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END SEMESTER EXAMINATION, NOVEMBER-2018

Semester – 3rd

Subject Code : CT-302

SURVEYING - I

Full Marks – 70

Time – Three hours

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

Instructions :

1. *All* questions of PART-A are compulsory.
2. Answer any *five* questions from PART-B.

PART - A

Marks – 25

1. Fill in the blanks :

1×10=10

(a) Bearing of a line is measured in _____ direction in WCB system.

(b) A relatively permanent point of reference whose reduced level is known is called _____.

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- (c) Bearing of a line is always measured with reference to a _____.
 - (d) A closed contour lines with one or more higher ones inside it represents a _____.
 - (e) A series of straight, parallel and equally spaced contour lines represent a _____.
 - (f) A point on which both fore sight and back sight are taken is called _____.
 - (g) Elimination of parallax is done by focussing the _____ and _____.
 - (h) The operation of levelling to determine the elevation of points at some distance apart is called _____.
 - (i) Representative fraction of the scale 1 cm = 20m is _____.
 - (j) The back bearing of line AB is $152^{\circ}45'$, its fore bearing is _____.
2. Write true or false : $1 \times 10 = 10$
- (a) Chain surveying is the most accurate method of making direct linear measurements.
 - (b) Prismatic compass gives bearing of a line in quadrantal bearing system.

- (c) Parallax is a condition in which the image of an object is formed parallel to the cross-hairs.
 - (d) Local attraction in compass surveying may exist due to bad weather.
 - (e) Focussing the eyepiece of a level makes the cross-hairs clear and distinct.
 - (f) In prismatic compass graduations are engraved inverted.
 - (g) In whole circle bearing system, difference between fore bearing and back bearing is always 180° .
 - (h) Fore sight is always taken at a point of unknown elevation.
 - (i) In levelling, a station is a point where the level is set up.
 - (j) Datum is a reference surface to which elevations are referred.
3. Choose the correct answer : $1 \times 5 = 5$
- (a) If the reduced bearing of a line is $N 57^{\circ}45' 30'' W$, its whole circle bearing is
 - (i) $302^{\circ}45'3''$ (ii) $302^{\circ}4'30''$
 - (iii) $302^{\circ}14'30''$ (iv) $302^{\circ}41'30''$

(b) The magnetic bearing of a line is $52^{\circ}46'$, what is the true bearing if the magnetic declination is $4^{\circ}28'$ West ?

(i) $48^{\circ}18'20''$

(ii) $46^{\circ}16'10''$

(iii) $48^{\circ}18'10''$

(iv) $48^{\circ}18'00''$

(c) A 30m chain was used to measure a line AB which was found to be 205 metres long. The actual length of the line AB was 205.14m. What was the error in the chain ?

(i) 1 cm

(ii) 2 cm

(ii) 3 cm

(iv) 4 cm

(d) A reading is taken on a staff held on a B.M. The staff reading is recorded as 1.875m and height of instrument is 125.325m. What is the elevation of B.M ?

(i) 123.54m

(ii) 123.57m

(iii) 123.45m

(iv) 125.25m

(e) The magnetic bearing of a line is

(i) The horizontal angle between any line

(ii) The vertical angle of a line from the horizontal plane

(iii) The horizontal angle between the magnetic meridian and the line

(iv) The vertical angle between the magnetic meridian and the line.

PART-B

Marks - 45

4. (a) Define the following :

$2 \times 2 = 4$

(i) Contour gradient

(ii) Line of collimation.

(b) What is temporary adjustment ? Explain the steps involved in temporary adjustment of a level. 5

5. (a) Define the following :

$2 \times 2 = 4$

(i) Contour interval

(ii) Cadastral surveying.

- (b) Fore bearings of the lines AB, BC, CD and DA are $42^{\circ}18'$, $123^{\circ}15'$, $205^{\circ}30'$ and $287^{\circ}45'$ respectively. Find the interior angles A, B, C and D. 5

6. (a) Define the following : $2 \times 2 = 4$

(i) Magnetic meridian

(ii) Levelling.

- (b) In levelling between two points A and B on opposite banks of a river, the level was set up near A, and the staff readings on A and B were 1.266 and 2.874m respectively. The level was then moved and set up near B and the respective readings on A and B were 0.785 and 2.356m. What is the true difference of level between A and B ? 5

7. (a) In a closed traverse, the fore bearings of the lines AB, BC, CD and DA are $45^{\circ}25'$, $122^{\circ}15'$, $210^{\circ}30'$ and $285^{\circ}45'$ respectively. Find the included angles A, B, C and D. 5

- (b) Define the following : $2 \times 2 = 4$

(i) Reduced bearing

(ii) Cumulative error.

8. (a) Explain five characteristics of contours. 5

- (b) Define : $2 \times 2 = 4$

(i) Plane surveying

(ii) Compensating error.

9. The whole circle bearings of the lines of a closed traverse are given below. Calculate the included angles and check for any observational and instrumental error. Considering the bearings of line AB to be correct, compute the correct bearings of other lines. 9

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	$275^{\circ}30'$	$94^{\circ}30'$

10. The following consecutive readings were taken with a level : 9

6.34, 5.16, 5.22, 8.18, 9.82, 6.74, 7.93, 8.60, 9.92, 10.20

The level was shifted after 3rd, 5th and 9th readings. The R.L. of the first point was 250.456m.

(a) Enter the readings in a level field book-form and reduce the levels by rise and fall method.

(b) Apply the arithmetic check.