4TH SEM. /CIVIL ./ 2024(S)

Th-4 Highway Engineering

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions   2 x 10

   a. Name various factors that control highway alignment.

   b. Differentiate between formation width and formation level.

   c. Mention the width of carriageway recommended by IRC for
       i) Single lane road, ii) Two lanes without raised kerbs.

   d. What are the different types of sight distance considered in highway design?

   e. Write down the mathematical expressions of i)Lag distance, ii)Braking distance.

   f. What do you mean by transition curve? What are its types?

   g. List the types of bituminous binders used in flexible pavement construction.

   h. What are the tests to evaluate the properties of bitumen binders?

   i. What do you mean by breast wall?

   j. Draw traffic regulatory sign of i)U-turn, ii)No-Parking.

2. Answer **Any Six** Questions   6 x 5

   a. Explain briefly about "PIEV" theory.

   b. Draw typical cross section showing all details of a hill road of partly in cutting and partly in filling.

   c. What do you mean by soil stabilization? Explain its necessity and purpose.

   d. Write different types of road failures. Mention it causes and remedies.

   e. What are the objectives of traffic signs? State the different types of traffic signals used at road crossing.

   f. Explain the penetration test carried out for bituminous material.

   g Discuss briefly the working of bulldozer.

3   Calculate the safe stopping sight distance on a level road for design speed   10
of 96kmph for i)Two-way traffic on a two lane road ii)Two-way traffic on a
single lane road. Assume co-efficient of friction as 0.37 and reaction time
of driver as 2.5 sec.

4   What do you mean by flexible pavement and rigid pavement? Explain the   10
various steps involved in the preparation of sub-grade of flexible
pavement.

5   What is super-elevation? Why super-elevation is provided to the road   10
pavement. Estimate the super-elevation required at a horizontal curve of
radius 300m for a design speed of 80kmph. Assume co-efficient of lateral
friction as 0.15.

6   What is the necessity of cross-drainage? Give details of different works   10
provided in i) Surface drainage ii) Sub-surface drainage

7   Write short notes on   2.5*4

- Hot mix plant
- Water Bound Macadam road
- Surface drainage
- Camber