22205

# 21222

## 3 Hours / 70 Marks

Seat No. | | | | | | | | |

**15 minutes extra for each hour**

***Instructions :*** (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :** **5 × 2 = 10**

(a) State any two purposes of survey.

(b) Define Base line and Tie line.

(c) List the types of meridian.

(d) Define line of collimation.

(e) State the uses of contour map.

(f) State any two advantages of digital planimeter.

(g) Enlist types of surveying.

**2. Attempt any THREE of the following :** **3 × 4 = 12**

(a) Define dip of needle and magnetic declination.

(b) Explain the principles of surveying.

(c) State the types of benchmark used in surveying.

(d) Convert the following bearing into relevant bearings :

(i) S 52º 32' E

(ii) 215º 15'

(iii) 46º 45'

(iv) N 21º 30' W

**3. Attempt any THREE of the following :** **3 × 4 = 12**

(a) Draw conventional symbols of the following :

(i) Road in cutting

(ii) Building

(iii) Benchmark

(iv) Marshy ground

(b) Describe the procedure of adjustment of closing error of a traverse using graphical method.

(c) Discuss the process of Fly levelling with neat sketch.

(d) Explain the following terms :

(i) Datum

(ii) Height of instrument

**4. Attempt any THREE of the following :** **3 × 4 = 12**

(a) List the types of levels and describe any one in detail.

(b) Discuss in detail method of direct contouring.

(c) Describe the process of measurement of volume of reservoir from contour map.

(d) Describe the procedure for measuring the area using digital planimeter.

(e) The following staff reading were taken with a level. The instrument having been shifted after $4^{th}$, $7^{th}$ and $10^{th}$ reading. The B.M. is 150.000 m. Rule out a page of a level book and enter the following readings. Calculate the reduced levels of the points by rise and fall method and apply the usual checks.

1.655, 2.740, 3.050, 3.800, 0.375, 1.555, 0.890, 0.640, 2.840, 3.215, 1.280, 2.825

**5. Attempt any TWO of the following :** **2 × 6 = 12**

(a) Plot the following cross-staff survey of field and calculate its area in $m^2$ as shown in Fig.-1.

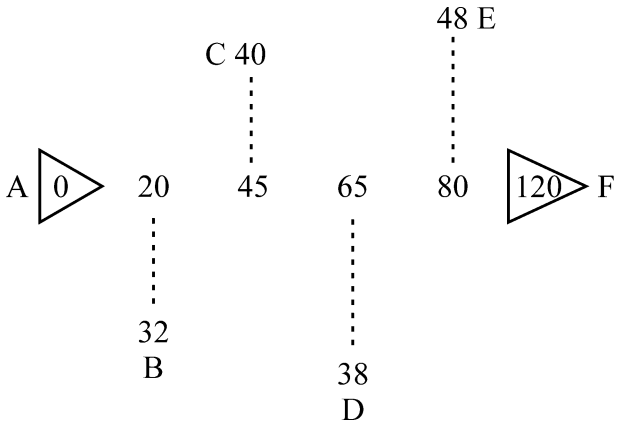


**Fig.-1**

(b) The following observations were taken while conducting a close traverse with a compass in a place where local attraction was suspected :

| Line | F.B. | B.B. |
|---|---|---|
| PQ | 48º 25' | 230º 00' |
| QR | 177º 45' | 356º 00' |
| RS | 104º 15' | 284º 55' |
| ST | 165º 15' | 345º 15' |
| TP | 259º 30' | 79º 00' |

At what stations do you suspect local attraction ? Find the corrected bearing of a close traverse.

(c) The following consecutive readings were taken with a level and a 4.0 m staff on a continuously sloping ground as a common interval of 30 m :

0.460, 1.285, 1.730, 2.695, 1.200, 2.055, 2.740, 3.485, 3.820, 0.620, 1.530, 1.860 and 3.580

The reduced level of the first point 'A' was 450.650 m. Enter the reading in level field book. Calculate reduced level by line of collimation method and gradient of line joining the first and the last point.

**6. Attempt any TWO of the following :** **2 × 6 = 12**

(a) (i) Draw a neat sketch of prismatic compass and label the parts.

(ii) Describe the temporary adjustment of prismatic compass.

(b) Contour survey data of a field is shown in figure below. Draw 89.000 m contour line by linear interpolation method. Show all the calculations. Grid size is 5 m × 5 m.

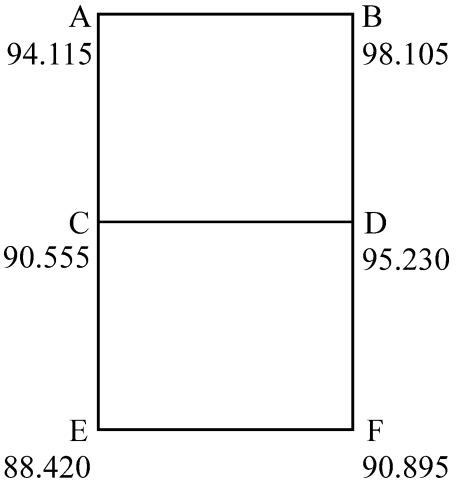


**Fig.**

(c) Calculate the missing reading and reduced levels. Apply the usual checks.

| Stations | BS | IS | FS | Rise | Fall | RL | Remark |
|---|---|---|---|---|---|---|---|
| 1. | 3.000 | | | | | | B.M. |
| 2. | | X | | | 0.840 | 99.160 | |
| 3. | | 2.340 | | X | | | |
| 4. | | X | | 1.000 | | | |
| 5. | 1.850 | | 2.185 | | X | | CP1 |
| 6. | | 1.575 | | | | | |
| 7. | | X | | | | | |
| 8. | X | | 1.895 | | 1.650 | | CP2 |
| 9 | | | 2.870 | | | | |