APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER M.TECH DEGREE EXAMINATION

Civil Engineering

(Transportation Engineering)

04CE 6207--Highway Analysis and Design

Max. Marks : 60   Duration: 3 Hours

PARTA
Answer All Questions
Each question carries 3marks

1. Improvement of geometric standards of a road facility at a later stage is difficult. Justify the statement

2. Is number of vehicles per unit time a rational measure for mixed traffic volume calculations?

3. Explain the roadway factors affecting capacity

4. Justify the need of transition curves in geometric design

5. Explain the factors that control the selection of intersection type

6. Write a short note on HCM

7. Explain the types of channelizing islands based on function?

8. Draw and explain typical interchange elements.

PART B
Each questions carry 6 marks

9. Write the objectives of highway geometric design.

OR

10. Explain briefly the important pavement surface characteristics ensuring safe and comfortable riding experience?

11. Design the rate of super elevation IRC method for a horizontal highway curve of radius 480m for speeds 40 kmph, 80 kmph, 100 kmph, and 130 kmph. Comment on the results   .

OR

12. What are the factors controlling the super elevation rates? Discuss how super elevation is attained on roads?

13. What is decision sight distance? Find minimum sight distance to avoid head-on collision of two cars approaching at 80 kmph and 120 kmph.

OR

14. Explain the application of capacity studies for highway facility?

15. Transition curve is provided for valley curve and not for summit curve. Justify. Which shape do you suggest for both?

OR

16. A valley curve is formed by descending grade of 1 in 15 meeting an ascending grade of 1in 30. Design the length of valley curve for a design speed of 100 kmph.
Assume $C = 0.6$ m/sec^3.

17. Explain the factors affecting free flow speed? List the base conditions assumed in capacity calculation of a freeway facility.

OR

18. Explain with figure any six design principle of an intersection?

19. What are the general geometric design guidelines for ramps?

OR

20. The width of approaches for a rotary intersection is 12 m. The entry and exit width at the rotary is 10m. Table below gives the traffic from the four approaches, traversing the intersection. Find the capacity of the rotary and design the same.

Approach	Left turn	Straight	Right turn
North	300	800	400
South	450	280	520
East	400	450	650
West	380	540	720