[Time: 3 Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Q.1 is compulsory.
2. Attempt any three questions out of the remaining questions.
3. Assume suitable data if required.
4. Figures to the right indicate full marks.

Q.1 State the applications of the followings: **20**
- a) Total station
- b) Electronic Theodolite
- c) Remote sensing
- d) GIS

Q.2 a) Explain with neat sketches **10**
- i) Composite curve
- ii) Compound curve
- iii) Reverse curve
- iv) Vertical curve

b) Two tangents intersect at chainage 2032m having their deflection angle as $46^0 30$. Calculate all the data necessary for setting out a simple circular curve of 250m radius by the offsets from the chord produced method. Take P.I. = 20m. **10**

Q.3 a) Two straights intersect at chainage 4540m with a deflection angle of 40^0. It is proposed to connect a circular curve of 330m radius with transition curve 60m long at each end. Compute the date necessary for setting out the combined curve having PI = 20m for circular curve and 10m for transition curve? **10**

b) A gradient of -1.20% meets a gradient of +1.60% at a chainage of 1410m and elevation of 245.15m. A vertical curve of length 140m is to be set out with pegs at 10m interval. Calculate the elevations of the pegs by chord gradient method. **10**

Q.4 a) Write an exhaustive note checking the vertically of high rise structures. **10**

b) Describe the Road Project in detail. **10**

Q.5 a) State and explain the methods of determining azimuth. **10**

b) Explain the procedure of aerial survey. **10**

Q.6 Write notes on: **20**
- i) Soundings
- ii) Site square
- iii) Pentagraph
- iv) Form 7 and Form 12 abstract
