53 (CE 502) TRAN–I

2018

TRANSPORTATION ENGG–I

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***all*** *questions.*

1. *(a)* What are the recommendations of Jayakar Committee ? 5

   (b) What are the different types of road patterns ? 5

   (c) What are the different factors controlling highway geometric design ? Explain in detail. 10

2. *(a)* In a district road where the rainfall is heavy, major district road of WBM pavement, 3·8*m* wide and a state highway of Bituminous concrete pavement, 7·0*m* wide are to be constructed. What should be the height of crown with respect to the edges in these two cases? 5

(b) Calculate the safe stopping sight distance for design speed of 50*km/hr* for two-way traffic on two-lane road. 5

(c) Derive expression for overtaking sight distance. 10

3. *(a)* A highway is provided with a horizontal curve of radius 300*m*. Calculate superelevation required to maintain a design speed of 90*km/hr*. 5

(b) Calculate the values of ruling minimum and absolute minimum radius of horizontal curve of NH in plain terrain. Assume ruling design speed and minimum design speed values as 100 and 80*km/hr* respectively. 5

(c) An Expressway four-lane divided passing through a flat terrain has a horizontal curve of radius equal to Ruling minimum radius. If the design speed is 120*km/hr*, calculate the following elements of the curve.

(i) Ruling minimum radius

(ii) Superelevation

(iii) Extra widening

(iv) Length of transition curve

Suggest the best suitable shape of the transition curve. 10

4. (a) The speed relationship for a particular road was found to be $v = 42{\cdot}76 - 0{\cdot}22k$, where '$v$' is the speed in *km/hr* and k is the density of vehicle in *km*. Find jam density, maximum capacity and density at maximum capacity. Sketch the relationship between density and flow and indicate important traffic flow parameters on it. 10

(b) Define the following : 2×5=10

(i) Time headway

(ii) Space headway

(iii) Basic capacity

(iv) Possible capacity

(v) Practical capacity.

5. (a) Explain CBR test in detail. 5

(b) What are the desirable properties of aggregates used in road construction ? 5

(c) Explain Impact test on aggregate. 5

(d) Explain Flash and Fire Point test of Bitumen. 5