[3 Hours]   [80 Marks]

Q 1 is compulsory. Attempt **any three** questions from the remaining questions.

Q.1 Answer briefly. Each question carries 05 marks.   (20)
- a Define Surveying. Classify surveying on the basis of the instruments used.
- b Differentiate between Whole circle bearing (WCB) and Reduced bearing system. If Θ is the WCB, what would be the reduced bearing in all four quadrants?
- c Define: i) Chainage .ii) Backsight. iii) Intermediate sight. iv) Foresight, v) Change point
- d A tacheometer has a diaphragm with three cross hairs spaced at a distance of 1.40 mm. The focal length of the object glass is 20 cm and the distance of the object glass from the trunnion axis is 10 cm.Calculate the tacheometric constants.

Q.2   (20)
- a A closed compass traverse ABCD was conducted round a lake and the bearings as shown   10
aside were obtained. Determine which
of the stations are affected by local
attraction and give the values of the
corrected bearings.

Line	AB	BC	CD	DA
F.B	84°20'	117°20'	234°50'	316°40'
B.B	266°0'	296°20'	54°50'	136°0'

- b A road embankment 35 m wide at top with side slope of 2 to 1 have ground levels at 100   10
metres interval along line AB as under: A(153.0),151.8,151.2,150.6,(149.2)B.The
formation level at A is 162.4 m with a uniformly falling gradient of 1 in 40 from A to B.
Find volume of earthwork by prismoidal formula. Assume the ground to be level in c/s .

Q.3   (20)
- a Following is the page of a level book. Fill in the missing data.Apply the usual checks.   12
Σ B.S is 8.445.

Station	B.S	I.S	F.S	Rise	Fall	RL	Remarks
1	2.150					450.000	**BM**
2	1.645		?	0.500		?	
3		2.345		?	?	?	
4	?		1.965	?		?	
5	2.050		1.825	0.400		?	
6		?	?			451.730	
7	(–) 1.690		?	0.120		?	Inverted staff rdg
8	?		2.100		?	?	
9			?	?		449.100	

- b Write a note on different axes of a theodolite and their interrelationships for the   08
instrument to be in perfect adjustment alongwith a neat sketch.

TURNOVER

Q.4

a List the accessories required for Plane Table Survey. Describe the radiation method of plane table survey with its advantage.

b Write short notes on :
   i.   Measurement of horizontal angle by method of Repetition.
   ii. Two point problem.

Q.5

a

Calculate latitudes and departures for the traverse whose details are as shown aside:	Line	Length (m)	WCB
	AB	89.31	45°10'
	BC	219.76	72°05'
	CD	151.18	161°52'
	DE	159.10	228°43'
	EA	232.26	300°42'

b

Distance	0 (pt. P)	20	40	60	80	100	120	140	160 (pt. Q)
Offset	2.40	3.70	4.65	6.85	5.35	7.20	8.85	8.35	5.60

The above perpendicular offsets were taken at 20 m intervals from a survey line PQ to an irregular boundary line. Calculate the area using Simpson's Rule.

Q.6

a Initially, a staff was held vertically at a distance of 46.2 m and 117.6 m from the centre of a theodolite fitted with stadia hairs and the staff intercepts with the telescope horizontal were 0.45 m and 1.15 m respectively. The instrument was then set over a station P having RL as 150 m, the height of instrument axis being 1.38 m .The stadia hair readings on a staff held vertically at a station Q with instrument at P were 1.200, 1.930 and 2.650 m respectively, while the vertical angle (depression) was – 9°30'.Find RL of Q & dist. PQ.

b A 20 m chain was found to be 6 cm too long after chaining 1500 m.It was 9 cm too long at the end of day's work after chaining a total distance of 2500 m.If the chain was correct before commencement of the work, find the true distance.

c Write a note on Gale's traverse table.