BENGAL ENGINEERING AND SCIENCE UNIVERSITY, SHIBPUR

B.E. (Civil) 5th Semester Final Examination 2011-2012

Transportation Engineering- I (CE-505)

Time: 3 Hours. Full Marks: 70

Use separate answer script for each half

Assume data reasonably if required

FIRST HALF

Attempt Q.No.1 and any TWO from the rest

1. Write short notes on (Any three) (3x5=15)

   a) Comparison of flexible pavement and rigid pavement in respect of i) material and ii) cost.

   b) Causes of errors and method of correction in CBR curve

   c) Different types of cracks on flexible pavement surface

   d) Port, harbour and dock

   e) Joints in rigid pavement

2. a) How is effect of repetition of wheel load taken care in pavement design?
   b) What is ESWL? Determine ESWL from equal stress criterion at a depth of 200 mm and 600 mm of a flexible pavement for a truck having dual wheel configuration at the rear axle. The each wheel of the dual wheels is carrying 3.5 kN. The centre to centre distance between two tyres of the dual set is 225 mm. The tyre pressure is assumed as 0.72Mpa and the tyre contact surface is taken as circular. (4+6)

3. A concrete pavement 28 cm thick and 3.5 m wide are having a joint width 2.0 cm, a modulus of subgrade reaction of 7 kg/cm^3. An axle load of 20.4 tones applied over the outermost dowel at a distance of 15 cm from the edge. If the modulus of dowel support is 41300 kg/cm^3 and the percentage of load transfer is 40, then determine the maximum load on one dowel and design the size and spacing of dowel bar (assume grade of concrete as M40 and modulus of elasticity of dowel as 2.0×10^6 kg/cm^2). (10)

4. What are the different types of wall used in the dock? Discuss with neat sketch the different types of dock wall. What are essential factors considered for design of dock wall? (2+6+2)

SECOND HALF

Attempt Q.No.5 and any TWO from the rest

5. Write short notes on (Any three) (3x5=15)

   a) Desirable properties of Dense Graded Bituminous Macadam (DBM)

   b) Testing of pavement materials in respect of their characteristic on i) resistance to abrasion, ii) resistance of impact

   c) Pavement Condition Rating

   d) Blind curves in hill road

   e) Design criteria of Hair-Pin Bends in hill road

6 a) Explain with neat sketch for attainment of superelevation in two lane single carriageway road considering pavement rotation about the centre line.

   b) Assuming a brake efficiency of 50% and a total of perception and brake reaction time of 2.5 second, calculate the minimum required sight distance to avoid a collision with a car approaching from the opposite direction, if both the cars are assumed to be speeding at 80 km/hr. (4+6)

7 a) State the factors on which the design of valley curve depends?

   b) Calculate the length of transition curve for a two lane single carriageway national highway having design speed 100km/hr, radius of circular curve is 360m. Assume other data as per IRC guidelines. (4+6)

8 a) What is overlay? Discuss why overlays are required.

   b) During maintenance of a cracked surface how traffic flow of a two lane street should be regulated.

   c) Why is roughness measurement an important task in pavement performance study?

   d) Discuss on various levels of roadway maintenance.

   e) Enumerate the steps of pavement performance study.

(2+2+2+2+2)