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**Question Paper Code : 20257**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third Semester

Civil Engineering

CE 6304 — SURVEYING — I

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the two basic principles of surveying.
2. What are the different tape corrections?
3. Define magnetic declination.
4. Name some of the errors in plane table survey.
5. What is a change point?
6. What are the different kinds of bench marks?
7. What is a planimeter?
8. What is contour gradient?
9. What is called spire test?
10. Define latitude and departure.

PART B — (5 × 13 = 65 marks)

11. (a) A survey line is obstructed by a high building. To prolong the line beyond the building, a 150m long perpendicular BC, is set out at B. From C, two lines CD and CE are set out at angles of 30° and 40° with CB respectively. Determine the lengths CD and CE so that D and E may be on the prolongation of AB. If the chainage of B is 100 m, find the chainage of D.

Or

- (b) A line AB was measured with a steel tape which was exactly 30 m at a temperature of 20° C and pull of 10 Kg. The measured length was 1650 m. The temperature during measurement was 30°C and the pull applied was 15 Kg. Find the true length of the line, if the cross sectioned area of the tape was 0.025 cm<sup>2</sup>. The coefficient of expansion of the material of the tape per degree Celsius is  $3.5 \times 10^{-6}$  and modulus of elasticity of the material of tape is  $E = 2.1 \times 10^6$  Kg/cm<sup>2</sup>.

12. (a) In an anti-clockwise traverse ABCA, all the three sides were equal in length. The magnetic fore-bearing of the line BC obtained by prismatic compass was 15° 30'. The bearing of the sun observed was 184° 30' at local noon with the compass. Calculate the magnetic bearing and true bearing of all the sides of traverse.

Or

- (b) The magnetic bearing of the line was found to be N60°30'W in 1992, when the declination was 5°10' E. Find its present magnetic bearing, if declination is 3°W.
13. (a) A vane 3.0 m above the foot of a staff was sighted at a point 3000 m away from the instrument. The observed angle of elevation was 2° 30'. The reduced level of trunnion axis being 200 m. Find the reduced level of staff station.

Or

- (b) The captain of a ship just sees the top of a light house 75 m in height. If the eye level of the captain was 7 m above the sea level, determine the distance of ship from the light house.
14. (a) A railway embankment is 12 m wide. The ground is level in a direction transverse to the centre line. Calculate the volume contained in a 100 m length by trapezoidal rule and prismoidal rule, if the slope is 1.5:1. The centre heights at 20 m interval are 3.7 m, 2.6 m, 4.0 m, 3.4 m, 2.8m, 3.0 m and 2.2 m.

Or

- (b) The following offsets were taken in a chain survey, the offset distances from a chain line to the boundary line. The interval adopted was 10 m. 0, 3.55, 2.50, 2.75, 4.25, 3.5, 0 m.
- Calculate the area bounded between the chain line and the boundary line and the end offsets by (i) middle ordinate rule and (ii) average ordinate rule.

15. (a) A levelling staff is held vertical at a distances of 100 m and 300 m from the axis of a tacheometer and the staff intercept for horizontal sites are 0.99m and 3.00 m respectively. Find the constants of the instruments. The instruments is setup at station A and the staff is held vertical at a point B with the telescope inclined at an angle of depression of  $10^\circ$  to the horizontal, the readings on the staff are 2.670, 1.835, 1.000 m. Calculate the RL of B and its horizontal distance from A. The HI is 1.42m and the RL of station A is 450.5 m.

Or

- (b) Find upto which vertical angle, in stadia work, a sloping distance may be assumed to be horizontal so that the error may not exceed 1 in 300? The instrument is fitted with an analytic lens and the staff is held vertical.

PART C — (1 × 15 = 15 marks)

16. (a) With neat sketches explain in detail about different levelling instruments and their adjustments.

Or

- (b) An instrument was setup at a point 200m away from a transmission tower. The angle of elevation to the top of the tower was  $30^\circ 42'$ , whereas the angle of depression to the bottom was  $2^\circ 30'$ . Calculate the total height of the transmission tower.