PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2017 - 18 Examination

Semester: 2   Date: 09/01/2018
Subject Code: 03211152   Time: 2.00 pm to 4.30 pm
Subject Name: Pavement Design & Evaluation   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) What are the desirable characteristics of pavement structure? **(05)**
B) What are the factors affecting pavement stability? **(05)**
C) The CBR of sub-grade soil = 5%
Calculate the total pavement thickness by using U.S.Corps of Engineering formulae. Assume wheel **(05)**
load =4082 kg and tyre pressure = 7kg/cm^2

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark) **(15)**
A) State the pavement design variable. What are the various flexible pavement design methods?
B) The two lane single carriageway to be widen to four lane divided highway. As per IRC-37 :2001.Calculate cumulative number of standard axle load from the following data:
Initial traffic volume in year of completion is 6000CV/day.
Design life of pavement = 10yrs
Design CBR value =6%
Traffic growth =7%
Axle load using the road = 11000kg
Load distribution factors = 75%
C) Compare highway pavement with airport pavement.
D) Explain deterministic and probabilistic approach of pavement design.

Q.3 A) What are the parameters to be considered in design of rigid pavement? What are the factors affecting the design of rigid pavement. **(07)**
B) What are the assumptions of Westergaard's theory? Calculate the radius of relative stiffness of concrete pavement from data given below:
Modulus of elasticity of concrete = $3x10^5$ kg/cm^2
Pavement thickness =20 cm
Poissons ratio =0.15
Modulus of sub-grade reactions = 3kg/cm^2 **(08)**

OR

B) State the various types of joints to be provided in c.c. pavement. Show the layout of different joints with tie-bars and dowel bars. **(08)**
A) Assume thickness of concrete pavement= 17 cm, wheel load =4200kg,Allow 10% impact.
Tyre pressure = 5 kg/cm^2
Modulus of subgrade reaction = 6 kg /cm^2

Q.4 Concrete has E value = $3 x 10^5$ kg/cm^2 **(07)**
μ value = 0.15
flexural strength = 50 kg/ cm^2
Factor of Safety= 2

OR

A) What are the various pavement evaluation techniques? What are the objectives of pavement evaluation? **(07)**
B) Considering following data, design the tie-bar (plain tie bar for cc pavement as per IRC: 58-2002
Slab thickness =33 cm
Lane width =3.5cm
Coefficient of friction = 1.5
Allowable tensile stresses = 1250kg/cm^2 **(08)**
Diameter of bar = 12mm
Density of concrete = 2400kg/ cm^3