Registration No.: | | | | | | | | | | |

Total Number of Pages: 02 **Course: B.Tech**
Sub_Code: RCI4C002

4th Semester Back Examination: 2024-25
SUBJECT: TRANSPORTATION ENGINEERING
BRANCH(S): CIVIL
Time: 3 Hours
Max Marks: 100
Q.Code: S449

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.
IRC Design codes are not allowed during examination

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Part-I

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

a) What are the different types of road patterns?
b) What are the objectives of Map study in engineering survey for highway location?
c) As per the IRC, width of a double lane road is 7.5 m. Justify it.
d) Why overtaking zones are provided?
e) Define level of service.
f) What are the factors on which PCU values depend?
g) Differentiate between flakiness index and elongation index.
h) What are the different grades of bitumen as per viscosity value, which grade of bitumen is mostly used in Odisha?
i) What are the stress develop in flexible pavement?
j) What is mud pumping?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) What are the salient features of Bombay road plan?
b) Explain merits and demerits of different types of road pattern.
c) What are the importance of highway alignment? Explain the requirements of highway alignment.
d) The design speed of highway is 25 m/sec. There is horizontal curve of radius 270 m on a certain locality. Calculate the superelevation needed to maintain this speed.
e) Derive an expression for finding the overtaking sight distance.
f) Find the total width of two lane roads on a horizontal curve for a new National highway to be aligned along a rolling terrain with a ruling minimum radius having ruling design speed of 80 kmph. Assume necessary data as per IRC
g) Briefly explain the Ductility test of bitumen.

h) What are the different stress develop in rigid pavement, explain the critical combination of stress due to wheel load and temperature effect?

i) Explain with sketches how the subsurface drainage system is provided to lower the water table, and control seepage flow.

j) A valley curve is formed by descending gradient of 3 % which meets an ascending gradient of 5 %. Design the total length of valley curve if the design speed is 25 m/sec so as to fulfill both comfort condition and head light sight distance. Allowable rate of change of centrifugal acceleration is 0.6 m/sec^3, beam angle is 1^o and height of the head light above carriageway is 0.75 m. Assume any other data as per IRC.

k) What are the various objects and applications of spot-speed studies?

l) What are the different causes of road accident? Explain the various measures that may be taken to prevent the accident.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four) **(16 x 2)**

Q3 Enumerate the different methods of carrying out traffic volume studies. Indicate the principle of each. **(16)**

Q4 What are the different methods for design of flexible pavement? Explain briefly the procedure for design of flexible pavement as per the IRC: 37- 2012. **(16)**

Q5 Differentiate between WBM, GSB, and WMM. Briefly explain the construction procedure for bituminous pavement. **(16)**

Q6 Explain the various types of failures in rigid pavement and flexible pavement. Explain their remedial measures. **(16)**

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