

Registration No.:

--	--	--	--	--	--	--	--	--	--

Total Number of Pages: 02

Course: B.Tech  
Sub\_Code: RCI4C002

4<sup>th</sup> 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

Part-I

Q1 Answer the following questions:

(2 x 10)

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

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)

(6 x 8)

- What are the salient features of Bombay road plan?
- Explain merits and demerits of different types of road pattern.
- What are the importance of highway alignment? Explain the requirements of highway alignment.
- 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.
- Derive an expression for finding the overtaking sight distance.
- 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
- 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  $0.6 \text{ m/sec}^3$ , beam angle is  $1^\circ$  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)