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C020514(020)

B. Tech. (Fifth Semester) Examination, Nov.-Dec. 2021

(Civil Engg. Branch)

TRANSPORTATION ENGINEERING

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

***Note** : Attempt all the questions. From all the units question (a) is compulsory and from remaining parts attempt any **two** questions.*

1. (a) Explain the recommendations of Jaykar Committee. 4

(b) Define camber. And in a district road where the rainfall is heavy, major district road of WBM

pavement 3·8 m wide and a state highway of bituminous concrete pavement, 7·0 m wide are to be constructed. What should be the height of crown with respect to the edges in these two cases? 8

(c) On a two way traffic road, the speed of overtaking vehicles are 100 kmph and 50 kmph. If the average acceleration is 0·92 m/s^2. Determine the overtaking sight distance. Draw neat-sketch of the overtaking zone and show the positions of the sign posts. 8

(d) Explain the different types of gradients. 8

2. (a) Draw the neat sketch of different types of traffic maneuvers. 4

(b) Explain the vehicular characteristics. And also determine the average skid resistance, when a vehicle travelling at the speed of 80 kmph, stopped within 2·5 seconds after the application of the breaks. 8

(c) Explain the different types of traffic sign with neat sketch of some signs. 8

(d) Define traffic rotary and also explain the various component with neat sketch. 8

3. (a) Enlist the various soil classification system. 4

(b) Design the pavement section by triaxial test method using the following data :

Wheel load	=	4100 kg
Radius of contact area	=	15 cm
Traffic coefficient	=	1·5
Rainfall coefficient	=	0·9
Design deflection	=	0·25 cm
E value of subgrade soil	=	100 kg/cm^2
E value of base course material	=	400 kg/cm^2
E value of 7·5 cm thick bituminous concrete surface course	=	1000 kg/cm^2 8

(c) Using the data given below, calculate the wheel load stresses at (a) interior, (b) edge and (c) corner regions of a cement concrete pavement using Westergaard's stress equations. Also determine the probable location where the crack is likely to develop due to corner loading.

Wheel load, $P = 5100$ kg

Modulus of elasticity of cement concrete, $E = 3{\cdot}0 \times 10^5$ kg/cm^2

Pavement thickness, $h = 18$ cm

Poisson's ratio of concrete, $\mu = 0{\cdot}15$

Modulus of subgrade reaction, $K = 6{\cdot}0$ kg/cm^2

Radius of contact area, $a = 15$ cm 8

(d) Explain the different types of joints with neat sketch. 8

4. (a) Explain different types of gauges. 4

(b) Explain the various types of rail failures with neat sketch. 8

(c) Define sleeper density. And using a sleeper density of M + 5, find out the number of sleepers required for constructing a railway track 640 meters long. (B. G. track). 8

(d) Explain the different types of ballast. 8

5. (a) Enlist the different types of causes of derailments over the turnout. 4

(b) On a B. G. 3° curve the "equilibrium cant" is provided for a speed of 70 kmph :

(i) Calculate the value of equilibrium cant

(ii) Allowing a maximum cant deficiency. What would be the maximum permissbile speed on the track? 8

(c) Explain the different types of track junction with neat sketch. 8

(d) Explain the operation classification of railway station with neat sketch. 8