



- (v) The north end of a magnetic needle deflects \_\_\_\_\_ in the northern hemisphere.
- (vi) The imaginary lines joining the points having the same dip on the surface of the earth are known as \_\_\_\_\_ lines.
- (vii) Any sight taken on a levelling staff held at a point of known elevation is termed as \_\_\_\_\_ sight.
- (viii) Planimeters is used for measuring \_\_\_\_\_.
- (ix) Axis of telescope is the line joining the centre of the eye piece and the optical centre of the \_\_\_\_\_.
- (x) Contours equally spaced depict a \_\_\_\_\_ slope.
- (b) State whether the following statements are True or False ( $\frac{1}{2} \times 10 = 5$ )
- (i) At local noon, the sun is exactly on the geographical meridian.
- (ii) The fore and back bearing of a line differ by  $90^\circ$ .
- (iii) Sensitiveness of a level tube is increased by the increase in its length
- (iv) Error due to refraction may not be completely eliminated by reciprocal levelling.
- (v) Contours cannot intersect but may unit to form a single contour.
- (vi) Equispaced contours show that the ground is flat.



- (vii) If the first and last ordinates are zero, then these are omitted from the Simpson's formula.
- (viii) The volume of earthwork computed by Prismoidal formula is always more than the volume computed by the method of end areas.
- (ix) A box sextant is used only to measure the horizontal angles.
- (x) The algebraic sum of the total departures of the stations of an adjusted closed traverse should be equal to zero.

2. (a) Give a list of corrections to be applied to measurements made with tape and say whether they are additive or subtractive. (5)

(b) A 20 m chain was found to be 6 cm too long after chaining a distance of 3800 m. It was tested again at the end of day's work and found to be 9 cm too long after chaining a total distance of 7000 m. If the chain was correct before the commencement of the work. Find the true distance. (10)

3. (a) During the process of chaining you come across (i) a pond and (ii) a tall building. Describe how would you continue the line with chain only.

(4 + 4 = 8)

(b) A survey line ABC crosses a river, B and C being on the near and far banks respectively. A perpendicular BD 80 m long is set out at B, If the bearing of DC and DA are  $289^{\circ}30'$  and  $199^{\circ}30'$  respectively and the chainage of B is 500 m, find the chainage of C. (7)



4. (a) What do you mean by local attraction? How can you detect local attraction at a station? Explain. (2 + 3 = 5)
- (b) The following bearings were observed in running a closed traverse ABCDEA. At which station do you suspect local attraction? Find the corrected bearings of the line if the magnetic declination was  $2^{\circ}30'N$ . (10)

Line	Forward Bearing	Backward Bearing
AB	N $67^{\circ}E$	S $67^{\circ}W$
BC	S $35^{\circ}30'E$	N $35^{\circ}W$
CD	S $45^{\circ}30'E$	N $44^{\circ}E$
DE	S $75^{\circ}30'W$	N $76^{\circ}30'E$
EA	N $15^{\circ}E$	S $15^{\circ}W$

5. (a) How many axes are there in a levelling instrument? What are different methods of calculating the elevations of different points on the ground? Explain any one of them. (5)
- (b) The following consecutive readings were taken with a level and 5 metres levelling staff on continuously sloping ground at a common interval of 20 metres :
- 0.385 ; 1.030 ; 1.925 ; 2.825 ; 3.730 ; 4.685;  
 0.625 ; 2.005 ; 3.110 ; 4.485
- The reduced level of the first point was 208.125 m. Rule out a page of a level field book and enter the above readings. Calculate the reduced levels of the points by rise and fall method and the gradient of the line joining the first and last points. Also show the usual arithmetical checks. (10)



6. (a) State the advantages and disadvantages of plane-table surveying. (6)
- (b) Describe, with sketches, the method of intersection in plane-table surveying. (5)
- (c) Show with neat sketches of the characteristics features of contour lines of the following (any eight) : (8 × ½ = 4)
- (i) A pond
  - (ii) A hill
  - (iii) A ridge
  - (iv) A valley
  - (v) A saddle
  - (vi) A Plateau
  - (vii) An over-hanging cliff
  - (viii) A sloping ground
  - (ix) A vertical cliff.

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7. (a) What is transit theodolite? What do you mean by face-left and face-right observations? How can you change the face? What are the temporary adjustments of a theodolite? Name the fundamental lines of a theodolite. (8)
- (b) The following notes refer to reciprocal levels taken with one level :

Instrument	Staff reading on		Remarks
Near	P	Q	Distance Between
P	1.824	2.748	P and Q = 1010 m
Q	0.928	1.606	R.L. of P = 126.386 m

Find :

- (i) The true R.L. of Q
  - (ii) The true difference in elevation between P and Q.
  - (iii) Combined correction for curvature and refraction.
  - (iv) Error in the collimation adjustment of level.
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