53 (CE 401) SURV-II

2014

SURVEYING-II

Paper : CE 401

Full Marks : 100

Pass Marks : 30

Time : Three hours

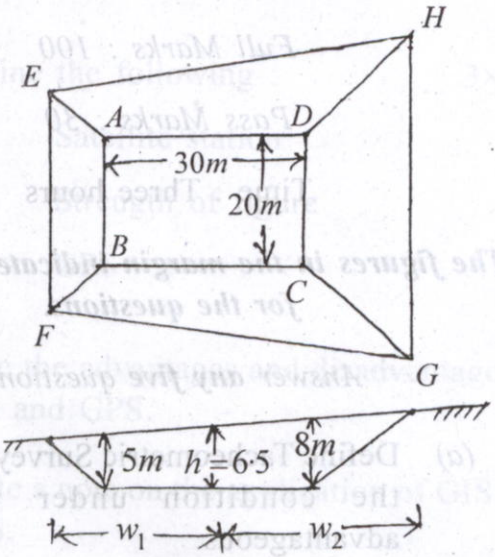
The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Define Tacheometric Surveying ? Describe the condition under which it is advantageous. 4

(b) Two triangulation stations *A* and *B* are 60 kilometres apart and have elevations 240*m* and 280*m* respectively. Find the minimum height of signal required at B so that the line of sight may not pass near the ground less than 2 *metres*. The intervening ground may be assumed to have a uniform elevation of 200 *metres*. 6

(c) Calculate the volume of the excavation shown in *fig.* the side slopes being $1\frac{1}{2}$ horizontal to 1 vertical and the original ground surface sloping at 1 in 10 in the direction of the centre line of the excavation 10

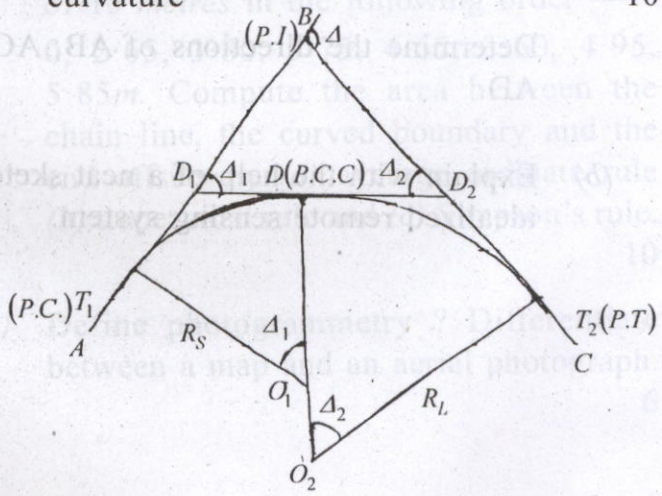


2. (a) A tacheometer reads 1·645 and 2·840 corresponding to the stadia wires, when sighted horizontally to a vertical staff 120*m* away. The focal length of the object glass is 20*cm* and the distance from the object glass to the trunnion axis is 15*cm*. Calculate the stadia interval. 5

(b) Define super-elevation ? What are the conditions necessary for setting out transition curve ? 5

(c) Explain the *three* methods of determining the intervisibility between triangulation stations. 10

3. (a) Two straights AB and BC are intersected by a line D_1D_2. The angles BD_1D_2 and BD_2D_1 are 40°30′ and 36°24′ respectively. The radius of the first arc is 600 *metres* and that of the second arc is 800 *metres*. If the chainage of intersection point B is 8248·1 *metres*, find the chainage of the tangent points and the point of compound curvature 10



(b) What do you understand by Geographical Information System ? Write a note on Components of GIS. 4+6=10

4. (a) From a satellite station S, 5·8 *metres* from the main triangulation station A, the following directions were observed. 10

A	0°	0′	0″
B	132°	18′	30″
C	232°	24′	6″
D	296°	6′	11″

The lengths AB, AC and AD were computed to be 3265·5 *m*, 4022·2 *m* and 3086·4 *m* respectively.

Determine the directions of AB, AC and AD.

(b) Explain with the help of a neat sketch an idealized remote sensing system. 10

5. *(a)* The area of a figure was measured by a planimeter with the anchor point outside the figure and the tracing arm set to the natural scale. $(M = 100\,Sq.cm)$. The initial reading was 8·628 and final reading was 1·238. The zero mark of the disc passed the index mark once in the clockwise direction. Calculate the area of the figure. 5

(b) What is Remote Sensing ? What are the basic principles of remote sensing ? Differentiate between active and passive remote sensing. 5

(c) A series of offsets were taken from a chain line to a curved boundary line at intervals of 15 *metres* in the following order — 0, 2·65, 3·80, 3·75, 4·65, 3·60, 4·95, 5·85*m*. Compute the area between the chain line, the curved boundary and the end offsets by *(a)* average ordinate rule *(b)* trapezoidal rule and *(c)* Simpson's rule. 10

6. *(a)* Define photogrammetry ? Differentiate between a map and an aerial photograph. 6

(b) The Scale of an aerial photography is $1cm=100m$. The photograph size is $20cm \times 20cm$. Determine the number of photographs required to cover an area $10km \times 10km$, if the longitudinal lap is 60% and the side lap is 30%. 5

(c) Define the following : $3 \times 3 = 9$

(i) Satellite station

(ii) Strength of figure

(iii) GPS

7. (a) Give the advantages and disadvantages of GIS and GPS. 10

(b) Write a note on the application of GIS and GPS. 10
