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BICE-020

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00082

December, 2016

BICE-020 : TRANSPORTATION ENGINEERING – II

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Assume suitable data wherever necessary. Use of scientific calculator is allowed.*

1. (a) Explain the necessity and objectives of highway planning. *5*

(b) Discuss the different stages of engineering surveys that are carried out for finalising the location of highway alignment. *5*

2. (a) Briefly describe the stages of transportation planning process. *5*

(b) Draw a typical road cross-section showing the geometric features. *5*

3. Design the length of transition curve on a 500 m radius curve with a design speed of 100 kmph for National Highway in a heavy rainfall area. Assume double lane highway. *10*

4. (a) The absolute minimum sight distance required on a highway is 90 m. Find the required clearance of obstruction from the centre line of a horizontal curve of radius 400 m and length 200 m. Assume two-lane highway. 5

(b) Explain summit and valley curves and the various cases when these are formed while two different gradients meet. 5

5. (a) What is the significance of subgrade soil in highways ? Write the desirable properties of subgrade soil. 5

(b) Draw typical plots of bituminous mix design by Marshall method. How is the optimum bitumen content for the mix design determined ? 5

6. (a) Explain the CBR method of pavement design. How is thickness of different layers determined ? 5

(b) The width of expansion joint gap is 2 cm in a cement concrete pavement. If the concrete laying temperature is 20°C and the maximum slab temperature in summer is 55°C, calculate the spacing between expansion joints. Assume coefficient of thermal expansion of concrete as 10×10^{-6} per °C. 5

7. (a) Write the construction procedure of W.B.M. roads. 5

(b) Explain the methods of spot speed study. What are the applications of spot speed studies ? 5

8. (a) Explain traffic capacity, basic capacity, possible capacity and practical capacity. 5

(b) Write the fundamental relationship between traffic volume, density and speed. Determine the capacity flow on a road, if the average spacing between vehicles under stopped condition is 6·9 m. The free mean speed on this road is found to be 80 kmph. 5

9. (a) Describe different types of traffic signal systems. 5

(b) Write a short note on application of GIS in traffic engineering. 5

10. (a) Discuss the various cost components of highway projects. 5

(b) Write down the special features of expressways. 5