

**SURVEYING – I**

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

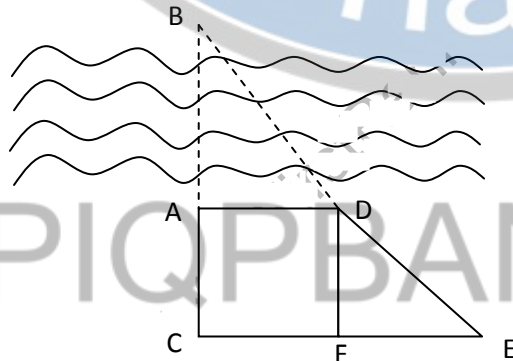
- Define scale of the map.
- What do you mean by well conditioned triangle?
- Write Back Bearing for the followings bearings: (i)  $125^\circ 15'$ . (ii)  $N30^\circ E$ .
- What are the various errors in plane tabling?
- Find the correction for curvature and refraction and the combined correction if the distance between stations is 900 m.
- Draw the contours showing the characteristics of valley and hill.
- Why do we need to take face left and face right observation in theodolite survey?
- With a neat sketch, show the difference between included angle, exterior angle and deflection angle in a traverse.
- State and explain prismoidal formula for volume computation.
- Name any four minor instruments and their functions in surveying.

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 (a) In order to determine the length across a river of a continuing chain line, the following measurements were made (figure given below):  $CA = AD = 40$  m,  $\angle CAD = 90^\circ$ ;  $CE = 76.8$  m,  $\angle ACE = 90^\circ = \angle DFE$ . Find the length AB.



- (b) Discuss the principle of surveying.

**OR**

- 3 It is proposed to widen a highway by increasing the gradient of the side slope to 1 in 1.5. The difference in level between the bottom and top of the embankment at a critical section was measured as 15.0 m. The length of the embankment along the side slope was measured as 29.872 m using a steel tape under a pull of 151 N at a temperature of  $27^\circ C$ . Determine the additional road width which will be available with the new slope. The tape was standardized on the flat at  $18^\circ C$  under a pull of 47 N. The cross-sectional area of the tape is  $6.5 \text{ mm}^2$ ,  $E = 20.8 \times 10^4 \text{ MN/m}^2$  and  $\alpha = 1.1 \times 10^{-5}$  per  $^\circ C$ .

**UNIT – II**

4 The following are the fore and back bearings of the lines observed in an unclosed traverse ABCDE.

Line	Fore bearing	Back bearing
AB	65°30'	245°00'
BC	106°00'	286°00'
CD	220°45'	40°30'
DE	210°20'	30°00'

Locate the position of local attraction and find the corrected bearings.

**OR**

5 Explain the two point problem and method of solution in plane tabling

**UNIT – III**

6 Data from a differential leveling have been found in the order of B.S., F.S..... etc. starting with the initial reading on B.M. (elevation 150.485 m) are as follows : 1.205, 1.860, 0.125, 1.915, 0.395, 2.615, 0.880, 1.760, 1.960, 0.920, 2.595, 0.915, 2.255, 0.515, 2.305, 1.170. The final readings closes on B.M. Put the data in a complete field note form and carry out reduction of level by Height of instrument method. All units are in meters.

**OR**

7 Explain with an illustration about finding the capacity of reservoir using contour map.

**UNIT – IV**

8 Explain the methods of finding horizontal angle using theodolite.

**OR**

9 The angles at the stations of a closed traverse ABCDEFA were observed as given below:

Traverse station	Included angle
A	120°35' 00"
B	89°23' 40"
C	131°01' 00"
D	128°02' 20"
E	94°54' 40"
F	155°59' 20"

Adjust the angular error in the observations, if any, and calculate the bearing of the traverse lines if whole circle bearing of the line AB is 42°.

**UNIT – V**

10 A tract of land has three straight boundaries AB, BC, and CD. The fourth boundary DA is irregular. The measured lengths are as under: AB = 135 m, BC = 191 m, CD = 126 m, BD = 255 m. The offsets measured outside the boundary DA to the irregular boundary at a regular interval of 30 m from D, are as below:

Distance from D (m)	0.0	30	60	90	120	150	180
Offsets (m)	0.0	3.7	4.9	4.2	2.8	3.6	0.0

Determine the area of the tract.

**OR**

11 A swimming pool is planned to construct in an indoor stadium at level ground. The top edges are 50 m x 40 m. The side slope on longer edges is given as 1: 2 and on shorter edge is given as 1: 1.5. If depth is 4 m, find out the volume of earthwork.