B.E. / B.Tech. Civil Engineering (Model Curriculum) Semester-VI
PEC-CE 601 / PAVDES1 - Pavement Design

P. Pages : 2

Time : Three Hours

|| *2205* ||

Max. Marks : 80

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Notes : 1. All questions carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Compare rigid pavement with flexible pavement. **8**

b) Estimate total fatigue in a service life of 15 years in terms of standard axle load of 8100kg average. Assume traffic growth rate of 7.5% per annum and delay in opening to traffic as 2 years. **8**

Axle load	ADT	Eq. Factors
1,100	132	0.002
2,100	92	0.003
4,100	102	0.025
6,100	138	0.33
8,100	176	1.00
10,100	82	1.70
12,100	56	4.25

OR

2. a) What are the various factors to be considered in pavement design? Discuss the significance of each. **8**

b) What is ESWL? Calculate ESWL of a dual wheel assembly carrying 2050 kg wheel load each for pavement thickness of 20, 25 and 30cm. Centre to Centre type spacing is 25 cm and the distance between the walls of the tyre is 12 cm. **8**

3. a) Explain how you will determine modulus of subgrade reaction by plate load test now the value is influenced by plate diameter and field moisture content? **8**

b) Explain CBR test with its advantages and limitations. **8**

OR

4. a) Calculate cone bearing value from following data and hence design the pavement thickness. **8**

Load (kg)	Penetration (mm)	Half angle of cone
4.5	15.2	
9.0	31.7	7° 45'
18.0	51.3	
36.0	68.3	

b) Explain with neat Sketch storage level and Storage zones in reservoir. **8**

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5. a) A Plate test Was Conducted with 30 cm diameter plate on a Subgrade 12 m which records **12**
5 mm deflection with type pressure of 3.6 kg/cm2 the test when conducted over the subgrade
with type pressure on 20 cm thick base covers constructed over the subgrade with type
pressure of 6.8 kg/cm 2 under same deflection. Find out the deflection of pavement system
for a wheel load of 5200 kg with Type pressure of 6.5 kg/cm 2 with 30 cm thick back course
$\mu s = 0.35$.

b) Write a short note on Burmister's method. **4**

<p align="center">OR</p>

6. a) Explain in detail design of expansion joints and longitudinal tie bar joint for rigid pavement. **6**

b) Design a rigid pavement for two lane highway from the given data **10**
1) Wheel load = 5100 kg
2) Tyre pressure = 5.6 kg/cm^2
3) Grade of concrete = M30
4) Modulus of subgrade reaction = $75 kg/cm^3$
5) Cx = 0.92, Cy = 0.72
6) Temperature gradient = 0.55° c/cm
7) Projected traffic = 3700 CVD
8) Assume any other required data suitable.

7. a) From the ultimate load analysis, find out the load factor at all the region of pavement and **8**
also locate the failure position and draw the sketches of yield line pattern from the
following data
1) Thickness of pavement = 20 cm
2) Modulus of rupture = $42 kg/cm^2$
3) Modulus of subgrade reaction = $7.5 kg/cm^2/cm$
4) Modulus of elasticity of concrete = $3.18 \times 10^5 kg/cm^2$
5) Wheel load = 6200 kg
6) Tyre pressure = $5.9 kg/cm^2$
7) Poisson ratio of concrete = 0.16.

b) Explain in detail LCN method of designing a rigid pavement for airfields. **8**

<p align="center">OR</p>

8. a) Explain the Mcleod method of design of Airfields. **8**

b) Explain in detail F.A.A method of design for Airfields. **8**

9. a) Write a brief note on maintenance of highway pavements. **8**

b) What are the various types of failure in flexible pavement. **8**

<p align="center">OR</p>

10. a) Following observations were recorded in a Benkelmen Beam deflection investigations for **8**
certain sections of state highway
1.47, 1.31, 1.28, 1.30, 1.62, 1.54, 1.52, 0.99, 1.43, 1.38, 1.55, 1.46 (corrected values)
Design a bituminous overlay if maximum allowable deflection is 0.80 mm. Assume layer
equivalency factor.

b) Write a note on Profilometers. **8**

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