

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023

CIVIL ENGINEERING

(2020 SCHEME)

Course Code : 20CET206

Course Name: Transportation Engineering

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Explain PIEV theory.
2. Discuss the objectives of providing camber. State the IRC specifications,
3. State the major differences between flexible and rigid pavements.
4. What are the various factors to be considered in pavement design?
5. Explain the factors affecting level of service of a multilane highway.
6. Discuss the different traffic control devices.
7. Describe coning of wheels and why is it necessary?
8. What are docks? Differentiate dry dock and wet dock.
9. Explain primary functions of air traffic control.
10. Differentiate runway and taxiway.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) While driving the vehicle at a speed of 40 kmph in descending grade, the driver requires a braking distance equal to 1.5 times that required for stopping the vehicle when travelling the ascending grade. If the coefficient of friction is 0.35, find the grade of the road. (6)
b) While aligning a highway in a built-up area, it was necessary to provide a horizontal curve of radius 300 m for a design speed of 65 kmph, length of wheel base is 6m and pavement width is 10.5m. Design super elevation and extra widening of pavement. (8)

OR

12. a) The design speed of highway permitting two-way traffic is 70 km/hr. If the acceleration of overtaking vehicle is 0.99 m/sec^2 (10)
a. Calculate safe overtaking sight distance.

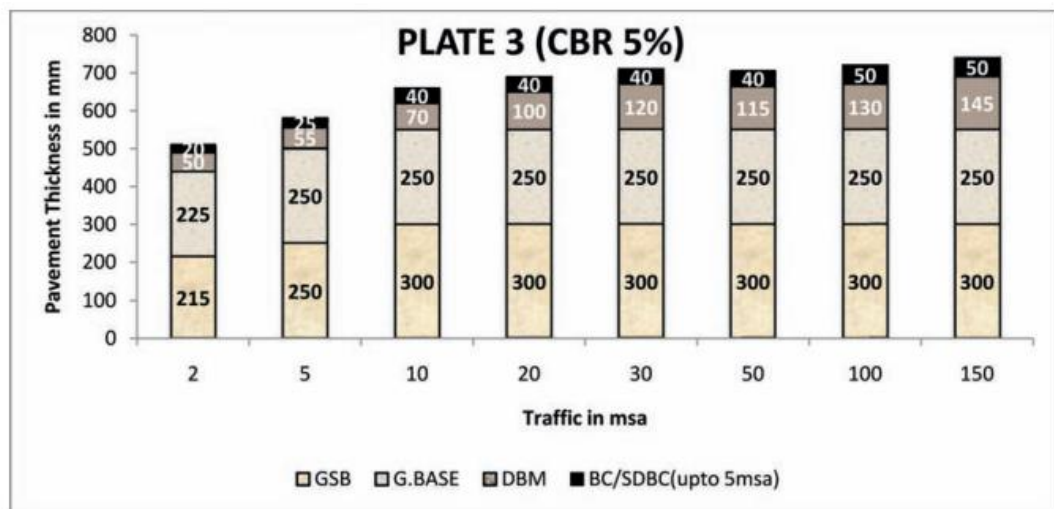
- b. Mention the minimum length of overtaking zone and draw a neat sketch of the overtaking zone & show the positions of the sign posts.
- b) What are the points to be kept in view while selecting the alignment for a highway? (4)

MODULE II

13. a) What are the desirable properties of aggregates as a highway material? Explain any two laboratory tests conducted to ensure the quality of aggregates. (8)
- b) Discuss any three steps in the construction of a bituminous pavement. (6)

OR

14. a) Design a flexible pavement for the construction of a new highway with the following data: (8)
- Category of road - four lane dual carriage way, number of commercial vehicles in the year of completion of construction = 2400 CVPD per direction, design life = 15 years, annual growth rate of vehicles = 5%, design CBR value of soil subgrade = 5%, vehicle damage factor = 3.5, lane distribution factor = 0.75



- b) What are the desirable properties of bitumen to be used in pavement construction? (6)

MODULE III

15. a) Explain the relationship between the variables in a traffic flow with the help of figures. (7)
- b) Explain the procedure for any one method of speed and delay study. Mention any three uses of speed and delay study. (7)

OR

16. a) Define (i) Saturation flow, (ii) Lost time, and (iii) Phase in a signal design. (6)
b) Enumerate the different types of road intersections. Illustrate with the help of sketches. (8)

MODULE IV

17. a) Sketch the typical cross-section of a railway track. Explain the functions and requirements of rails. (6)
b) Compare mound type break water and wall type breakwater with the help of sketches. (8)

OR

18. a) Explain the requirements of a good harbor. (6)
b) Define grade compensation and why is it necessary? What should be the actual ruling gradient if on a B.G. track a ruling gradient of 1 in 250 has been fixed and a 3° horizontal curve is also superimposed in the above track? (8)

MODULE V

19. a) Sketch the layout of airport and list its components (7)
b) Enumerate the various factors which would be kept in view while selecting suitable site for an airport (7)

OR

20. a) What is a wind rose diagram? How is it useful in fixing the best orientation of runway? (6)
b) The runway length required for landing at sea level in standard atmospheric conditions is 3000m. Runway length required for take-off at sea level in standard atmospheric condition is 2500m. Aerodrome reference temperature is 25°C and that of the standard atmosphere at aerodrome elevation of 150m is 14.025°C. If the effective runway gradient is 0.5 percent, determine the runway length to be provided. (8)
