

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech-Vth Semester (CE)

COURSE CODE (CREDITS): 3

MAX. MARKS: 35

COURSE NAME: Highway Engineering (18B11CE511)

COURSE INSTRUCTORS: Dr. Amardeep

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	For a horizontal curve, the radius of a circular curve is obtained as 300 m with the design speed as 15 m/s. If the allowable jerk is 0.75 m/s^3 . Calculate the length of transition curve.	CO2	4
Q2	While aligning a hill road with a ruling gradient of 6%, a horizontal curve of radius 50 m is encountered. What should be the grade compensation (in percentage, up to two decimal places) to be provided for this case?	CO2 & 4	4
Q3	A superspeedway in New Delhi has among the highest super-elevation rates of any track on the Indian Grand Prix circuit. The track requires drivers to negotiate turns with a radius of 335 m and 33° banking. Given this information, what will be the coefficient of side friction required in order to allow a vehicle to travel at 320 km/h along the curve?	CO2	3
Q4	A road is being designed for a speed of 110 km/hr on a horizontal curve with a super elevation of 8%. If the coefficient of side friction is 0.10, calculate the minimum radius of the curve (in m) required for safe vehicular movement.	CO2	4
Q5	Know the load, warping and frictional stresses on a cement concrete pavement slab as 220 N/mm^2 , 300 N/mm^2 and 10 N/mm^2 respectively, What would be the critical combination of stresses during summer season?	CO3	4
Q6	A vertical summit curve on a freight corridor is formed at the intersection of two gradients, +3.0% and -5.0%. Assume the following : Only large-sized trucks are allowed on this corridor Design speed = 80 kmph Eye height of truck drivers above the road surface = 2.30 m Height of object above the road surface for which trucks need to stop = 0.35 m Total reaction time of the truck drivers = 2.0 s Coefficient of longitudinal friction of the road = 0.36	CO2	4

	Stopping sight distance gets compensated on the gradient Calculate the design length of the summit curve (in meters) to accommodate the stopping sight distance . (rounded off to 2 decimal places).		
Q7	Calculate the three critical stresses for 9 inch thick slabs. Use a 9,000 lb. FWD loading (a = 5.9 inches). Use k = 200 pci for calculation of the radius of relative stiffness (l).	CO3	3
Q8	Discuss about the different stresses occurred in case of rigid pavement along with formulas.	CO3	4
Q9	Discuss in detail about the basic relationship of traffic engineering with suitable diagrams.	CO5	4

UNIT TEST-3 EXAMINATION- Dec-2024