

B. Tech 5th Semester Examination
Transportation Engineering-I (NS)
CE-315

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

- Note :** (i) Attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the sub parts of the questions in Section E.
(ii) Marks of all the questions and their parts are indicated in the right hand margin
(iii) Missing data, if any, may be assumed suitably.
(iv) Before attempting the question paper be sure that you have got the correct question paper.

SECTION - A

1. Briefly describe the Nagpur road development plan. Write the major recommendation of Nagpur plan. What are the salient features of the Nagpur road development plan? (20)
2. (a) Draw the neat sketch of a highway cross section and describe the following elements.
(i) control line, (ii) building line, (iii) road land boundary line
(iv) set-back distance (SBD), (v) right of way and roadway. (10)
(b) Describe the different factors controlling the highway alignment. (10)

SECTION - B

3. (a) What are the advantage and disadvantage of rotary intersections? (10)
(b) Draw the neat sketch of full Cloverleaf and T-intersection and show the movement of traffic. (10)

4. (a) A 7 m wide road is to be provided with a horizontal curve of 200 m radius. The speed of the vehicle is 70 kmph and co-efficient of lateral friction is 0.15. Calculate:-
(i) Super elevation (ii) Equilibrium super elevation. (8)
(b) Speed of overtaking and overtaken vehicles are 60 and 50 kmph, respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.90 m/sec^2 . Calculate safe overtaking sight distance. Show the minimum length of overtaking zone and also show the position of the sign posts. Assume $t=2 \text{ sec}$. (12)

SECTION - C

5. Explain briefly the principle of Burmister's two layer theory and mention the advantages over the elastic single layer theory for the analysis of flexible pavements. (20)
6. Explain briefly the principle of the various tests on road stones. Mention their advantages and limitations. Also specify the desirable values of the test results. (20)

SECTION - D

7. A cement concrete pavement has a thickness of 20cm and has two lanes of 7.0m with a longitudinal joint along the centre. Design the dimensions and spacing of the tie bar Use the following data: Allowable working stress in tension (S_s) 1400 kg/cm^2 , Unit weight of concrete (w) $=2400 \text{ kg/m}^3$, Coefficient of friction (f) $=1.5$, Allowable bond stress in deformation bars in concrete (S_b) $=24.6 \text{ kg/cm}^2$. (20)
8. Describe the construction of water bound macadam roads. Mention their advantages and disadvantages. (20)

SECTION - E

9. (i) What are the causes of landslides?
(ii) Explain the soil cement mix design.
(iii) Explain the method of application of prime coat and tack coat.
(iv) Write brief notes on Tie bar and joint filler and sealer.
(v) Enumerate along with the year of establishment the different institutions/organizations related to road development in India. (4×5=20)