Total No. of Questions : 12]

SEAT No. :

**P3638**

[Total No. of Pages :5

**[4758]-2**

# T.E. (Civil)

# ADVANCED SURVEYING

## (2008 Pattern) (Semester - II)

*Time : 3 Hours]* *[Max. Marks :100*

***Instructions to the candidates:***

1) ***Solve Q.1or Q.2, Q.3 or Q.4, Q.5 or Q.6, from section I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from section II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures to the right side indicate full marks.***

## SECTION - I

***Q1)*** a) Define, **[8]**

i) Well conditioned triangle

ii) Extension of the base

iii) Phase of a signal

iv) Satellite Station

b) State and explain various components of GPS and applications to civil engg. **[6]**

c) What are the various points to be considered for selecting a triangulation station? **[4]**

OR

***Q2)*** a) There are two stations A and B at elevations of 240 m and 280 m respectively. The distance between A and B is 60 Km. Find the minimum height of target required at B so that line of sight may not pass near the ground than 2 meters. The intervening ground may be assumed to have a uniform elevation of 200 meters. **[8]**

b) Differentiate between triangulation and traversing and trilateration. **[6]**

c) What are different types of errors in GPS signal or result? **[4]**

***P.T.O.***

***Q3)*** a) Find the most probable values of the angles A & B from the following observations; **[8]**

A = $9^o$ 48' 36.6" wt.2

B = $54^o$ 37' 48.3" wt.3

A + B = $104^o$ 26' 28.5" wt.4

b) Explain step by step procedure for figure adjustment for a geodetic quadrilateral with central station. **[4]**

c) Explain the following terms; **[4]**

Conditioned Equation, True Error, Most Probable Value, Residual Error.

OR

***Q4)*** a) Find the corrected values of the angles of a triangle ABC from the following observations; **[8]**

A = $77^o$ 14' 20" wt.4

B = $49^o$ 40' 35" wt.3

C = $53^o$ 04' 52" wt.2

b) What is spherical excess? What are the methods of computing the sides of a spherical triangle? Explain any one method. **[4]**

c) Explain the following terms; **[4]**

Independent quantity, Weight of an observation, Mistake, True Value

***Q5)*** a) The following reciprocal observations were made from two points P and Q: **[10]**

Horizontal distance betwen P and Q = 6996 m

Angle of elevation of Q at P = $1^o$56' 10"

Angle of depression of P and Q = $1^o$56'52"

Height of signal at P =4.07 m

Height of signal at Q = 3.87 m

Height of instrument at P = 1.27 m

Height of instrument at Q = 1.48 m

Find the difference in level between P and Q and the refraction correction. Take Rsin 1" = 30.88 m.

b) Explain with a neat sketch how the alignment of tunnel is transferred from surface to the underground. **[6]**

OR

***Q6)*** a) Find the difference of levels of the points P and Q and the R.L. of P from the following data: **[10]**

Horizontal distance between P and Q = 7118 m

Angle of depression to P at Q = $1^{o}32'12"$

Height of signal at P = 3.87 m

Height of instrument at Q = 1.27 m

Co-efficient of refraction = 0.07

R.L. of Q = 417.860 m

Take Rsin 1" = 30.88 m

b) Describe in brief the location survey of a long bridge. **[6]**

## SECTION - II

***Q7)*** a) Define Relief displacement. Derive an equation to determine the height of an object with neat sketch. **[5]**

b) What is parallax of a point in photogrammetry. Describe the procedure of measuring parallax using parallax bar. **[5]**

c) Determine the number of photographs required to cover an area.

25km x 20 km, if the scale is 1 in 10000 and the format is 230 x 230 mm. take longitudinal lap as 60% and the side lap as 30%. **[8]**

OR

***Q8)*** a) What are the types of aerial photographs? Explain drift and crab. **[5]**

b) Explain in brief the procedure for determining Air Base Distance using mirror stereoscope. **[5]**

c) A calculate the air base, flying height and datum scale from the following data from a pair of aerial photograph. Focal length = 153 mm. **[8]**

| Point | Absolute Parallax (mm) | Ground Height (m) |
|---|---|---|
| A | 70.40 | 295 |
| B | 71.65 | 332 |

***Q9)*** a) What makes data spatial? Differentiate between vector and raster data. **[6]**

b) Differentiate between active and passive system of remote sensing. **[5]**

c) What are the elements of image interpretation? **[5]**

OR

***Q10)***a) What are different types of resolutions. Explain any one in detail. **[6]**

b) What is geo-stationary and sun-synchronous satellites. **[5]**

c) What are the capabilities or functions available in G.I.S. **[5]**

***Q11)***a) The following observations were made on three stations A, B, & C from a boat at O with the help of a sextant. Station B & O being on the same side of AC. Calculate the distances of the boat from the three stations.

Angle AOB = $30^{o}25'$, angle BOC = $45^{o}25'$, Angle ABC = $130^{o}10'$ AB = 4000 m, BC = 4995 m. **[8]**

b) What is sounding? Enlist the instruments used & explain principle of sextant with a neat sketch. **[8]**

OR

***Q12)***a) A, B, & C are three visible stations in a hydrographic survey. The computed sides of the triangle ABC are AB = 1200 m, BC = 1442 m & CA = 1960 m. Station O is established outside the triangle and its position is to be determined by resection on A, B, & C, the angle AOB and BOC being respectively 45°30' and 52°15'. Determine distances of OA and OC, if O & B are on the Opposite sides of line AC. **[8]**

b) Define hydrographical surveying. Explain graphical method of solving three point problem. **[8]**

*EEE*