

PRINCIPLES OF GEOINFORMATICS*Time: Three Hours**Maximum Marks: 100*

Answer five questions, taking ANY TWO from Group A, any two from Group B and all from Group C.

All parts of a question (a, b, etc.) should be answered at one place.

Answer should be brief and to-the-point and be supplemented with neat sketches.

Unnecessary long answer may result in loss of marks.

Any missing or wrong data may be assumed suitably giving proper justification.

Figures on the right-hand side margin indicate full marks.

Group A

1. (a) Discuss in details various classification of survey. 6
- (b) The length of a survey line, when measured with a chain of 20 m nominal chain length, was found to be 841.5 m. When the chain was compared with a standard, it was found to be 0.1 m too long. Find the correct length of the line. 6
- (c) What is meant by local attraction? How is it detected and how are the observed bearings corrected for local attraction? 8

2. (a) Following bearings of the lines of a traverse are measured. Find stations affected by local attraction: 8

Line	FB	BB
AB	191 ⁰ 45'	13 ⁰
BC	39 ⁰ 30'	222 ⁰ 30'
CD	22 ⁰ 15'	200 ⁰ 30'
DE	242 ⁰ 45'	62 ⁰ 45'
EA	330 ⁰ 15'	147 ⁰ 45'
- (b) Explain a level tube with a diagram. Define sensitivity and proves that sensitivity of a level tube depends on the radius of curvature of the internal surface. 6

- (c) Define contour. State various characteristics of contour lines. Write short notes on any two of the following: 6
- (i) Contour interval
 - (ii) Contour gradient
 - (iii) Horizontal equivalent
3. (a) What are various methods of plane table surveying? Explain Bessel's method in details. 8
- (b) What is resection? Describe any one method of resection. 6
- (c) How should you measure a horizontal angle by repetition? What are its advantages? 6
4. (a) It was required to determine the distance between two points A and B by a tacheometer fitted with an analectic lens ($k = 100$, $c = 0$). With the instrument at A and staff at B, the observations made were at a vertical angle of $+9^{\circ}46'$ and staff intercept of 1.915 m. What is the horizontal distance AB? Later on it was found that the constants of the instrument were 100 and 0.5. What would be the percentage error in the horizontal distance computed? 8
- (b) A +1.4% grade meets a -0.6% with rate of change of grade as 0.1% per 20 m chain. Find the length of the vertical curve. 6
- (c) Compute necessary data to trace a simple circular curve on the ground using method of offsets from extended chord. Following data are given: 6
- Chainage of point of intersection = 755.0 m
 - Angle of intersection = 55°
 - Radius of curve = 120 m
 - Length of normal chord = 10 m

Group B

5. (a) Find the most probable value of angles A, B and C of triangle ABC from the following observations: 10
- $A = 68^{\circ}12'36''$, $B = 53^{\circ}46'12''$, $C = 58^{\circ}1'16''$
- (b) The altitudes of two proposed stations A and B, 100 km apart, are 10

respectively 400 m and 705 m. The intervening obstruction situated at C, 70 km from A, has an elevation of 476 m. Ascertain if stations A and B are intervisible and, if necessary, find by how much station B should be raised so that the line of sight must nowhere be less than 3 m above the surface of the ground.

6. (a) What is meant by stereo photography? Two distant objects at left and right of phototheodolite line of sight, made an angle of 47° on the instrument station. In the positive print, they are seen to be 70 mm left and 60 mm right of the photo centre. Calculate the focal length of the camera lens. 10
- (b) A camera having focal length of 20 cm, is used to take a vertical photograph to a terrain having an average elevation of 1800 m. What is the height above sea level at which an aircraft must fly in order to get the photograph to a scale of 1:7500. 10
7. (a) Define remote sensing. How it differs from Photogrammetry? 10
- (b) What are various forms of remotely collected data? Briefly describe data acquisition and its interpretation. 10
8. (a) Sketch and explain the principle of electronic distance measuring (EDM) instrument. 10
- (b) Write short note on (i) Digital theodolite (ii) Total station 10

Group C

9. Answer the following in brief: 20
- (i) Explain sensitivity of the bubble tube.
- (ii) Explain extension of base net.
- (iii) Define reverse curve.
- (iv) True bearing and magnetic bearing
- (v) Prismatic compass and surveyors compass
- (vi) Direct method and indirect method of locating contours
- (vii) Aerial photographs and satellite imagery

- (viii) Differential levelling and reciprocal levelling
- (ix) Curvature and refraction effects
- (x) Strength of figure

(Refer our course material for answers)

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