BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – Dip.CE-2024
Course Name – Surveying and Levelling
Course Code - DCE40113
(Semester IV)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select the correct definition of surveying.
a) Study of soil
b) Measurement of land and features
c) Design of buildings
d) Cost estimation

(ii) Select the main purpose of surveying.
a) Decoration
b) Mapping and planning
c) Concrete testing
d) Load calculation

(iii) Select the scale commonly used by engineers.
a) Plain scale
b) Diagonal scale
c) Engineer's scale
d) Chord scale

(iv) Select the full form of RF.
a) Relative Factor
b) Reduced Fraction
c) Representative Fraction
d) Ratio Formula

(v) Select the instrument used to locate intermediate points on a line.
a) Peg
b) Line ranger
c) Plumb bob
d) Cross staff

(vi) Select the method used when ends of line are visible.
a) Indirect ranging
b) Direct ranging
c) Random ranging
d) Parallel ranging

(vii) Select the bearing measured from true meridian.
a) Magnetic bearing
b) Arbitrary bearing
c) Reduced bearing
d) True bearing

(viii) Select the basic principle of compass traversing.
a) Whole to part
b) Part to whole
c) Measurement of angles
d) Measurement of bearings

(ix) Choose the difference between prismatic and surveyor compass.
a) Bearing system
b) Size
c) Shape
d) Color

(x) Choose the temporary adjustment of prismatic compass.

a) Centering
b) Levelling
c) Focusing prism
d) All of these

(xi) Select the levelling suitable for long distance roads.

a) Simple
b) Fly
c) Profile
d) Check

(xii) Select the levelling staff which gives direct reading.

a) Target staff
b) Self-reading staff
c) Folding staff
d) Wooden staff

(xiii) Choose the imaginary line joining points of equal RL.

a) Profile line
b) Contour
c) Gradient line
d) Datum line

(xiv) Choose the vertical distance between contours.

a) Horizontal equivalent
b) Contour interval
c) Gradient
d) Reduced level

(xv) Choose the method where rays are drawn from one station.

a) Traversing
b) Intersection
c) Radiation
d) Resection

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the principle of chain surveying. (3)
3. State true meridian and magnetic meridian. (3)
4. Apply conversion of bearing from WCB 300° to Reduced Bearing. (3)
5. The distance between two stations was 1,200 m when measured with a 20 m chain. The same distance when measured with a 30 m chain was found to be 1,195 m. If the 20 m chain was 0.05 m too long, estimate the error in the 30 m chain. (3)
6. The magnetic bearing of a line CD is S 30° 15 ′ W . Calculate its true bearing, if the declination is 10° 15 ′ E. (3)

OR

Analyze the role of graphical adjustment of closing error in a compass traverse and its importance in survey accuracy. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. List and define primary and secondary surveying. (5)
8. Explain methods of plane table survey. (5)
9. During a fly levelling operation, the following observations were made: (5)

BS readings: 0.650, 2.155, 1.405, 2.655, 2.435 m

FS readings: 2.455, 1.305, 0.555, 2.405 m

The first backsight was taken on a BM of RL 90.560 m. From the last backsight, it is required to set four pegs each at a distance of 30 m on a falling gradient of 1 in 100. Estimate the RLs of these four pegs.

10. A steel tape was exactly 30 m long at 20 °C when supported throughout its length under a pull of 10 kg. A line was measured with this tape under a pull of 15 kg and at a mean temperature of 32°C and found to be 780 m long. The cross-sectional area of the tape = 0.03 cm^2, and its total weight = 0.693 kg. α for steel = 11×10^−6 per °C E for steel = 2.1×10 ^6 kg/cm^2 Compute the true length of the line if the tape was supported during measurement (i) at every 30 m (ii) at every 15 m. (5)
11. A steel tape was exactly 20 m long at 20 °C when supported throughout its length under a pull of 5 kg. A line measured with this tape under a pull of 16 kg and at a mean temperature of 32 °C, was found to be 680 m long. Assuming the tape is supported at every 20 m, estimate the true length of the line. Given: Cross-sectional area of tape = 0.03 cm^2 E=2.1×10 ^6 kg/cm^2 α=11×10 ^−6 per °C Density of tape material = 10 g/cm^3 (5)

12. The following are the fore and back bearings of the sides of a closed traverse: (5)

Side	FB	BB
AB	150°15′	330°15′
BC	20°30′	200°30′
CD	295°45′	115°45′
DE	218°0′	38°0′
EA	120°30′	300°30′

Calculate the interior angles of the traverse.

OR

The following are the bearings of a closed traverse: (5)

Side	FB	BB
AB	N 45°30′ E	S 45°30′ W
BC	S 60°0′ E	N 60°0′ W
CD	S 10°30′ W	N 10°30′ E
DA	N 75°45′ W	S 75°45′ E

Calculate the interior angles of the traverse.

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