S'12:6 FN:CV 406 (1432)

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) Compare the methods of measurement of distance by chain and measurement of distance by tape. 6

    (b) Describe various corrections to be applied to measured length. 7

    (c) Explain the classification of surveys based on instruments used. 7

2. (a) Describe the method of adjustment of compass traverse using the graphical approach. 7

    (b) R. L. of factory floor is 50.500 m. Staff reading on floor is 1.500 m and staff reading when the staff is held inverted with bottom touching the tie beam of

the roof truss is 3.500 m. Find the height of tie beam above the floor. 6

(c) Following interior angles were measured with a sextant in a closed traverse. The bearing of the line AB was measured as $60°00'$ with prismatic compass. Calculate the bearing of all other lines, if $\angle A = 140°10'$; $\angle B = 99°8'$; $\angle C = 60°22'$; $\angle D = 69°20'$. 7

3. (a) Discuss various indirect methods of contouring and mention the conditions in which you will recommend the use of each method. 8

(b) What is the significance of re-section in plain table surveying ? Describe *any one* method of solving three point problem. 6

(c) Differentiate between repetition method and reiteration method of measurement of horizontal angles. Describe reiteration method of measurement of horizontal angles. 6

4. (a) Two parallel railway lines are to be connected by a reverse curve, each section having the same radius. If the lines are 12 m apart and the maximum distance between tangent points measured parallel to the straights is 48 m, find the maximum allowable radius. 6

(b) Adjust the following angles closing the horizon : 7

$$\angle A = 110°20'48''\text{ wt.4}$$
$$\angle B = 92°30'12''\text{ wt.1}$$
$$\angle C = 56°12'00''\text{ wt.2}$$
$$\angle D = 110°57'04''\text{ wt.3}$$

(c) Following observations were taken with a tacheometer at the station P to a staff at Q held normal to the line of sight : 7

Staff readings = 1.450 ; 1.915 ; 2.380
Angle of depression = $15°30'$
R. L. of P = 201.45 m
Height of trunnion axis above the peg at P = 1.315 m
Determine the horizontal distance between P and Q, and the R. L. of Q. Take $k = 100$ and $C = 0°0'$

Group B

5. (a) Show that the relief displacement on a vertical photograph is radial from the principal point. 8

(b) Describe in brief flight planning for determination of number of photographs necessary to cover a given area. 12

6. (a) Describe the principles and applications of the following : (*i*) EDM, and (*ii*) Total station. 12

(b) Define base net. Describe the method of extension of base net. 8

7. (a) Two points A and B having elevations of 500 m and 300 m, respectively above datum appear on the vertical photograph having focal length of 20 cm and flying altitude of 2500 m above datum. Their corrected photographic co-ordinates are as follows :

Point	Photographic Co-ordinates	
	x, cm	y, cm
a	+ 2.65	+ 1.36
b	-1.92	+ 3.65

Determine the length of ground line AB. 12

(b) The distance from principal point to an image on photograph is 6.44 cm, and the elevation of the object above the datum (sea level) is 250 m. What is the relief displacement of the point, if the datum

scale is 1/10,000 and the focal length of the camera is 20 cm ? 8

8. Describe the following in the context of remote sensing : 4×5

(i) Basic principles of remote sensing

(ii) EMR and spectrum

(iii) Interaction mechanisms

(iv) Atmospheric windows

Group C

9. Differentiate between the following : 10×2

(i) True bearing and magnetic bearing

(ii) Prismatic compass and surveyors compass

(iii) Height of instrument method and rise and fall method of levelling

(iv) Direct method and indirect method of locating contours

(v) Observation equation and condition equation in adjustment of error

(vi) Crab and drift

(vii) Aerial photographs and satellite imagery

(viii) Data acquisition and processing in the context of remote sensing

(ix) Differential levelling and reciprocal levelling

(x) Sensors and platforms.

S'12 : 6 FN :CV 406 (1432) (4) AG