ACHARYA INSTITUTE OF TECHNOLOGY
Bangalore - 560090

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Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Transportation Engineering – I

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting at least TWO questions from each part.*
2. Missing data may be suitably assumed.

PART – A

1 a. Explain various characteristics of road transport. **(06 Marks)**

b. Determine the length of different categories of road in a state in India by 2001 plan. Total area of the state is 80,000km^2, total number of towns as per 1981 census is 86. Calculate the length of primary, secondary and tertiary road network. **(08 Marks)**

c. Explain briefly the following:
i) Indian Roads Congress (IRC)
ii) Central Road Fund. **(06 Marks)**

2 a. Define saturation system of road planning. **(06 Marks)**

b. List the factors affecting realignment of a project (highway). **(06 Marks)**

c. Three new roads A, B and C are to be completed in a district a five year plan period. Using the data given below in a table, work out the order of priority for phasing the plan programme by the principle of maximum utility per unit length. Assume the data suitably. **(08 Marks)**

Road	length in km	No. of villages served population			Productivity, 1000 ton	
		< 2000	2000-5000	>5000	Agriculture	Industrial
A	15	10	8	3	15	1.2
B	12	16	3	1	11	0.0
C	18	20	10	2	20	0.8

3 a. Explain obligatory points. With a neat sketches discuss how these control the alignment. **(06 Marks)**

b. Explain PIEV theory. **(06 Marks)**

c. Define shoulders and list the important functions of the same. **(08 Marks)**

4 a. What is super elevation? Explain the steps for practical design of super elevation. **(06 Marks)**

b. The speeds of overtaking and overtaken vehicles are 100kmph and 84kmph respectively. If the acceleration of overtaking vehicle is 3.6kmph/sec. Calculate the safe OSD. Draw a neat sketch of overtaking zone, indicating the necessary data. **(08 Marks)**

c. List different types of transition curves and provide the objectives of providing the same. **(06 Marks)**

PART – B

5 a. List the desirable properties of bitumen. What are the various tests carried out on bitumen? **(06 Marks)**

b. Explain step by step procedure to determine modulus of subgrade reaction and to make corrections for variation in plate size. **(08 Marks)**

c. Classify the given soil into HRB soil classification:
Soil % passing
6.3mm – 100%
2.0mm – 70%
600μ - 65%
75μ - 42%
Liquid limit of soil is 45% and plastic limit is 20%. **(06 Marks)**

6 a. Differentiate between flexible and rigid pavement. **(06 Marks)**

b. Determine the ESWL under a dual tandem wheel load assembly using simplified graphical method at a depth of 450mm and 900mm and load on wheel is 70kN and pressure is 0.6MPa. C/C distance between dual wheels is 600mm, C/C distance between tandem axle is 1400mm. **(08 Marks)**

c. Define modulus of subgrade reaction and radius of relative stiffness. **(06 Marks)**

7 a. Write step by step procedure used in construction of a bituminous concrete layer. **(08 Marks)**

b. List the requirements of an highway drainage system. **(06 Marks)**

c. Write step by step procedure involved in preparing subgrade. **(06 Marks)**

8 a. With examples explain tangible and intangible benefits. **(06 Marks)**

b. Write short notes on: i) Annual cost method; ii) Benefit cost ratio method. **(08 Marks)**

c. Explain the concept of BOT and BOOT, in financing highway project. **(06 Marks)**

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