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CE 131605

Roll No. of candidate

2019

B.Tech. 6th Semester End-Term Examination

Civil

TRANSPORTATION ENGINEERING — II

Full Marks – 100   Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer Question No. 1 and any *six* from the rest.

1. Fill in the blanks : $(10 \times 1 = 10)$

    (i)   For a broad gauge route with M+7 sleeper
          density, number of sleeper per rail length is
          _____.

    (ii) Width of broad gauge used in India is
          _____.

    (iii) Coning of wheels is done with a slope of
          _____.

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(iv) The axle load (provided the rail has not lost more than 5% of its original section) for a 44.5 kg/m rail section for broad gauge should be _____ tones.

(v) The minimum depth of ballast cushion for a broad gauge wooden sleeper of size 275 × 25 × 13 cm with 75 cm sleeper spacing is _____.

(vi) Staggered joints are mainly provided on _____ tracks.

(vii) The grade compensation on a 4 curve on a broad gauge railway track is _____.

(viii) Dog spikes are used for fixing rails to the _____.

(ix) The application of _____ diagram is used to find the orientation of the runway to get the desired wind coverage.

(x) A hinged flap, known as _____ is fixed in the way to control the rolling movement of an aircraft in air.

2. (a) Give sketch of a flat footed rail and mention the relative merits of flat footer rail over bull and double headed rails. (5)

(b) How do you classify wear of rails? Discuss the various causes of wear and suggest suitable methods to reduce the wear of rails. (10)

3. (a) What is ballast in permanent way? Mention the functions of ballast and state the requirements of a good ballast material. (7)

   (b) Write down four materials commonly used as ballast in Indian Railways and state the merits, demerits and suitability of each material as ballast. (8)

4. (a) What do you mean by sleeper density? Write a brief note on the use of concrete sleepers on the Indian railways. (7)

   (b) A five degree curve diverges from a three degree main curve in reverse direction in the layout of a B.G yard. If the speed on the branch line is restricted to 35 kmph, determine the restricted speed on the main line. (8)

5. (a) Write all the characteristics of an ideal rail joint. (7)

   (b) What is the purpose of providing fish plates? Give details of a typical connection by fish plates on the Indian railways. (8)

6. (a) Discuss all the types of gradients giving their permissible values adopted on Indian railways. (7)

   (b) What would be the equilibrium cant on a M.G. curved track of 7 degree for an average speed of trains 50 kmph? Also calculate the maximum permissible speed after allowing the maximum cant deficiency. (8)

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7. (a) Discuss the necessity and effects of coning of wheels. (7)

   (b) The length of runway under standard conditions is 1620 m. The airport site has an elevation of 270 m. Its reference temperature is 32.90 °C. If the runway to be constructed with an effective gradient of 0.20 percent, determine the corrected runway length. (8)

8. (a) Classify tunnels based on purpose. State the advantages and disadvantages of tunnels. (7)

   (b) Define the following terms :

   (i) Airport capacity

   (ii) Taxiway

   (iii) Cross-wind component

   (iv) Rudder. (8)

9. (a) What are the geometric standards for taxiway as recommended by ICAO? (5)

   (b) What are the factors that govern the layout of taxiway? (5)

   (c) What is basic runway length? What corrections are necessary to obtain the actual runway length at a particular site? (5)

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