

B.E. Fourth Semester (Civil Engineering) (C.B.S.)
Transportation Engineering - I

P. Pages : 3

Time : Three Hours



NKT/KS/17/7265

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.
 10. Illustrate your answers whenever necessary with the help of neat sketches.
 11. Use of non programmable calculator is permitted.

1. a) State the ideal requirement of highway alignment. Explain how the obligatory points influences the alignment of a new road. **7**
- b) Describe the following test on highway materials : **6**
- i) Penetration test on bitumen.
 - ii) Impact test on aggregate

OR

2. a) Discuss the Engineering surveys to be undertaken during the planning of a new road. **7**
- b) Discuss how to judge the suitability of sub-grade soil with the help of Group index method. **6**
3. a) Design a super elevation for the design speed of 100 k.m.p.h and ruling minimum radius. **7**
- b) State the primary & secondary objectives of providing transition curve. **6**

OR

4. a) In a vertical alignment of two gradients, a vertical summit curve is formed at their intersection. The gradients are of +4.0% & -6.0%. The design speed on the same section of road is fixed as 100 kmph. Design the length of summit curve to provide stopping sight distance. **7**
- b) Discuss the purpose & types of Camber provided on road. **6**
5. a) Enumerate the factors affecting the design of a pavement. **6**

- b) Suggest a suitable crust composition of flexible pavement from the given data 8
- i) Area of plunger = 19.6 cm^2
 - ii) Load at 5 mm penetration = 3.98 kg/cm^2
 - iii) Load at 2.5 mm penetration = 2.81 kg/cm^2
 - iv) Sub-base CBR = 20%
 - v) WBM base course CBR = 90%
 - vi) Expected final traffic volume = 600 CVD.
- Ref design chart.

OR

6. a) Discuss the failure of pavement in detail. 6
- b) Calculate the wheel load stresses at corner edges & interior region from the given details. 8
- i) Design wheel load = 4500 kg
 - ii) Tyre pressure = 6 kg/cm^2
 - iii) Modulus of subgrade reaction = $4 \text{ kg/cm}^2/\text{cm}$
 - iv) $E = 2.5 \times 10^5 \text{ kg/cm}^2$, $\mu = 0.15$
 - v) Slab thickness = 15 cm.

7. a) Describe in detail traffic volume study. State the significance of 30th highest hourly volume of traffic. 7
- b) Explain how the static & dynamic characteristics of vehicle affects the safe driving. 6

OR

8. a) What are the objectives of carrying out speed study. State the significance of the following terms related with speed study : 8
- i) 98th percentile of speed
 - ii) 85th percentile of speed
 - iii) 15th percentile of speed

- b) Discuss the use of Intelligent transportation system with Indian perspective. 5

9. a) Derive the condition for economic span of a bridge. State its limitations. 7

- b) What is Scour depth ? Calculate the scour depth for the following conditions 7

- i) 3 span of 22.5 m
 - ii) 2 span of 47.5 m
- Hydrological data given are as below :
- i) Average discharge = $325 \text{ m}^3/\text{sec}$
 - ii) Self factor = 1.1.

OR

10. a) Enlist various loads acting on a bridge. Describe all types of live load. 7

- b) Discuss how to compute of load discharge using Rationale method. 7

11. a) Describe the construction of well foundation for a bridge. Also comment on tilting of well. **7**
- b) Discuss the Inspection and Repairs of Bridges. **6**

OR

12. Write short note on **any four**. **13**
- i) Afflux
- ii) Cofferdams.
- iii) Wing walls
- iv) Rating of Bridges
- v) Clearance & free board.
- vi) Bridge Aesthetics.
