BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH **SEMESTER : VI**
BRANCH: CIVIL ENGINEERING **SESSION : SP/2023**

SUBJECT: CE305 TRANSPORTATION ENGINEERING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Calculate the safe stopping sight distance for design speed of 50 km/h, if (a) Two – way traffic on a two lane road (b) Two – way traffic on a single plane road.	[5]	1	3
Q.1(b)	The radius of a horizontal circular curve is 100 m. The design speed is 50 km/h and the design co-efficient of lateral friction is 0.15. (a) Calculate the superelevation required if full lateral friction is assumed to develop. (b) Calculate the co-efficient of friction needed if no superelevation is provided. (c) Calculate the equilibrium superelevation if the pressure on inner and outer wheels should be equal.	[5]	1	3
Q.2(a)	The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour; the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all red time required for pedestrian crossing is 12 secs. Design two phase traffic signal by Webster's method.	[5]	2	4
Q.2(b)	Explain origin and destination study. Mention the various uses of O & D studies.	[5]	2	2
Q.3(a)	Discuss the functions and importance of each component of the flexible pavement and also Draw a sketch of flexible pavement.	[5]	3	3
Q.3(b)	Calculate the stresses at interior, edge and corner regions of a cement concrete pavement using Westergaard's stress equations. The following data are given. Wheel load, P = 5100 kg, Modulus of elasticity of cement concrete, E = 3.0 $\times 10^5$ kg/cm^2, Pavement thickness, h = 18 cm, Poisson's ratio of concrete, μ = 0.15, Modulus of subgrade reaction, K = 6.0 kg/cm^3, Radius of contact area, a = 15 cm.	[5]	3	4
Q.4(a)	Discuss the functions and requirements of a good ballast material in a railway track.	[5]	4	2
Q.4(b)	Discuss the different types of sleepers in use on railway track.	[5]	4	2
Q.5(a)	Explain about types of gradients adopted in Indian Railways.	[5]	5	2
Q.5(b)	If a 8 degree curve track diverges from a main curve of 5 degree in an opposite direction in the layout of a B.G. yard, Calculate the superelevation and the speed on the branch line, if the maximum speed permitted on the main line is 45 km/h.	[5]	5	4

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