TCE-604   203

Even Semester Examination 2017-18

B.TECH. (SEMESTER-VI)

TRANSPORTATION ENGINEERING-I

Time: 03:00 Hours   **Max Marks : 100**

Note: Attempt **all** questions. Each question carry equal marks.

Q.1   Attempt any **FOUR** questions.

    (a)   Calculate the minimum sight distance required to avoid head on collision of two cars approaching from opposite directions at 90 kmph and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction 0.7 and brake Efficiency of 50% in either case.

    (b)   Explain camber. What are the objectives of camber? Discuss the factors on which camber depends?

    (c)   Explain the salient features of Bombay Road Plan?

    (d)   Enumerate the steps for practical design of super elevation?

    (e)   What role of civil engineer for highway construction

Q.2   Attempt any **FOUR** questions.

    (a)   Give the classification of roads according to Nagpur road plan?

    (b)   What are the factors on which stopping sight distance depends? Explain briefly?

    (c)   Write down the construction steps for water bound macadam road?

    (d)   Define Overtaking Sight Distance?

    (e)   Explain various types of failures of cement concrete pavement and their causes?

TCE-604/2160   (1)   [P.T.O.]

Q.3 Attempt any **TWO** questions.

(a) The speeds of overtaking and overtaken vehicles are 70 and 40 kmph respectively on two way traffic road. If the acceleration of overtaking vehicle is 0.99m/sec2.

    (i) Calculate safe overtaking sight distance

    (ii) Mention the minimum length of overtaking zone

    (iii) Draw a sketch of overtaking zone and show the position of the sign posts

(b) Define the wet mix macadam & advantages of W.M.M Plant.

(c) Calculate the stress at interior, edge and corner region of a cement

Concrete pavement using Westergaard's equation?

Use following data.

Wheel load (P)=5100kg

Modulus of elasticity of concrete (E)=3,00,000kg/cm^2

Pavement thickness=18cm

Poisson Ratio, u=0.15

Modulus of sub grade=6.0kg/cm^3

Radius of contact area =15 cm

Q.4 Attempt any **two** question

(a) The following data were collected for planning the road development program of a backward district.

    (i) Total area   = 9600 km^2

    (ii) Agricultural and development area   =3200 km^2

(iii)   Existing railway track length   =105 km

(iv)   Existing length of metalled road   =322 km

(v)   Existing length of unmetalled road   =450 km

(vi)   Number of towns or villages in different population ranges is as below.

Population	>5000	2001-5000	1001-2000	501-1000	<500
Number of villages and towns	8	40	130	280	590

Calculate the additional length of metalled and un metalled roads for the road system based on Nagpur road plan formulae for this district

2.   Explain cbr test procedure and how are the results of the test obtained and interpreted?

3.   Explain desirable properties of aggregate to be used in different types of pavement construction?

4.   List various types of transition curves used in highways. What is an ideal transition curve? Explain.

Q.5   Attempt any **two** questions

(a)   Writethe procedure for ductility test for bitumen.

(b)   Write short note on flexible & rigid pavements & their failures.

(c)   Write short notes on

(i)   ]Thirteenth highest hourly traffic volume

(ii)   ]Desire lines

(iii)   ]Traffic signal system

(iv)   Before and after studies

(v)   Passenger car unit

----- X -----

TCE-604/2160   (3)