

Code No: 137SV

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

PAVEMENT DESIGN
(Civil Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

- 1.a) Explain various types of pavements with a neat cross-section.
b) What are the functions of each of the following layers? Explain.
i) Sub-base course
ii) Base course
iii) Surface course [7+8]
- 2.a) Describe various types of stresses developed in pavements with neat sketches and justifications.
b) Explain visco-elastic theory. [8+7]
3. Write a short note on
a) Modulus of subgrade reaction
b) Purpose of dowel bars in rigid pavement. [7+8]
- 4.a) Explain about the lime-chemical stabilization and write the associated reactions.
b) What is diametral resilient modulus? Write its application in the pavement design. [7+8]
5. A circular load of radius 'a' and intensity 'q' is applied on the surface of the homogeneous half-space with elastic modulus E, Poisson's ratio ν and permanent deformation parameters α and μ . Derive an equation for determining the permanent deformation at the center of the loaded area as a function of the number of load applications. [15]
6. Design a bituminous pavement with granular base and sub-base layers using the following data:
a) Four lane divided carriage way
b) Initial traffic in the year of completion of construction = 5000 cvpd (two-way)
c) Traffic growth per annum = 6%
d) Design life period = 20 years
e) Vehicle damage factor = 5.2
f) Effective CBR of subgrade = 7%
g) Marshall mix design carried out on the bituminous mix to be used in the bottom bituminous layer (DBM) for a void content of 3% resulted in an effective bitumen content (by volume) of 11.5%. [15]
7. What are the factors governing the design of rigid pavements? Explain. [15]
8. Write the salient design features of low volume rural roads according to IRC: SP:72-2015. [15]

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