

**4<sup>TH</sup> SEM /CIVIL /2023 (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. When Indian road congress formed and what was its objective?
  - b. What is RoW and formation width in Highway?
  - c. What is Emulsion and write its types.
  - d. What are Pneumatic tyre and sheep's foot rollers?
  - e. Draw any two traffic control signals and write their meaning.
  - f. Write at least four causes of pavement failure.
  - g. How landslide can be controlled in hilly roads?
  - h. What is Kerb? Write two functions of it.
  - i. Calculate the values of ruling minimum radius assuming design speed as 80km. Assume  $e=0.07$  and  $f=0.15$ .
  - j. What is necessity of providing cross-drainage works?
  
2. Answer **Any Six** Questions 6 x 5
  - a. Calculate the safe stopping distance for design speed of 60kmph for (a) two way traffic in two lane road, (b) two way traffic in a single lane road. Assume coefficient of friction as 0.4 and reaction of driver as 3.0 secs.
  - b. Write briefly, the necessity of providing curves in highway.
  - c. Elaborate Penetration test of Bitumen with figure.
  - d. Differentiate between Rigid pavement and Flexible pavement.
  - e. What is surface drainage and what are the methods for providing it?
  - f. What is corrugations and discuss its remedial measures.
  - g. Write a short note on Hot-Mix plant.
  
3. What are the requirements of a good aggregate? Why and how abrasion test is performed in aggregate? 10
  
4. What are the methods of providing super elevation? If the design speed of a highway is 100kmph and horizontal curve of radius 180m on a certain area, calculate super elevation required to maintain this speed. Take coefficient of friction as 0.18. 10
  
5. What is the purpose of Stabilization? Explain how lime stabilization is carried out in pavements. 10
  
6. Draw a neat sketch of flexible pavement showing different layers and give a brief idea about Sub-Grade preparation. 10
  
7. Describe failures in Rigid pavement and its maintenance. 10