

Total No. of printed pages = 6

CT-302/Surv-I/3rd Sem(R)/2018/M

SURVEYING - I

Full Marks - 70

Pass Marks - 28

Time - Three hours

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

PART - A

1. Choose the correct answer from the given options : 1×5=5

(i) If the whole circle bearing of a line is $237^{\circ} 45' 30''$, its quadrantal bearing is

(a) S $57^{\circ} 45' 30''$ W

(b) S $47^{\circ} 45' 30''$ E

(c) S $32^{\circ} 14' 30''$ W

(d) S $32^{\circ} 14' 30''$ E

[Turn over

(ii) If the measured distance along the slope is 18.5 m and the gradient is 1:16, then the horizontal distance is

(a) 18.5m (b) 18.46m

(c) 17.9m (d) 16m

(iii) A 30 m chain was used to measure a line AB which was found to be 205 metres long. If the chain was found to be 2 cm too long, then the actual length of the line AB is

(a) 203.86m (b) 204.86m

(c) 205.13m (d) 206m

(iv) When the reading is taken on a staff held at a point of known elevation of 123.45 m, the staff reading is recorded as 1.875 m. The height of instrument is

(a) 1.875m (b) 121.575m

(c) 123.45m (d) 125.32m

(v) The magnetic bearing of a line is

(a) the horizontal angle between any lines

(b) the vertical angle of a line from the horizontal plane

(c) the horizontal angle between the magnetic meridian and the line

(d) the vertical angle between the magnetic meridian and the line

2. State whether the following statements are true or false : 1×5=5

(i) Invar tape has a very low coefficient of expansion.

(ii) Surveyor's compass is based on reduced bearing system.

(iii) Parallax is a condition in which the image of an object is not formed in the plane of cross hairs.

(iv) Local attraction in compass surveying may exist due to bad weather.

(v) Focussing the eye-piece of a level makes the cross-hairs clear and distinct.

3. Fill in the blanks : $1 \times 5 = 5$

- (i) The effect on magnetic needle due to external magnetic sources is called _____.
- (ii) Levelling of an auto level is done by using _____.
- (iii) A levelling staff which can be read directly by the instrument man through the telescope is called _____.
- (iv) Line joining points of equal elevation on earth surface is called _____.
- (v) The horizontal distance between two points on two consecutive contours is known as _____.

4. Define the following : $2 \times 5 = 10$

- (i) Contour gradient
- (ii) Line of sight
- (iii) True meridian
- (iv) Reciprocal levelling
- (v) Geodetic surveying

PART - B

5. Answer the following questions : $5 \times 5 = 25$

(i) What is temporary adjustment ? Explain the steps involved in temporary adjustment of a level.

(ii) Explain the use of contour map.

(iii) With a neat diagram explain any one method of chaining on uneven ground.

(iv) What is reciprocal levelling ? What are the errors eliminated by reciprocal levelling.

(v) Explain the differences between a prismatic compass and surveyor's compass.

6. The whole circle bearings of the lines of a closed traverse are given below. Determine which stations are affected by local attraction and correct the bearings by calculating the included angles. 10

Lines	Forebearings	Backbearings
AB	$41^{\circ}20'$	$221^{\circ}20'$
BC	$114^{\circ}30'$	$293^{\circ}50'$
CD	$164^{\circ}40'$	$364^{\circ}20'$
DA	$275^{\circ}30'$	$94^{\circ}30'$

7. The following consecutive readings were taken with a level :

10

6.58, 5.23, 6.32, 8.52, 9.69, 6.58, 7.93, 8.59, 9.93, 10.20

The level was shifted after 4th, 6th and 9th readings. The R.L. of the first point was 251.462 m.

- Enter the readings in a level field book-form and reduce the levels by rise and fall method.
- Apply the usual arithmetic check.
- Determine the difference in elevation between first and last point.

Line	Backsightings	Inter-sightings	Foresightings
1	10		6.58
2		5.23	
3		6.32	
4		8.52	
5		9.69	
6		6.58	
7		7.93	
8		8.59	
9		9.93	
10			10.20