(OLD COURSE)   Q.P. NO : **14415**

(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**.

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   5
       of tacheometry.
   (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   10
       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.
   (b) How would you align a bridge and measure the length of bridge and   10
       distance between the piers?

4. (a) A downgrade of 1.2 % is followed by an up gradient of 2.4 %. RL of   10
       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.
   (b) Write benefits of a transition curve.   5
   (c) Write a short note on precise leveling.   5