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Section-D

8. (a) Calculate all the necessary element required to set out a 1 in 8.5 turnout taking off from a straight B.G. track with its curve starting from the toe of the switch (i.e.) tangential to the gauge face of the outer main rail and pass through theoretical nose of crossing. The heel divergence (d) is 11.4 cm. 10
- (b) Draw a typical cross section of a railway track and explain the function of various components of a railway track. 10
9. Describe in detail the following : 20
- (a) Lining of tunnels
- (b) Shaft and purpose of shaft.

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B.Tech. 5th Semester (Civil F-Scheme)

Examination, December-2017

TRANSPORTATION ENGINEERING-I

Paper-CE-303-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Q. No. 1 is compulsory. Students have to attempt five questions in total at least one question from each section. All questions carry equal marks.

1. (a) Explain obligatory points. 5×4=20
- (b) Explain with neat sketch the "PLEV" theory?
- (c) What do you understand by "Negative super elevation". Explain.
- (d) Explain the classification of tunnels.
- (e) What do you understand by crossing and essential requirements of good crossing?

Section-A

2. (a) Determine the length of different categories of roads in a state in India by the year 2001, using the Third Road Development formula and the following data: 12
- Total area of State = 13400 sq km
- Total No. of towns as per 1981 census = 12
- Road Density 82 km/100 km²

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(b) Explain the road development Plan Vision 2021 in India. 8

3. (a) A national highway passing through a flat terrain has a horizontal curve of radius equal to the ruling minimum radius. If the design speed is 80 kmph, calculate ruling minimum radius, super elevation, extra widening absolute minimum sight distance, intermediate sight distance, set-back distance. Assume necessary data suitably. 15

(b) There is a horizontal curve of radius 360 m and length 180 m. Calculate the clearance required from the central line on the inner side of the curve, so as to provide : 5

Overtaking sight distance of 250 m

Section-B

4. A national highway passing through a rolling terrain having a horizontal curve of radius 650 m. Design the length of transition curve and compute the shift using the following data :

Design speed, $V = 85$ kmph, Normal pavement width = 7 m, Number of lane = 2, Wheel base width = 6 m, Allowable rate of distribution of super elevation = 1 in 150, Allowable rate of change of centrifugal acceleration, $C = 0.507$ 20

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5. (a) What are the various methods of carrying out speed and delay study ? Explain floating car method in detail. 10

(b) Explain the following :

- (i) AADT
- (ii) Parking Volume
- (iii) Thirtieth Highest Hourly Volume
- (iv) Time Mean speed and space mean speed. 10

Section-C

6. The properties of sub grade soil are given below : 6

(a) Passing 0.074 mm sieve = 55%

Liquid limit = 50%, Plastic limit = 41%

Classify the soil by revised PRA / HRB system.

(b) Explain with a figure the bonding phenomenon of emulsion with aggregates. Distinguish between cutback and emulsion. Explain the basic properties of cutback and uses of it. 14

7. Describe in detail the following as : 20

- (i) Rail joints
- (ii) Creep wearing
- (iii) Types of spikes bolts and keys
- (iv) Welding of rails
- (v) Types of sleepers.

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