SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2007

CE 04 605—TRANSPORTATION ENGINEERING—II

(2004 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer the following questions.

I. (a) Draw a typical cross-section of a permanent way. Discuss in brief the basic functions of various components of the railway track.

    (b) Discuss different types of rail-joints with the help of neat sketches and give their merits and limitations.

    (c) What is creep ? Discuss the theories proposed for the probable causes of creep.

    (d) Explain the different types of signals used in station yards.

    (e) How do you transfer the centre line from the surface to the tunnel ?

    (f) Write short notes on tunnel ventilation.

    (g) What are the different Navigational aids used in harbours and ports ?

    (h) Write a short notes on inter modal coordination.

(8 × 5 = 40 marks)

2. (a) Write short notes on any *three* of the following :—

       (i) Coning of wheels.

       (ii) Sleeper density.

       (iii) Rail failures and remedial measures.

       (iv) Material assessment for unit length of track.

       (v) Grade compensation.

(9 marks)

    (b) What do you understand by Negative count ? If a 8° curve track diverges from main curve of 5° in opposite direction in the layout of BG Yard calculate the super elevation and the speed on the branch line, if the maximum speed permitted on the main line is 45 kmph.

(6 marks)

Or

    (c) Write short notes on :

       (i) Gradients in Station yards.   (ii) Transition curves.

       (iii) Equilibrium count.

(9 marks)

    (d) What is the permissible speed in B.G. track with a 4° curve ? If for other reasons the speed is restricted to 75 kmph, what superelevation should be given after allowing permissible count deficiency ?

(6 marks)

Turn ov

3. (a) Calculate all the necessary elements required to set out 1 in 8½ turnout taking off from a straight BG track with its curve starting from the toe of the switch i.e. tangential to the gauge face of the outer main rail and pass through theoretical nose of crossing. Heal divergent = 11.4 cm.

(7½ marks)

(b) Explain and discuss the following by means of neat sketches :—
   (i) Way side stations.
   (ii) Junction stations.
   (iii) Terminal stations.

(7½ marks)

Or

(c) Explain clearly working principles of the following :—
   (i) Centralized traffic control system.
   (ii) Automatic train control system.

(6 marks)

(d) Write short notes on :
   (i) Tappet locking.
   (ii) Plate laying.
   (iii) Shafts.

(9 marks)

4. (a) Write short notes on :
   (i) Wet and dry docks.
   (ii) Lock and Lock gates.
   (iii) Fenders and Dolphins.
   (iv) Quays and Piers.
   (v) Classification of harbours and ports.

Or

(b) Write short notes on :
   (i) Navigational aids.
   (ii) Breakwater construction.
   (iii) Transit shed and warm house.
   (iv) Site selection for harbour.
   (v) Shipways.

(15 marks)

5. (a) Explain the salient features of first and second road development plan in India. (7½ marks)

(b) What are the various surveys to be carried out before planning a highway system for a given area ? Explain briefly.

(7½ marks)

Or

(c) Write a note on economics of highway pavement.   (7½ marks)

(d) It is proposed to widen a stretch of a single lane road of length 40 km to two lanes at a total cost of Rs. 6.5 lakhs per km and the rate of interest is 10% per year. The annual cost of maintenance of the existing single lane road is Rs. 10,000 per km and that of the improved two lane road is 12,000 per km. The average vehicle operation cost on the existing road is Rs.4.50 per vehicle km. If present traffic is 2,500 motor vehicles per day and by the end of 15 years design period the traffic is estimated to be doubled, determine whether the investment on the improvement of the road is economically viable.

(7½ marks)

[4 × 15 = 60 marks]