Code : 011619

B.Tech 6th Semester Examination, 2017

Transportation Engg.-I

Time : 3 hours *Full Marks : 70*

Instructions :

(i) There are Nine Questions in this Paper.

(ii) Attempt Five questions in all

(iii) Question No. 1 is Compulsory.

(iv) The marks are indicated in the right-hand margin.

1. Fill in the blanks of any seven of the following: 2×7=14

(i) A transition curve has a radius which decreases from _____ at the tangent point to a designed radius.

(ii) A width of _____ is considered desirable for a road having single lane for vehicles of maximum width 2.44 m.

(iii) The rigid characteristics are associated with _____ action.

(iv) The ratio of contact pressure to tyro pressure is defined a _____ factor.

(v) The property of the stones to withstand the adverse actions of weather may be called _____.

(vi) When the bitumen contains some inert materials it is sometimes called _____.

P.T.O.

(vii) Keeping all these problems is view, bituminous stabilization seems to be a suitable solution for _____.

(viii) The distance travelled by the vehicle during the total reaction time known as _____ distance.

(ix) The spacing between contraction joints for 3.5 m slab width having thickness of 10 cm for plain cement concrete is _____.

(x) A plate bearing test was carried out on sub grade using a 76 cm diameter rigid plate. A deflection of 1.25 mm was caused by a pressure of 0.84 kg/cm^2. The modulus of sub grade reaction is _____ kg/cm^3.

2. (a) Why is widening of pavement necessary at horizontal curve ? Explain the method of calculating widening and derive the formula. 7

(b) Determine the absolute minimum radius and ruling minimum radius for minimum value of super elevation of horizontal curve for a design speed of 50 kmph. 7

3. (a) What do you understand by right distance ? How does it affect the design and construction of highway? 7

(b) Calculate the minimum non-passing sight distance on a highway at a descending gradient of 6%. Given the following data: 7

Design speed = 80 kmph

Reaction time of driver = 2.5 secs

coefficient of friction between tyre and road surface = 0.4.

7

4. (a) What points will you bear in mind while deciding about the alignment of a new road? 7

(b) What are the principles to be considered for an ideal highway alignment ? Discuss in brief. 7

5. (a) Name the usual tests employed for evaluating the road aggregates. What test values are generally considered suitable for road stones to behave as good construction materials? 8

(b) What are the objects of carrying out penetration, ductility and softening point tests on bitumen? 6

6. (a) What is understood by the following terms: 8

(i) AADT (ii) 85 percentile speed

(iii) Basic capacity (iv) PCU

(b) 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 there 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.

7. (a) Discuss the functions of pavement layers. and draw the sketch of Flexible pavement layers in proper sequence. 6

(b) Design a tie-bar system for a cement concrete pavement, given. 8

Slab thickness = 20 mm, slab width = 3.35 m

Number of lanes to be tied =2

Coefficient of friction between slab & subgrade =1.5,

weight of slab = 480 kg/m^2.

Allowable working stress in steel = 1400 kg/cm^2

Maximum permissible bond stress for plain bars = 17. 5 kg/cm^2 & deformed bars = 24 kg/cm^2.

8. (a) Differentiate between WBM and WMM. 6

(b) What do you understand by penetration macadam? What are the various materials used and what should be their requirements ? Describe the methods of construction of a penetration macadam road. 8

9. (a) Discuss the scope of soil stabilization in road construction. 6

(b) Explain with sketches how the subsurface drainage system is provided to lower the W.T. and control seepage flow. 8

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