

B.E./B.TECH. Degree Examination, December 2020

Fifth Semester

CE16502- HIGHWAY ENGINEERING

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer ALL questions

PART A - (8 X 2 = 16 marks)

1. Central Road Fund (*CRF*) was formed in the year: (a) 1937 (b) 1947 (c) 1929 (d) 1939
2. As per Indian Road Congress (*IRC*), camber recommended for Water Bound Macadam (*WBM*) road in heavy rain fall area is: (a) 2.0% (b) 3.0% (c) 4.0% (d) 2.5%
3. Displacement level of _____ is used for calculating 'Modulus of Subgrade Reaction': (a) 0.125 cm (b) 0.125 mm (c) 0.125 m (d) 1 cm
4. The radius of the mould used for laboratory *CBR* test is: (a) 150mm (b) 75mm (c) 100mm (d) 125 mm
5. State the highway development during 'Mughal period'.
6. Calculate Stopping Sight Distance (*SSD*): Speed of Vehicle = 50 kmph; Reaction time of the driver = 2.0 sec. ; Coefficient of longitudinal friction = 0.40; Brake efficiency = 80%
7. Differentiate: Tar & Bitumen.
8. What is the importance of 'flakiness index'?

PART B - (4 X16 = 64 marks)

09. (a) (i) List the various categories of roads in India. (6)
 (ii) Compare different categories of 'rural roads' in India. (10)

(OR)

- (b) (i) Explain on 'Indian Road Congress (*IRC*)'. (4)
 (ii) Classify engineering surveys for fixing alignment of a road. State how these surveys are inter-correlated. (12)
10. (a) (i) The speeds of overtaking and overtaken vehicles are 50 and 30 kmph, respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.79 m/s^2 . Calculate the safe overtaking distance. (12)
 (ii) Compare stopping sight distance with passing sight distance. (4)

(OR)

- (b) At a horizontal curve portion of a 4 lane undivided carriageway, a transition curve is to be introduced to attain required superelevation. The design speed is 60 kmph and the radius of the curve is 245 m. assume length of wheel base as 6m, superelevation rate as 5% and rate of introduction of this superelevation as 1 in 150. Calculate the length of transition curve in (m) required, if the pavement is rotated about inner edge. (16)

11. (a) (i) Distinguish: Flexible pavement & Rigid pavement. **(8)**
(ii) Justify the importance of optimum moisture content in pavement construction. **(8)**

(OR)

- (b) Explain the IRC method of Rigid pavement design step-by-step. **(16)**

12. (a) Explain California Bearing Ratio test in detail. **(16)**

(OR)

- (b) Enlist the various properties required for a good road aggregate and brief on 'test for toughness property of aggregates' with a neat sketch. **(16)**