



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)

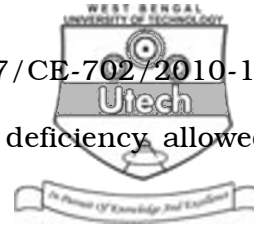
1. Choose the correct alternatives for any *ten* of the following :

10 × 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. $3 \times 5 = 15$

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.



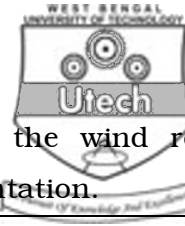
GROUP – C

(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

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