Registration No :

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B.Tech.
PCI6J002

6th Semester Regular Examination 2017-18
PAVEMENT DESIGN
BRANCH : CIVIL
Time : 3 Hours
Max Marks : 100
Q.CODE : C337
Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions :** **(2 x 10)**

a) Critical load position in a rigid pavement design is taken as
(a) Interior loading   (b) Edge loading
(c) Corner loading   (d) Interior, edge and corner loading

b) Flexible pavement distribute the Wheel load
(a) Directly to subgrade
(b) Through structural action
(c) Through a set of layers to the subgrade
(d) None of the above

c) Bottom most layer of pavement is known as
(a) Wearing course   (b) Base course
(c) Sub-base course   (d) Subgrade

d) Tyre pressure influences the
(a) total depth of pavement   (b) quality of surface course
(c) both the above   (d) none of the above

e) The critical combination of stresses for corner region in cement concrete roads is
(a) load stress + warping stress — frictional stress
(b) load stress + warping stress + frictional stress
(c) load stress + warping stress
(d) load stress + frictional stress

f) The maximum spacing of contraction joints in rigid pavements is
(a) 2.5 m   (b) 3.5m
(c) 4.5 m   (d) 5.5m

g) The function of an expansion joint in rigid pavements is to
(a) Relieve warping stresses   (b) relieve shrinkage stresses
(c) Resist stresses due to expansion   (d) allow free expansion

h) When the bituminous surfacing is done on already existing black top road or over existing cement concrete road, the type of treatment to be given is
(a) Seal coat   (b) Tack coat
(c) Prime coat   (d) Spray of emulsion

i) Reflection cracking is observed in
(a) Flexible pavement
(b) Bituminous overlay over Cement concrete surface
(c) Rigid pavement
(d) Rigid overlay over flexible pavement

j) As per latest IRC guidelines for designing flexible pavement by CBR method, the load parameter required is
(a) Number of commercial vehicles per day
(b) Cumulative standard axles in msa
(c) Equivalent single axle load
(d) Number of vehicles (all types)

Q2   **Answer the following questions :**   (2 x 10)

a) Differentiate between legal axle load and standard axle load?
b) Define Perpetual pavement.
c) As per IRC:37-2012, What is SAMI layer and Where it is provided.
d) Define lane distribution factor.
e) Differentiate between rutting failure and fatigue failure.
f) What is structural number?
g) Define ESWL.
h) State the purpose of pavement evaluation.
i) What is mud pumping?
j) Differentiate between JRCP and CRCP.

Part – B (Answer any four questions)

Q3 a) Briefly explain the difference between the design guideline for flexible pavement as per IRC:37-2001 and IRC:37-2012   **(9)**

b) What are the difference between the flexible pavement and rigid pavement?   **(6)**

Q4 a) Calculate ESWL at a depth of 4.5 cm, 18.0 cm and 40 cm for a dual wheel carrying 22.5 KN each. The centre to centre spacing is 21 cm and the clear distance between the two tires is 10.5 cm.   **(6)**

b) Briefly explain the factors affecting the structural design of pavement.   **(9)**

Q5 a) Enumerate the various steps for design of Rigid pavement by AASHTO method.   **(8)**

b) How do the corner, edge and interior stresses vary due to temperature and load?   **(7)**

Q6 a) Derive the equation for determining the duration of loading time and height of fall required to produce a desirable impulse load of a Falling Weight Deflectometer.   **(9)**

b) State the use and application of pavement layer moduli back-calculated from the FWD measured deflection data.   **(6)**

Q7 a) The axle load spectrum from a survey data is presented in the following table. Find the value of VDF   **(6)**

Axle load range (tonnes)	Percentage frequency	Axle load range (tonnes)	Percentage frequency
17-15	04	11-09	45
15-13	15	09-07	18
13-11	20	07-05	08

b) Briefly explain about the structural and functional failure of Rigid pavement.   **(9)**

Q8 a) Briefly explain the working principle of Benkelman beam with a neat sketch.   **(9)**
b) Enumerate the various steps for design of Flexible pavement by IRC:37-2012.   **(6)**

Q9 a) Briefly explain about the International Roughness Index.   **(7)**
b) Briefly explain the use of Geosynthetics in road construction.   **(8)**