Explain one-point, two-point and three-point perspective projections using neat sketches.
(h) Explain the following through an isometric sketch of a rectangular prism:
(i) Isometric axes
(ii) Isometric Lines
(iii) Non Isometric Lines
(iv) Isometric plane.

PART B

(4 × 15 = 60)

II. Draw a logarithmic spiral for one convolution with an angle between consecutive radii of 45 degrees. The ratio of the succeeding radii is 4:3, and the greatest radius is 10 cm.

OR

III. Construct a parabola when the distance between the focus and the directrix is 60 mm. Draw the tangent and normal at any point P on the curve.

(P.T.O.)

IV. A pentagonal prism of base side 35 mm and axis length 60 mm is resting on one of the corners of its base on the H.P. The longer edge containing that corner is inclined at 45° to the H.P. top view of the axis makes an angle of 30° with the V.P. Draw the projections of the solid.

OR

V. A line PQ 60 mm long has its end P 30 mm above HP and 15 mm in front of VP. The end Q is 50 mm above HP and 45 mm in front of VP. Draw its projections and find its true inclinations with HP and VP. What are the lengths of front and top views?

VI. A pentagonal pyramid of base 35 mm side and an axis of 60 mm height is lying on the ground on its base with a base edge parallel to the VP. It is cut by a plane perpendicular to the HP and inclined at 45 degrees to the VP and passes through a point 8 mm away from the axis. Draw sectional elevation and add an auxiliary sectional view on the plane parallel to the section plane.

OR

VII. A cone of base diameter 60 mm and height 70 mm is resting on HP. It is cut by a plane 45 degrees to HP and passes through the midpoint of the axis of the cone. Draw the development of the lateral surface of the truncated cone.

VIII. Draw the isometric view of a hollow rectangular prism of outer base edges 60 mm × 50 mm and height 40 mm. It rests with its base on HP and one of its rectangular faces parallel to VP. The thickness of the wall of the prism may be taken as 6 mm.

OR

IX. A square prism of base 30 mm and height 50 mm rests on the ground plane (GP) with edges equally inclined to the picture plane (PP). The corner nearest to the PP is 30 mm to the right of the station point and 20 mm behind the PP. The station point is 65 mm above GP and 80 mm in front of PP. Draw the perspective view of the square prism.

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B.Arch-I&II(S)-04-23-2373 Reg. No. | | | | | | | | |

A

B.Arch. Degree I & II Semester Supplementary Examination April 2023

AR 1108 MECHANICS OF STRUCTURES

(2014 Scheme)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. (a) Explain the concept of Free Body Diagrams with sketches.

(b) Distinguish between (i) Static and Kinetic friction (ii) Sliding and Rolling friction.

(c) Write note on Parallel axis theorem and Perpendicular axis theorem.

(d) Describe the method of analysis of trusses by sections.

(e) Draw the shear force and bending moment diagrams of a cantilever beam of length ℓ m carrying a point load of intensity PkN at its free end.

(f) Explain the various types of beam supports, indicating the reaction components diagrammatically.

(g) Explain principle of superposition.

(h) Write note on Bending stress and Shear stress.

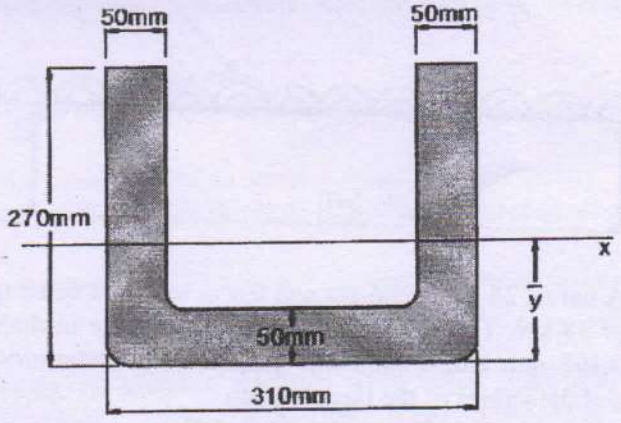
PART B

(4 × 15 = 60)

II. Forces of 2 kN, $\sqrt{3}$ kN, 5 kN, $\sqrt{3}$ kN, and 2 kN respectively act at one of the angular points of regular hexagon towards the other five angular points, taken in order. Find the magnitude and direction of resultant force.

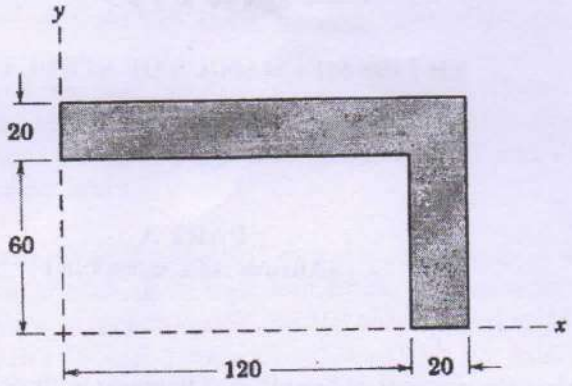
OR

III. Locate the centroid of the shaded area shown in the figure.



(P.T.O.)

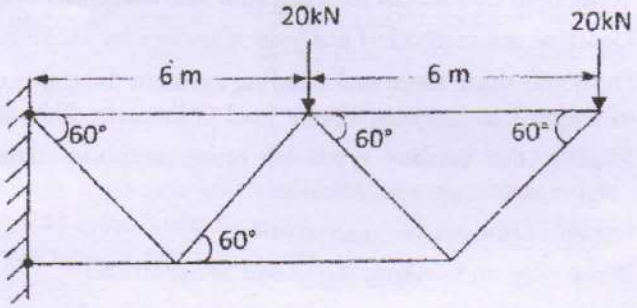
IV. Determine the moment of inertia for the shaded section with respect to X and Y axes.



Dimensions in millimeters

OR

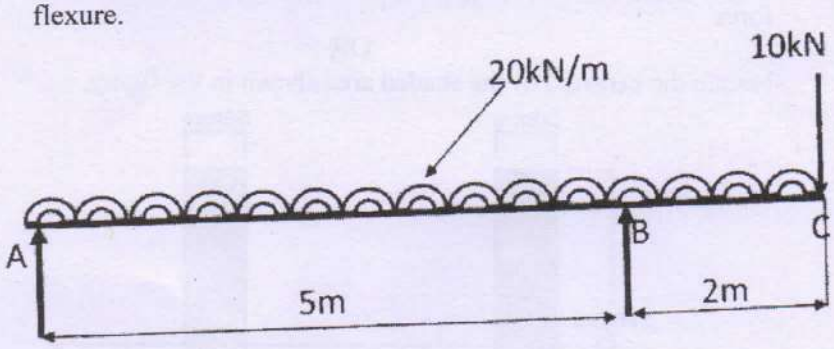
V. Determine the axial forces in all members of the truss given below.



VI. Draw SFD and BMD for a simply supported beam AB of length 9 m carries a uniformly distributed load of intensity 10 kN/m for a distance of 6 m from the left hand support.

OR

VII. Analyse the given overhanging beam. Draw the shear force and bending moment diagrams showing all salient points including point of contra-flexure.



VIII. A bar of 24 mm diameter and 0.4 m length is acted upon by an axial load of 38 kN. The elongation of bar and change in diameter is measured as 0.165 mm and 0.0031 mm respectively. Determine the Poisson's ratio and the values of the three moduli.

OR

IX. A simply supported beam of span 3 m has a rectangular cross section 100 mm × 150 mm, support a point load of intensity W kN at the centre of the beam. If the safe stresses are 28 N/mm^2 in bending and 2 N/mm^2 in shear, calculate the safe intensity of the load which can be supported by the beam.

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B.Arch-I&II(S)-04-23-2374 Reg. No. | | | | | | | | |

B

B.Arch. Degree I & II Semester Supplementary Examination April 2023

AR 1109 SURVEYING AND LEVELLING

(*2014 Scheme*)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. (a) List out the instruments used in chain surveying.
(b) State the advantages and disadvantages of plane table survey.
(c) Distinguish between closed traverse and open traverse.
(d) Draw a neat diagram indicating the various parts of a theodolite.
(e) Write in detail about Distomat.
(f) Differentiate between Digital and Auto levels.
(g) Write note on Cross-sectional levelling.
(h) What are the factors affecting choice of contour interval?

PART B

(4 × 15 = 60)

II. Explain in detail various classifications of Surveying. (15)

OR

III. Write the procedure to find out the position of station using Two point problem with neat figure. (15)

IV. Write notes on closing error in traversing. Explain the method of balancing the closing error. (15)

OR

V. Explain the procedure for measurement of the vertical angle and the magnetic bearing using a theodolite with the help of neat sketches. (15)

VI. (a) What is GPS? Explain its uses. (9)
(b) What are the advantages of total station over other surveying instruments? (6)

OR

VII. (a) What are the main parts of an aerial camera? Discuss briefly. (7)
(b) How would you determine the scale of a given vertical photograph? (8)

VIII. What do you mean by Contouring? Explain the characteristics and uses of contour. (15)

OR

IX. The following consecutive readings were taken with a dumpy level: 0.555, 0.725, 1.235, 0.730, 0.825, 1.560, 0.285, 0.945, 0.785 and 2.465. The level was shifted after the third and seventh readings. The first reading was taken on the BM of RL 100 m. Calculate the reduced levels of all other points and find the level difference between the first and last point. (15)

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