Fourth Semester B. E. (Civil) (CBS) Examination

TRANSPORTATION ENGINEERING – I

Time : Three Hours] [Max. Marks : 80

N. B. : (1) Assume suitable data wherever necessary.
(2) Retain the construction lines.
(3) Illustrate your answers wherever necessary with the help of neat sketches.
(4) Use of non programmable calculator is permitted.

1. (a) Explain the necessity and objects of highway planning. 7

(b) Discuss the requirements of "Ideal highway alignment". 6

OR

2. (a) What are the objectives and application of Ductility Test on bitumen ? 7

(b) Discuss applications of geosynthetic materials for road construction. 6

3. (a) Calculate overtaking sight distance requirements on a two lane road for :—

(i) Two–way traffic.

(ii) One–way traffic of 80 kmph. Take A = 3.2 Kmph/sec. 7

(b) Design the rate of superelevation for a design speed of 70 kmph with 190 m as the radius of curve. 6

OR

4. (a) Calculate the length of transition curve using the following data :—

Design speed = 65 kmph, Radius of circular curve = 220 m,

Pavement width with extra widening = 7.5 m

Road is built in a plane terrain. 7

(b) A vertical summit curve is formed at the intersection of two gradients (+) 3.0 and (–)5.0 percent. Design the length of summit curve for stopping sight distance of 128 m. 6

5. (a) What are the factors that affect the design of pavements ? Discuss. 7

(b) What are the various construction steps involved for "Water bound Macadam" Roads. 7

OR

6. (a) Enumerate various joints used in rigid pavements. What are the uses of "Tie bar" and "Dowel bar" ? 7

(b) Enumerate common types of defects in flexible pavements. Discuss any one in detail. 7

7. (a) What are the various road user characteristics that may affect their ability to operate the vehicle safely ? 7

(b) Discuss the various aspects which are investigated in parking studies. 6

OR

8. (a) Explain the term "Spot speed" What are the objects of carrying out spot speed studies ? 7

(b) What are the different causes of road accidents ? Discuss briefly. 6

9. (a) How bridges are classified and numbered ? Discuss in brief. 7

(b) What are the factors to be considered while selecting a site for a bridge ? 6

OR

10. (a) A bridge is proposed to be constructed across an alluvial stream carrying a discharge of 200 m^3/sec. Assuming a value of silt factor = 1.1, determine the maximum scour depth, when the bridge consist of three span of 35 m each. 7

(b) The catchment area of a stream is of sandy soil with thick vegetation cover and the area of the catchment is 11000 hectares. The length of catchment is 28 km and the fall in level from the critical point to the bridge site is 165 m. Calculate the peak runoff for designing the bridge if the severest storm as recorded yielded 30 cm of rainfall in 5 hrs. 6

11. (a) Discuss different types of RCC bridges in brief. 7

(b) Discuss the factors which govern the selection of following types of foundation for a bridge :—

(i) Pile foundation.

(ii) Well foundation. 7

OR

12. Write notes on (any **three**) :—

(i) Piers.

(ii) Afflux.

(iii) Coffer dams.

(iv) Rating of existing bridges. 14