

M.Tech. 2nd Semester Civil Engg. (Transportation
Engg.) (Elective-IV) Examination, July-2022

GEOMETRIC DESIGN OF HIGHWAYS

Paper-CE-645

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Write short note on overturning and transverse skidding effect. 10
- (b) Write a descriptive note on grade compensation on curves. 10
2. (a) Calculate the maximum allowable speed on a horizontal curve of radius 350 m if the maximum allowable values of lateral coefficient of friction is 0.15 and rate of superelevation is 0.07. 10
- (b) Write down the various steps for superelevation design. 10
3. (a) Explain ruling, maximum and exceptional gradients. Specify the values recommended by IRC for plains and hill. 10
- (b) Calculate the extra width of pavement required on a horizontal curve of radius 700 m on a two lane highway, the design speed being 80 kmph. Assume wheel base $L = 6$ m. 10

4. Explain with the aid of neat sketches the methods of eliminating camber and introduction of superelevation. 20
5. Explain the various design factors of traffic rotary along with a neat sketch in detail. 20
6. Write notes on :
- (a) Inter-relationship between geometric elements in rural and urban roads. 10
 - (b) Variations in geometric standards between plain and hilly regions. 10
7. (a) Explain grade separated intersections along with its advantages and limitations. 10
- (b) What are the relative advantages and disadvantages of over-pass and under-pass ?
8. (a) Write a note on channelized and unchannelized intersections. 10
- (b) Draw a neat sketch of full cloverleaf interchange. Also write down its various advantages. 10