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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 20CV5PCTRE **Max Marks: 100**
Course: Transportation Engineering - I

Instructions:

1. Answer Any FIVE Full Questions choosing ONE question from each Unit
2. Missing data may be assumed suitably.
3. Draw neat sketches wherever required.

UNIT - I

1	a)	Discuss about the characteristics of road transport.	**06**
	b)	The area of a certain district in India is 13400 sq km and there are 12 towns as per 1981 census. Determine the lengths of different categories of roads to be provided in this district by the year 2001.	**08**
	c)	Explain briefly the factors controlling highway alignment.	**06**

UNIT - II

2	a)	Explain briefly the restrictions to Sight distance with neat sketches.	**06**
	b)	Calculate the passing sight distance if the design speeds of overtaking and overtaken vehicles are 70 and 50 kmph respectively. Assume suitable data as per IRC standards if the acceleration of overtaking vehicle is given as 2.5 kmph/second.	**08**
	c)	Discuss briefly the scope of Traffic engineering.	**06**

OR

3	a)	Discuss briefly about Road User characteristics considered in Traffic Engineering.	**07**
	b)	A vertical summit curve is formed at the intersection of two gradients +3% and -5%. Design the length of summit curve to provide a stopping sight distance for a design speed of 80 kmph.	**08**
	c)	Explain briefly i) Extrawidening at curves ii) Types of Transition curve.	**05**

UNIT - III

4	a)	Differentiate between bitumen and tar.	**06**
	b)	Discuss the Factors influencing the Design of pavements.	**08**

c) Calculate the wheel load stresses at interior, edge and corner regions of a cement concrete pavement using Westergaard's stress equations for the following data: **06**
Wheel load=5100 kg; $E=3x10^5$ kg/cm^2 ; pavement thickness=18 cm; poisson's ratio=0.15; K=6kg/cm^3; Radius of contact area=15 cm.

OR

5 a) Discuss briefly about the desirable properties of subgrade soil used for Pavement construction. **06**

b) Discuss briefly the test procedure adopted to determine the Hardness property of coarse aggregate. **07**

c) Determine the CBR value of the soil graphically if 100 divisions of the load dial represents 190 kg load in the calibration chart of the proving ring for the following data: **07**

Penetration of Plunger, mm	0.0	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	7.5	10.0	12.5
Load Dial Readings, Divisions	0	0.5	1.5	2.5	6.0	13	20	30	38	50	58	63

UNIT - IV

6 a) Explain briefly the construction steps and Quality Control tests of Dense Bituminous Macadam (DBM) Binder course mix. **10**

b) Discuss the different types of Joints used in the construction of rigid pavement with a neat sketch. **10**

UNIT - V

7 a) List the different types of pavement distresses in flexible pavement. **04**

b) The maximum quantity of water expected in one of the open longitudinal drains on clayey soil is 0.9 m^3/s. Design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of the trapezoidal section to be 1 m and cross slope to be 1V:1.5H. The allowable velocity of flow in the drain is 1.2 m/s and Manning's roughness coefficient is 0.02. **08**

c) Discuss briefly the tangible and intangible benefits considered in highway improvement. **08**

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