

Code No: 137HX

**R16**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, December - 2019**

**TRANSPORTATION ENGINEERING**

**(Common to CE, CEE)**

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

**PART - A**

**(25 Marks)**

- 1.a) Give the classification of roads as per Nagpur Plan. [2]
- b) What are the different types of road network patterns? [3]
- c) What is the need for extra widening on a horizontal curve? [2]
- d) Give the factors on which the overtaking sight distance depends. [3]
- e) Define Condition diagram and Collision diagram. [2]
- f) Define Spot Speed, running Speed and average speed. [3]
- g) Draw a neat sketch of cloverleaf. [2]
- h) What are the types of at-grade intersections? [3]
- i) What are the stresses due to friction and temperature in rigid pavements? [2]
- j) What are the advantages and limitation of CBR method of design? [3]

**PART - B**

**(50 Marks)**

- 2.a) Explain the Chronological highway development in India.
  - b) What are obligatory points? Explain how these control the alignment. [5+5]
- OR
- 3.a) Explain briefly the stages of engineering surveys for locating a new highway.
  - b) Explain briefly the drawings usually prepared in a highway project and their use. [5+5]
- 4.a) What is Camber? Specify the recommended ranges of camber for different types of pavement surfaces.
  - b) Calculate the length of transition curve and the shift, when design speed is 80 Kmph, radius of circular curve is 250m, allowable rate of introduction of super elevation is 1 in 150 and pavement width including extra widening is 7.5m. [5+5]
- OR
- 5.a) Calculate the stopping sight distance for a design speed of 100kmph. Take the total reaction time as 2.5 sec. and coefficient of friction as 0.35.
  - b) Derive an expression for finding length of transition curve on horizontal alignment? [5+5]



- 6.a) What are the different methods of carrying out traffic volume studies?  
b) Discuss the engineering measures to be taken for preventing accidents. [5+5]

OR

- 7.a) Explain the role of road markings with examples in road safety and traffic regulations.  
b) Explain with neat sketches the classification of Traffic Signs. [4+6]

- 8.a) Define Channelization and explain the objectives of Channelization at Intersection.  
b) With neat sketch explain the suitability of various shapes of Rotary Islands. [4+6]

OR

- 9.a) Draw and explain the different types of intersections.  
b) Describe the advantages, disadvantages and limitations of rotary Intersection. [6+4]

- 10.a) Describe the step by step procedure of design of flexible pavements as per IRC 37-2001.  
b) Design a new flexible pavement for a two lane undivided carriageway: Design CBR value of sub grade = 5.0%, Initial traffic on completion of construction = 300cvpd, Average Growth Rate = 6.0%, Design Life = 10 years, and VDF = 2.5. [4+6]

OR

- 11.a) Classify and list the factors affecting the design and performance of rigid pavements. Mention the importance of each.  
b) Calculate the stresses by Westergaard's theory at corner and edge of a concrete slab. Wheel Load = 4800 kg, Modulus of Elasticity of concrete =  $2 \times 10^5$  kg/cm<sup>2</sup>, Pavement thickness = 20 cm, Poisson's ratio of concrete = 0.15, Modulus of sub grade reaction = 2 kg/cm<sup>3</sup>, radius of contact area = 20 cm. [4+6]