22301

23242

3 Hours / 70 Marks Seat No. | | | | | | | | |

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

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

Marks

1. Attempt any FIVE of the following: **10**

a) Enlist the accessories of plane table.

b) Define the term

i) Latitude

ii) Departure

c) State Bowditch's rule.

d) State the constants of tacheometer.

e) Define 'Degree of Curve'.

f) List any four modern surveying instruments.

g) State two applications of GPS.

Marks

2. Attempt any THREE of the following: **12**

a) Explain the procedure of intersection method of plane tabling with neat sketch.

b) State any four relations between fundamental axes of theodolite.

c) List any four essential characters of tacheometer.

d) Describe the procedure of setting out curve by Rankine's deflection angle method.

3. Attempt any THREE of the following: **12**

a) Describe temporary adjustment of theodolite.

b) State any four components of E.D.M. with their function.

c) Mention any four features of total station.

d) State the applications of GIS in Civil Engineering.

4. Attempt any THREE of the following: **12**

a) State any four advantages and four disadvantages of plane table survey.

b) The following deflection angles were measured in running a traverse from L to R.

Station	Deflection angle
M	23°47'R
N	18°19'L
O	37°20'R
P	15°38'R
Q	10°12'L

If the true bearing of LM is N62°18'E Calculate true bearing of the remaining sides.

c) Following table gives lengths and bearing of four sides of a five sided closed traverse PQRST. Compute the length and bearing of line TP.

Line	PQ	QR	RS	ST	TP
Length	194.1	201.20	164.40	172.6	?
Bearing	85°3'	15°30'	285°30'	195°30'	?

Marks

d) A tacheometer having constant 100 and 0.4 m readings were taken on vertically staff at station P and Q as follows :

Instrument Station	Staff Station	Hair reading	Remark
A	P	1.200, 2.300, 3.400	RL of P = 100.00 m
	Q	0.300, 2.100, 3.900	

Calculate the horizontal distance between A and Q and reduced level of Q. Assume line of sight horizontal.

e) Two straights of road deflect at an angle of intersection 120°. They are to be connected by a circular curve of 200 m radius calculate :

i) Length of tangent

ii) Apex distance

iii) Length of long chord

iv) Length of curve.

5. Attempt any TWO of the following: **12**

a) Following are the observed latitudes and departures of a closed traverse. Calculate the corrected consecutive co-ordinates.

Line	Length in M	Latitude	Departure
PQ	256	+225.68	+120.84
QR	327	–245.30	+210.13
RS	186	–149.93	–110.07
SP	278	+170.0	–219.96

b) Following are the observations taken while running closed traverse by theodolite. Find consecutive coordinates using Bowditch Rule.

Line	Length (m)	Bearing
AB	335	180°20'
BC	850	90°20'
CD	408	357°
DA	828	265°

Marks

c) A tacheometer fitted with anallatic lens was set up at station A and the following readings were obtained on vertically held staff.

Inst. Station	Staff Station	Vertical Angle	Stadia readings
A	BM	+ 8°	0.800, 1.120, 1.480
A	B	– 4°	1.140, 1.235, 1.330

The constant $\left(\frac{f}{i}\right)$ is 100, Find distance AB and RL of station B as RL of BM is 100.00 m.

6. Attempt any TWO of the following: **12**

a) Describe the procedure of traversing by using total station.

b) State any six component parts of digital theodolite and state their purpose.

c) Describe applications of remote sensing in Civil Engineering.