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BTECH
(SEM VI) THEORY EXAMINATION 2024-25
TRANSPORTATION ENGINEERING

TIME: 3 HRS

M.MARKS: 70

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief.

02 x 7 = 14

Q no.	Question	CO	Level
a.	What are various modes of transportation and the mediums they operate in?	1	K1
b.	Enlist the factors controlling road alignment.	1	K1
c.	Define camber. What is the value of camber for bituminous pavement in case of heavy rain condition as per IRC recommendation?	2	K2
d.	Differentiate traffic volume and traffic density.	3	K1
e.	Differentiate time mean speed and space mean speed.	3	K1
f.	Define modulus of subgrade reaction. Which test is performed to evaluate it.	4	K1
g.	Draw a neat sketch showing different layers of flexible pavement.	5	K4

SECTION B

2. Attempt any three of the following:

07 x 3 = 21

Q no.	Question	CO	Level
a.	Discuss the key recommendations of the Jaykar committee for the road development in India in early stage.	1	K3
b.	Define gradient. Discuss its classification in brief. Write the value of each gradients in case of plain terrain as per IRC recommendation.	2	K2
c.	What are the various methods used for Origin and Destination (O&D) studies? Describe any one method in detail. Also, explain how O&D data can be presented.	3	K4
d.	Discuss the design criteria for flexible pavement design in details as per IRC 37.	4	K4
e.	Discuss the equipment used for excavation and compaction purposes during construction of road.	5	K4

SECTION C

3. Attempt any one part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Discuss the key features of different 20 years road development plans implemented in India.	1	K1
b.	According to 1981 census, the area of state of Uttar Pradesh was 308000 km ² . The number of towns population above 5000 was 507. The total number of towns and village was 35,778. Determine the length of various road categories.	1	K4



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4. Attempt any *one* part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	On a two-way traffic road, the speed of overtaking vehicle is 40 km/hr and the speed of vehicle coming from opposite direction is 65 km/hr. If the average acceleration is 0.92 m/sec^2 . Determine the overtaking sight distance indicating the details of overtaking operations. Show the minimum length of overtaking zone by a neat sketch.	2	K4
b.	Discuss the need of super elevation on the horizontal curved pavement. Derive the formula for it.	2	K2

5. Attempt any *one* part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	The speed relationship for a particular road was found to be $u = (42.76 - 0.22k)$ where 'u' is the speed in km/hr and k is the density of vehicle per km. Find jam density, maximum capacity and density at maximum capacity. Sketch the relationship between speed, density and flow; and indicate important traffic flow parameters on same.	3	K3
b.	Define traffic rotary. Discuss various design elements and traffic operations on it with the help of neat sketch.	3	K2

6. Attempt any *one* part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Define radius of relative stiffness. Compute the radius of relation stiffness of 15 cm thick cement concrete slab from the following data Modulus of elasticity of cement concrete = 210000 kg/cm^2 Poisson's ratio for concrete = 0.13. Modulus of subgrade reaction $k = 3 \text{ kg/cm}^3$	4	K3
b.	Discuss the Marshall method for mix design of bituminous concrete. Enlist the requirement for the mix design of bituminous concrete as per MoRTH.	4	K4

7. Attempt any *one* part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Differentiate WMM and WBM. Write construction operation in details for any one of them.	5	K4
b.	Write a note on use of recycled materials for sustainable road construction.	5	K5