

(OLD COURSE)

QP Code : 3969

(3 Hours)

[Total Marks : 100

- N.B. :**
- (1) Question No.1 is compulsory.
 - (2) Attempt any four from remaining six questions.
 - (3) Figures to the right indicate full marks.
 - (4) If any data is missing assume it and justify the same.

1. (a) Define designation of simple circular curve. 5
 (b) Define radial acceleration used in transition curve. 3
 (c) Describe stadia diaphragm. 2
 (d) Explain various methods for positioning a structure. 5
 (e) Differentiate between tangential angle and deflection angle. 3
 (f) Write aim of route surveying. 2

2. (a) Explain linear methods of setting out of simple circular curve. 10
 (b) Explain why subtense bar method is more accurate than other methods of tacheometry. 5
 (c) Enlist various elements of a compound curve. 5

3. (a) Two straights BA and AC are intersected by EF. The angle BEF and EFC are 140° and 145° respectively. The radius of first arc is 600 m and that of second arc is 400 m. find the chainages of tangent points, the point of compound curve given that chainage of point of intersection (A) is 3415 m. 10
 (b) How would you align a bridge and measure the length of bridge and distance between the piers? 10

4. (a) downgrade of 1.2 % is followed by an up gradient of 2.4 %. RL of intersection is 100 m and the chainage is 360 m. A vertical parabolic curve 120 m long is to be introduced to connect the down grade. The peg interval is 15 m. Calculate the elevations of the curve by chord gradient method. If the RL of line of collimation is 103 m then determine the RL of top of wooden pegs driven along vertical curve. 10
 (b) Write benefits of a transition curve. 5
 (c) Write a short note on precise leveling. 5

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5. (a) Explain systematically the setting out of a culvert. 10
 (b) A tacheometer is set up at an intermediate point on a traverse course PQ 10
 and following observation were made on a vertically held staff.

Staff Station	Vertical angle	Staff intercept	Axial hair reading
P	+ 9° 30	2.250	2.105
Q	+ 6° 00	2.055	1.875

Compute the length of PQ and RL of Q if the RL of P is 350.5 m.

6. (a) Derive an expression for horizontal distance and elevation equation for tangential method when both vertical angles are of opposite sign. 5
 (b) Enlist modern surveying instruments and explain working principle of EDM. 10
 (c) Explain reverse curve and comment on their suitability in highway and railways. 5
7. (a) What is total station? Explain its various uses with sketches. 10
 (b) Two straights on the centre line of a proposed railway curve intersect at 2610 m. The deflection angle being 46°. A circular curve with 400 m radius and transition curve of length 90 m are to be introduced. Calculate the necessary data to set out the curve by tangential angles. (Calculate these values for first transition curve and circular curve only). 10
