Code : 011724

B.Tech 7th Semester Exam., 2015

TRANSPORTATION ENGINEERING—II

Time : 3 hours *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

(ii) There are ***NINE*** *questions in this paper.*

(iii) Attempt ***FIVE*** *questions in all.*

(iv) Question No. ***1*** *is compulsory.*

1. Choose the correct answer of the following (any *seven*) : 2×7=14

(a) One degree of curve is equivalent to —— (where R is radius of curve in *m*).

(i) $1600/R$

(ii) $1700R$

(iii) $1750R$

(iv) $1600R$

(b) Dog spikes are used for fixing rail to the

(i) wooden sleepers

(ii) CST-9 sleepers

(iii) steel trough sleeper

(iv) concrete sleepers

(Turn Over)

(c) Gauge is the distance between

(i) centre-to-centre of rails

(ii) running faces of rails

(iii) outer faces of rails

(iv) None of the above

(d) Sleeper density in India is normally kept as —— (where M is rail length in metre).

(i) $M+2$ to $M+7$

(ii) M to $M+2$

(iii) $M+5$ to $M+10$

(iv) M

(e) The grade compensation on a 4° curve on a BG railway track is

(i) 0·20%

(ii) 0·16%

(iii) 0·12%

(iv) 0·08%

(f) As per ICAO recommendation, minimum width of safety area for instrumental runway should be

(i) 78 m

(ii) 150 m

(iii) 300 m

(iv) 450 m

(g) The height of parapet or handrails on a highway bridge is not less than

(i) 1 m
(ii) 1·5 m
(iii) 2 m
(iv) 2·5 m

(h) The angle of bridge crossing-over a channel should not exceed

(i) 22½°
(ii) 30°
(iii) 60°
(iv) 45°

(i) A bridge designed to allow normal floods to pass through its vents but allowed to be over topped during floods is called

(i) submersible bridge
(ii) seasonal bridge
(iii) underbridge
(iv) fair-weather bridge

(j) A temporary suspension bridge in which the roadway rests directly on the suspension cables and consists of wooden cables is called

(i) temporary bridge
(ii) ramp bridge
(iii) temporary suspension bridge
(iv) side bridge

2. (a) What are the different modes of transport? Compare rail transport with road transport. 7

(b) Describe in brief the basic requirements of an ideal alignment of a railway track. 7

3. (a) What do you understand by widening of gauge on curves? 4

(b) Two high-level platforms are to be provided on the inside as well as the outside of a 2° curve on a BG track with a superelevation of 100 mm. What should the required extraclearances for these platforms, both on the inside and the outside of the curve, be? (Length of bogie = 21340 mm, c/c bogie distance = 14785 mm, height of platform = 840 mm.) 10

4. (a) What are the purposes of a railway station? 6

(b) A crossover is laid between two BG straight tracks placed at a distance of 5 m c/c. Calculate the (i) overall length, (ii) radius of the curved lead and (iii) lead distance. Heel divergence of 1 in 12 crossing = 133 mm. 8

5. *(a)* What is superelevation? Why is it necessary to provide superelevation on the curves of a railway track? 6

(b) A BG branch line track takes off a contrary flexure through a 1 in 12 turnout from a main line of a 3° curvature. Due to the turnout, the maximum permissible speed on the branch line is 30 kmph. Calculate the negative superelevation to be provided on the branch line track and the maximum permissible speed on the main line track. 8

6. *(a)* Explain any four factors which influence location of an airport. 7

(b) State the classification of airports according to ICAO. 7

7. *(a)* What do you mean by sinking and tilting of wells? 7

(b) What are the bases of selection of depth of well foundation for a bridge? 7

8. *(a)* How would you estimate the maximum scour depth for any bridge pier? 7

(b) The following are the costs of one pier and one superstructure span of multiple span bridge for various span lengths. The cost of superstructure span excludes the cost of railways and flooring system. Calculate the economic span : 7

Span (in metres)	4	8	12	15
Superstructure cost (in ₹)	1,700	7,000	16,000	24,500
Substructure cost (in ₹)	22,200	23,200	23,000	23,600

9. *(a)* Discuss briefly the characteristics of an ideal site for a bridge. 7

(b) Name the different types of loadings used for designing a bridge. Discuss IRC class AA loading in brief. 7

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