Sixth Semester B.E. Degree Examination, June/July 2017

Transportation Engineering – II

Time: 3 hrs.   Max. Marks:100

Note: 1. *Answer FIVE full questions, selecting*
at least TWO questions from each part.
2. *Missing data, if any, may be suitably assumed.*

PART – A

1. a. Mention the different gauges that are used in Indian railways. Discuss the factors affecting adoption of a particular gauge. **(06 Marks)**
   b. With neat sketches, explain coning of wheels and tilting of rails. **(06 Marks)**
   c. What is meant by wear of rails? How do you classify the wear? Discuss the various causes of wear. **(08 Marks)**

2. a. List the different fixtures used in railway track and give the dimensional sketch of fish plate. **(06 Marks)**
   b. Determine the quantity of materials required to construct a 800 m long BG railway track, assuming a sleeper density of (n + 5). **(06 Marks)**
   c. Calculate the maximum permissible train load that a B.G. locomotive can haul with 3 pairs of driving wheels with axle load of 22 kN each on a straight level track at a speed of 80 kmph. Calculate the reduction in speed, if the train has to run on a rising gradient of 1 in 200. What would be the further reduction in speed if the train has to negotiate a 4° curve on the rising gradient? Assume coefficient of friction as 0.2. **(08 Marks)**

3. a. Define: i) Super elevation   ii) Negative cant
           iii) Cant deficiency   iv) Grade compensation on curves **(06 Marks)**
   b. An 8° curve branches off from 4° main curve in B.G. layout. If the speed on branch line is 28 kmph, find the speed on main line. Cant deficiency is 7.61 cm. **(06 Marks)**
   c. Calculate the maximum permissible speed on a curve of highspeed B.G. track having the following particulars:
      Degree of curve = 1°
      Amount of super elevation = 8 cm
      Length of transition curve = 130 m
      Max. speed of the section likely to be sanctioned = 153 kmph. **(08 Marks)**

4. a. Calculate the elements of a BG turnout, if feel divergence is 11.43 cm. Number of crossing is 16 and angle of switch is 1°8′0″. Straight arm distance = 0.9 m. **(06 Marks)**
   b. With a neat sketch show the details of acute angle crossing. Indicate: i) actual, ii) theoretical rose of crossing. **(06 Marks)**
   c. What is signaling? What are the objectives of signaling? List the types of signals. **(08 Marks)**

PART – B

5. a. Write a note on aircraft characteristics. **(08 Marks)**
   b. Define wind rose diagram. With a neat sketch, explain the method of locating the best orientation of runway. **(06 Marks)**
   c. Write a note on airport classification. **(06 Marks)**

6 a. A taxiway is to be designed for operating a Boeing aircraft, which has the following characteristics. Determine the turning radius of the taxiway.
      Wheel base W = 17.70 m
      Tread of main gear = 6.62 m
      Width of taxiway, T = 22.5 m
      Turn-off speed = 40 kmph
      Coefficient of friction = 0.3 **(06 Marks)**

  b. Explain the various types of airport markings. **(06 Marks)**

  c. An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperatures for the hottest month at the site are 40°C and 28°C respectively. The effective gradient is 0.18 percent. Determine the length of runway required at the proposed site if the basic runway length is 1900 m. **(08 Marks)**

7 a. Write short notes on:
     i) Tunnel lining
     ii) Tunnel drainage **(08 Marks)**

  b. Explain various shapes of tunnel with neat sketches. **(06 Marks)**

  c. With a neat sketch, explain the needle beam method of tunneling in soft soils. **(06 Marks)**

8 a. Explain the functions of :
     i) Wharfs and quays
     ii) Wet and dry docks **(08 Marks)**

  b. Draw a neat sketch of artificial harbor, explain the various components. **(06 Marks)**

  c. Define breakwater. Explain any one type of breakwater. **(06 Marks)**

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