



Reg. No. :

Name :

**Eighth Semester B.Tech. Degree Examination, January 2018
(2013 Scheme)**

13.805.7 : DESIGN AND CONSTRUCTION OF PAVEMENTS (C)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** the questions :

1. What are the assumptions made in the Burmister layer theory ?
2. Discuss the effects of repeated applications of loads on pavements. Explain equivalent axle load factors for repetition of different loads.
3. Explain the different types of joints provided in Cement Concrete Pavements and their functions.
4. Write down the construction steps for laying Wet Mix Macadam base course.
5. What are the corrections applied to the Benkleman Beam Deflection (BED) reading ? **(5×4=20 Marks)**

PART – B

Relevant Charts and Tables are permitted

Answer **any one full** question from **each** Module.

Module – I

6. a) Design a new flexible pavement for a two-lane undivided carriageway for a design life of 10 years using the following data :
Design CBR value of subgrade = 5.0%
Initial traffic on completion of construction = 3000 cv/day
Take average growth rate as 6.0% per year and VDF as 2.5. **15**
- b) Which are the material input to be considered for the pavement design ? **5**

OR



7. a) Plate bearing tests were conducted with 30 cm plate diameter on soil subgrade and over 1.5 cm base course. The pressure yielded at 0.5 cm deflection are 1.25 kg/cm^2 and 4 kg/cm^2 respectively. Design the pavement section for 4100 kg wheel load with a tyre pressure of 5 kg/cm^2 for an allowable deflection of 0.5 cm using Burmister's approach. **15**
- b) Write short note on VDF for the design of flexible pavements. **5**

Module – II

8. a) Discuss the critical combination of stresses in a rigid pavement. Explain. **10**
- b) The spacing between the contraction joints of a CC pavement is 5.0 m. Determine the tensile stress developed in the CC pavement due to contraction if the coefficient of friction between the bottom of the pavement and the supporting layer is 1.0 and the unit weight of CC is 2400 kg/m^3 . **10**

OR

9. The design thickness of a CC pavement is 25 cm. Take the load to be sustained by the dowel group as 2400 kg. The radius of relative stiffness is 65 cm. Elastic modulus of dowel bar steel is $2 \times 10^6 \text{ kg/cm}^2$. Modulus of dowel concrete interaction is $41,500 \text{ kg/cm}^3$ and joint width is 2 cm, design the dowel bar. Use M40 concrete with characteristic compressive strength of 400 kg/cm^2 . **20**

Module – III

10. Mention the specification of materials, construction steps and quality control checks for laying pre-mix carpet with seal coat. **20**

OR

11. a) With sketches explain the effective surface drainage system for roads. **10**
- b) Indicate how the filter material is designed for use in sub-surface drainage system. **10**



Module – IV

12. a) Write short notes on :
- i) Rutting and Raveling 10
 - ii) Mud pumping. 10
- b) Explain any two methods followed for the functional evaluation of pavements. 10

OR

13. Benkleman beam deflection studies were carried out on a stretch of six lane divided highway with flexible pavement indicated that there are 3960 CV per day in one direction. The average growth rate of CV is found to be 4.9% per year and VDF value is 7.2. The estimated period of completing overlay construction is 2 years after the traffic studies. The field moisture content of subgrade soil (clayey soil with PI = 11%) was 9% and the annual rainfall of the region is 1690 mm. Mean deflection value = 1.42 mm, Standard deviation of deflection values = 0.27 mm, temperature of pavement = 46°C. Design overlay thickness using DBM binder course and BC surface course for a design life of 10 years. 20
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