Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (CE)/SEM-7/CE-702/2010-11

2010-11

TRANSPORTATION ENGINEERING – II

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) The main functions of sleepers are

      a) to support the rails

      b) to maintain the correct gauge

      c) to distribute the rolling load coming on rails to ballast

      d) all of these.

   ii) On M.G. track, the standard size of wooden sleeper used is

      a) 152 cm × 15 cm × 10 cm

      b) 2742 cm × 25 cm × 13 cm

      c) 180 cm × 20 cm × 11·5 cm

      d) none of these.

iii) The maximum gradient for B.G. track in station yards is

a) 1 in 1000

b) 1 in 400

c) 1 in 200

d) 1 in 100.

iv) Which of the following relates to the percussion theory for explaining the cause of creep ?

a) Pushing the rails forward and backward during starting

b) Pushing the rail off the track due to the thrust on driving wheels

c) Impact of wheels at the rail ends ahead of joints

d) None of these.

v) 52 MR rails are mostly used in

a) Metre gauge

b) Broad gauge

c) Narrow gauge

d) None of these.

vi) On Indian Railways maximum cant deficiency allowed on M.G. track is

a) 66 mm b) 51 mm

c) 76 mm d) 87 mm.

vii) On permanent track points and crossing are provided to change

a) Gauge b) Space

c) Direction d) Gradient.

viii) For a M.G. route with M + 7 sleeper density, no. of sleepers per rail length is

a) 18 b) 19

c) 20 d) 21.

ix) Which of the following is used for serving and repairs of the aircraft ?

a) Apron b) Hanger

c) Terminal Building d) Holding apron.

x) The structure that protects the harbour from stormy waves and permits calm in the harbour is called

a) Dock b) Breakwater

c) Wharf d) Jetty.

xi) The runway lengths as recommended by the ICAO are based on which of the following condition or conditions ?

a) The airport is located at mean sea level

b) The standard temperature of the airport site is 15°C

c) The runway gradient is zero

d) all of these.

xii) The chief function of a dry dock in a harbour is to enable

a) storage of goods

b) check goods by customs

c) handling of goods

d) repair of ships.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What are coning of wheels and tilting of rails ? What purposes do they serve ?

3. Briefly explain the survey conducted for track alignment.

4. State the functions of sleeper. Why pre-stressed concrete sleeper is very popular in Indian Railways ?

5. What is sleeper density ? Find out the number of sleepers required for 640 m length of track when sleeper density is M + 5.

6. Differentiate between taxiway and runway.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Discuss different theories of rail creep. 6

   b) Explain how creep can be measured. 4

   c) What is corrugation in rails ? Suggest remedial measure for corrugation. 5

8. a) Discuss the various tractive resistances. 8

   b) What do you mean by Hauling capacity of a locomotive ? 2

   c) Calculate maximum permissible train load that can be pulled by a locomotive having four pair of driving wheels carrying an axle load of 24 tonnes each. The train has to run at a speed of 80 km/hr on a straight level track (B.G.). Also calculate the reduction in speed if train has to climb a gradient of 1 in 200. 5

9. a) What is wind rose diagram ? 3

   b) How the best runway orientation is determined through the wind rose diagram ? 2

c) Given the following wind data, draw the wind rose diagram and show the best runway orientation. 10

Wind direction	**Percentages of winds**
N	2·9
NNE	5·7
NE	8·3
ENE	11·7
E	11·5
ESE	11·9
SE	8·8
SSE	4·9
S	2·3
SSW	3·2
SW	2·3
WSW	3·2
W	5·4
WNW	4·6
NW	2·5
NNW	2·7
Calm wind = 8·1 %	
Total = 100 %	

10. a) What do you mean by Negative super elevation ? 3

b) Explain the necessity of grade compensation on curves. 4

c) A 7 degree curve track diverges from a main curve of 4 degree in an opposite direction in the layout of a B.G. yard. Calculate the super elevation and speed restriction on the branch line, if maximum speed permitted on the main line is 45 kmph. 8

11. a) Define and classify break water. 3

b) Write short notes on tetrapods. 4

c) Differentiate between dry docks and wet docks. 3

d) What is light house ? 2

e) Explain the forces acting on a break water. 3

12. a) Explain the method of fixing the orientation of runway in airport with the help of windrose diagram. 8

b) What is grade compensation on curves ? Determine the gradient for a broad gauge track when the grade resistance together with the curve resistance due to a curve of 3° shall be equal to that for a ruling gradient of 1 in 200. 7