

R16

Code No: 137HX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, March - 2021

TRANSPORTATION ENGINEERING

(Common to CE, CEE)

Time: 3 hours

Max. Marks: 75

Answer any Five Questions

All Questions Carry Equal Marks

1. What are the various objectives of preliminary survey for highway alignment? Enumerate the details to be collected and the various steps in the conventional method. [15]
2. Briefly outline the main features of various road patterns commonly in use. Explain with sketches the star and grid pattern. [15]
- 3.a) Explain the role of pavement surface characteristics in highway geometrics design. State the factors affecting friction between pavements and tyre of vehicles?
b) Derive an expression for super elevation while a vehicle is negotiating on a horizontal curve. Explain the design steps involved in it. [7+8]
- 4.a) Enumerate the various design factors controlling the vertical alignment of highways.
b) Calculate the length of transition curve for a design speed of 80kmph at horizontal curve of radius 300m in a rural area. Assume suitable data. [7+8]
5. What are the applications of location file, spot maps, collision diagrams and condition diagrams? [15]
6. a) Explain the parameters which characterize traffic flow? With neat sketches elaborate how they are related.
b) At a right angled intersection of two roads, Road '1' has four lanes with a total width of 12.0 m and Road '2' has two lanes with a total width of 6.6m. the volume of traffic approaching the intersection during design hour are 950 and 843 PCU / hour on the two approaches of Road 1 and 378 and 180 PCU /hour on the two approaches of Road 2. Design the signal timings as per IRC guidelines. [7+8]
7. Explain the advantageous and disadvantageous of rotary. Elaborate the design elements involved for estimation of capacity of it. [15]
- 8.a) Calculate the stresses at interior, edge and corner regions of a concrete pavement using Westergaard's stress equation for the following data:
Wheel load = 4100 kg, Modulus of elasticity of concrete = 3.3×10^5 kg/cm², Pavement thickness = 30cm, Modulus of sub-grade reaction = 8kg/cm³, Diameter of loaded area = 25cm, Poisson's ratio of concrete = 0.15. Assume data if any data required.
b) Draw a sketch of flexible pavement cross section and show the component parts. Enumerate the function and importance of each component of the pavement. [7+8]

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