

Total No. of Questions : 10]

SEAT No. :

P1689

[Total No. of Pages : 4

**[5460]-506**  
**T.E. (Civil)**  
**ADVANCED SURVEYING**  
**(2015 Pattern)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Answer Q.No.1 or Q.No.2, Q.No.3 or Q.No.4, Q.No.5 or Q.No.6, Q.No.7 or Q.No.8, Q.No.9 or Q.No.10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

**Q1)** a) Define: **[5]**

- i) Well conditioned triangle
- ii) Strength of a figure
- iii) Accuracy of triangulation
- iv) Geodetic Surveying
- v) Indivisibility of stations

b) Define triangulation, state the object of triangulation and state its applications. **[5]**

OR

**Q2)** a) Describe briefly various applications of Global Positioning System. **[5]**

b) State any five advantages of space based positioning systems. **[5]**

**Q3)** a) State various methods of locating the position of boat in hydrographical surveying and explain briefly. **[5]**

- i) location by two angles from Boat
- ii) location by one angle from shore and the other from the Boat

b) Discuss in brief the various data sources to build GIS for civil engineering applications such as watershed development. **[5]**

**P.T.O.**

OR

- Q4)** a) Define remote sensing. State importance of digital image processing. [5]  
b) What is mean by three point problem? How it solve by analytical method? [5]

- Q5)** a) What do you mean by a spherical excess? and how do you find out the Area of a spherical triangle? [5]  
b) Define the following terms : [5]

- i) Mistake
- ii) True error
- iii) Most probable value
- iv) Conditioned equation
- v) Weight of an observation

- c) Following observation were recorded for an angle under identical condition. [8]

$162^{\circ}20'00''$	$162^{\circ}21'20''$	$162^{\circ}21'40''$
$162^{\circ}20'40''$	$162^{\circ}19'40''$	$162^{\circ}21'20''$

Calculate :

- i) the most probable error of single observation
- ii) the most probable error of mean
- iii) the most probable value of the angles

OR

- Q6)** a) Explain laws of weight. [5]  
b) Explain step by step procedure for figure adjustment for a geodetic quadrilateral without central station. [5]  
c) Neglecting the spherical excess, adjust the angle of triangle of which observed values are [8]

Angle	Weight
Angle A = $48^{\circ} 18' 22''$	3
Angle B = $76^{\circ} 32' 47.2''$	1
Angle C = $55^{\circ} 08' 53.8''$	3

- Q7)** a) Write a stepwise procedure of determine air base distance using mirror stereoscope. [5]
- b) Write short note on : Crab and Drift. [5]
- c) The scale of aerial photograph is 1: 12000. The size of aerial photograph is 250 mm × 250 mm. The longitudinal overlap is 60% and side overlap is 30%. Determine the number of photographs required to cover an area of 250 sq.km. [6]

OR

- Q8)** a) Define the following terms : [5]
- Air base distance
  - Relief displacement
  - Oblique photograph
  - Principal point
  - Mosaic
- b) Define Ground Control Points, state their role in photogrammetry and bring out difference between pre marked and post marked Ground Control Points (GCP). [5]
- c) Find the number of photographs (size 250 × 250 mm) require to cover an area of 20 km × 16 km if the longitude overlap is 60% and the side overlap is 30%. Scale of photograph is 1 cm: 150m. [6]
- Q9)** a) Two triangulation stations A and B are 3200.65 m apart. Find the difference of elevation of two stations for the following data : [8]
- |                                |            |
|--------------------------------|------------|
| Angle of depression at B to A  | = 2°18'16" |
| Height of signal at A          | = 4.23 m   |
| Height of Instrument at B      | = 1.24 m   |
| Coefficient of refraction at B | = 0.07     |
| R sin 1"                       | = 30.88 m  |
| R.L. of B                      | = 242.6 m  |
- b) Describe in brief how setting out of a tunnel with surface setting out and transferring the alignment underground is carried out at site. [8]

OR

**Q10) a)** Two triangulation stations A and B are 2800 m apart. Find the reduce level of station B for the following data : **[8]**

Angle of elevation at A to B =  $1^{\circ}28'32''$

Height of signal at A = 2.46 m

Height of Instrument at B = 1.38 m

Coefficient of refraction at B = 0.07

radius of earth is = 6372 km

R.L. of A = 125 m

**b)** Describe the procedure for setting out a bridge, explain with a sketch. **[8]**

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