Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CE467
Course Name: HIGHWAY PAVEMENT DESIGN

Max. Marks: 100   Duration: 3 Hours
(Use of IRC code & relevant charts is permitted)
PART A
Answer any two full questions, each carries 15 marks.   Marks

1	a)	Compare the merits and demerits of flexible and rigid pavements.	(8)
	b)	List the factors on which strength characteristics of soil depends on.	(3)
	c)	Give the concept and brief procedure for Marshall method of mix design	(4)
2	a)	What is meant by the term Modulus of subgrade reaction? How is it determined?	(8)
	b)	Explain the terms (i) VDF (ii) ESWL	(7)
3	a)	Sketch the different axle configurations commonly adopted in Indian road vehicles.	(7)
	b)	Determine the EWLF or VDF value of the following axle loads in terms of the standard axle load of 8.16t. (i) LCV with rear axle load of 2.5 t (ii) HCV with rear axle load of 15 t.	(8)

PART B
Answer any two full questions, each carries 15 marks.

4	a)	List the various methods for design of flexible pavement.	(5)
	b)	Determine the thickness required for a flexible pavement to sustain a wheel load of 22500 kg with a tyre pressure of 14 kg/cm^2 by Burmister two layered system. A plate load test was conducted on subgrade soil and for 0.125cm deflection, the unit pressure on 75cm plate was found to be 0.8kg/cm^2. On a test section of base course 15 cm thick the pressure on the plate was found to be 2.1 kg/cm^2 for the deflection of 0.125 cm.	(10)
5	a)	Explain the Concept of CBR and give step by step procedure for design of flexible pavement by CBR method as per IRC recommendations.	(7)
	b)	.Calculate the group index for the subgrade soil from the following data Soil portion passing No. 200 Sieve = 60%, Liquid limit of soil = 45%, Plastic limit of soil = 30%. Also design the pavement by group index method. Anticipated traffic condition- medium.	(8)
6	a)	Compare warping stress and frictional stress in rigid pavement.	(7)

b) A cement concrete pavement 15cm thick is constructed over a subgrade of (8) k=7.5kg/cm^3. Maximum temperature difference between top and bottom of slab during summer day and night is 12.5ºC and during winter is 4ºC. Spacing between transverse joint is 5m and between longitudinal joint is 3.5m. Wheel load is 4800kg, radius of loaded area is 14.5cm, E=$3x10^5$kg/cm^2, μ=0.15, e=$10x10^{-6}$/ºC. Calculate the worst combination of stresses at edge and corner using IRC method.

PART C
Answer any two full questions, each carries 20 marks.

7 a) Outline the IRC recommendations for determining the thickness of CC pavement (12)

b) A CC pavement 20 cm thick and 7.5 m width has a longitudinal joint along the (4) centre line. Design the diameter, length and spacing of the tie bars, if the allowable stress in steel is 1400 Kg/ cm2 in tension, allowable bond strength of deformed bars in concrete is 24.6 kg /cm^2 and coefficient of friction is 1.2. assume unit weight of concrete as 2400 kg/cm^2

c) Write the steps involved in designing the dimensions and spacing of tie bars as (4) per IRC recommendations

8 a) Write any one function of providing dowel bars and tie bars in Cement concrete (4) pavement.

b) Explain the fatigue behaviour of cement concrete slab considered in the design of (6) rigid pavements as per IRC 58:2002.

c) Discuss the design procedure of dowel bars as the guidelines of IRC 58: 2002 (10)

9 a) What are quality control tests for rigid pavement? (5)

b) Explain the steps of design of flexible pavement overlay using BBD data. (10)

c) Explain the structural requirement of flexible pavement. (5)

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