



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

**Fifth Semester, B.E. - Civil Engineering**

**Semester End Examination; Dec - 2017/Jan - 2018**

**Highway Engineering**

Time: 3 hrs

Max. Marks: 100

**Note:** i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.  
ii) Assume missing data suitably.

### UNIT - I

- |      |   |   |
|------|---|---|
| 1 a. | What are the necessary and objectives of Highway planning?  | 6 |
|      | b. What are the various methods of classifying roads? Briefly outline the classification based on location and function as suggested in the Nagpur Road plan. | 6 |
|      | c. What are the major policies and objectives of Third 20-year road development plan?   | 8 |
| 2 a. | What are the various surveys to be carried out before planning a highway system for a given area? Explain briefly.  | 8 |
|      | b. What are the various requirements of an ideal highway alignment? Discuss briefly.  | 6 |
|      | c. Explain briefly how the re-alignment of highway work is carried out?   | 6 |

### UNIT - II

- |      |   |   |
|------|---|---|
| 3 a. | What are the design factors which controls the geometric elements? Explain briefly.   | 8 |
|      | b. Calculate the safe overtaking sight distance for a design speed of 96 kmph. Assume all other data suitably.  | 6 |
|      | c. Write a note on Pavement Unevenness and Light reflecting characteristics.  | 6 |
| 4 a. | With sketches, indicate where the sight distances get restricted on highways?   | 6 |
|      | b. What are the objects of providing curves on the horizontal alignment of highways? Explain.   | 8 |
|      | c. Calculate the extra width of pavement required on a horizontal curve of radius 200 m on a two lane highway, the design speed being 65 kmph. Assume wheel base $I = 6.5$ m. | 6 |

### UNIT - III

- |      |   |    |
|------|---|----|
| 5 a. | List the different methods of road construction. Discuss their advantages and limitations.                    | 10 |
|      | b. Write down the construction steps for water bound macadam road.  | 10 |
| 6 a. | What are the various types of bituminous construction in use? Discuss the advantages and limitations of each. | 10 |
|      | b. What are the components of cement concrete pavement and their functions?                                   | 10 |

### UNIT - IV

- |      |  |   |
|------|--|---|
| 7 a. | What are the objects and requirements of highway pavements?              | 6 |
|      | b. Explain functional and structural requirements of road pavements.     | 6 |
|      | c. Briefly outline the advantages and limitations of flexible pavements. | 8 |

- 8 a. Draw a sketch of flexible pavement cross-section and show the component parts. 10  
Enumerate the functions and importance of each component of the pavement.
- b. What are the factors affecting design and performance of flexible and rigid pavement? 10

**UNIT - V**

- 9 a. What are the importance and objectives of highway maintenance? 6
- b. What are the classifications of highway maintenance works? Explain. 6
- c. Mention the causes of distress in flexible pavement and their maintenance measures. 8
- 10 a. What are the requirements of good highway drainage system? 6
- b. Specify the design approach for surface drainage system of a highway. 6
- c. Explain with neat sketches, how the subsurface drainage system is provided to lower the water table and control of seepage flow? 8

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