

Code: CE5T5

III B.Tech - I Semester – Regular Examinations – December 2016

TRANSPORTATION ENGINEERING - I
(CIVIL ENGINEERING)

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) Define the term alignment.
- b) What is the necessity of highway planning?
- c) Elaborate the importance of camber. Mention its types.
- d) Write the need for road marking.
- e) Explain the term grade compensation. Mention the limits of grade compensation.
- f) What are different types of At-grade intersection? Draw a neat sketch for the same.
- g) List the tests to be performed for viscosity grading.
- h) What are the requirements of flexible pavement?
- i) What is the mechanistic method of flexible pavement design?
- j) What are the equipments used in road constructions?
- k) Write the importance of soil stabilization in sub-grade layers.

PART – B

Answer any **THREE** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Explain the development of highways with respect to Indian Context. 8 M
- b) Bring out the differences in Nagpur & Bombay Road Development plan. 8 M
3. a) A valley curve is formed by a descending grade of 1 in 25 meeting an ascending grade of 1 in 30. Design the length of the valley curve to fulfill both comfort and head light sight distance for a design speed of 80kmph. Assume allowable rate of change in centrifugal acceleration $C = 0.6 \text{ m/sec}^3$ 8 M
- b) Explain the fundamental diagram of traffic flow along with its relationships. 8 M
4. a) The Phase diagram with flow values of an intersection is shown in Figure-1 below. The lost time and yellow time for the first phase is 2.5 and 3 seconds respectively. For the second phase the lost in time and yellow time are 3.5 and 4 seconds respectively. If the saturation headway is 2.2 seconds, compute the cycle length for that intersections and find out the green time allocated for the two phase. 8 M

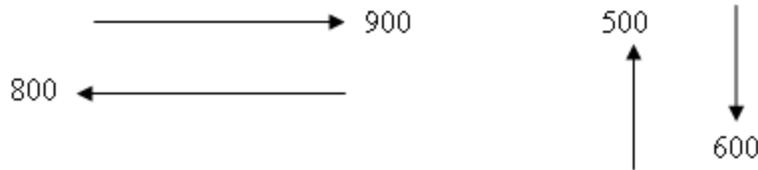


Figure-1. Phase diagram for an intersection

- b) Explain the desirable properties and requirements of Marshal method of mix design. 8 M
5. a) Explain the design procedure of flexible pavement using IRC – 37-2001. 8 M
- b) A cement concrete pavement of thickness 20cm thick has longitudinal joints at 3.5m and transverse joints at 4.5m. The modulus of subgrade reaction is 10 kg / cm^3 elastic modulus of cement concrete is $3 \times 10^5 \text{ kg / cm}^2$, $\mu = 0.15$, radius of contact area = 15 cm. Find the stresses at interior, edge and corner region of the concrete pavement using Westergaard's stress equation for a wheel load of 5100 kg. 8 M
6. a) Explain the construction of water bound macadam road along with its specifications. 8 M
- b) Elaborate the design procedure of continuous reinforced cement concrete pavements. 8 M