

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.(2) Attempt any **four** questions 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) Draw a neat sketch of a composite curve and show all elements there on. Also give their relationship. **10**
- (b) Describe various applications of the Total Station. **5**
- (c) Differentiate between fixed and moveable hair method of tacheometry. **5**
2. (a) Two straights of a road intersect at chainage 2570 meters having their angle of intersection equal to 120° . Calculate the chainage of the point of tangent curve, point of curve tangent and mid point of curve if the radius of curve is 250. **10**
- (b) A tacheometer was set up at an intermediate station 'C' of the line AB. **10**
Following readings were obtained :—

Staff Station	Vertical Angle	Staff Readings		
A	$-6^\circ 20'$	0.445	1.675	2.905
B	$14^\circ 20'$	0.950	1.880	2.810

The instrument was fitted with an anallatic lens. Find the gradient of the line joining station A and B.

3. (a) Explain the procedure for setting out a RCC building having outer dimensions as 50 meters \times 20 meters in a plot of 65 meters \times 35 meters. Enlist the surveying instruments to be used for this purpose. **10**
- (b) Explain working and principle of EDM. **10**
4. (a) The WCB of two straights AB and BC of a railway line are 85° and 120° respectively. The chainage of point of intersection is 1505.5 m. These two straights are to be connected by circular curve of 300 m radius, calculate the necessary data for setting out the curve by Rankine's method. Take peg interval as 20 m. **10**
- (b) The horizontal angle subtended on the theodolite station by a subtense bar with vanes 3 meter apart is 12 : 30. Compute the horizontal distance between the theodolite and bar. Calculate the error in the same if angular error is $+1'$. Also comments on the accuracy obtained by different methods of tacheometry. **10**
5. (a) How would you determine the constant of a tacheometer ? **6**
- (b) With sketch explain slope rail. **4**
- (c) What is precise leveling ? Enlist the equipments used in precise leveling and explain the field procedure for conducting the precise leveling. **10**

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6. (a) A downgrade of -1% is followed by an up gradient of 2% . RL of intersection is 350 m and the chainage is 470 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 tangent correction. If the RL of line of collimation is 352.20 m then determine the RL of top of wooden pegs driven along vertical curve. **10**
- (b) Explain how surface alignment and levels from surface one transferred to underground in tunnel surveys. **10**
7. (a) Explain the “offsets from chord produced method” of setting out the simple circular curve. **10**
- (b) Write the use of contour maps in Civil Engineering. **5**
- (c) Explain methods of interpolating contour lines. **5**
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