

Register No.: ..... Name: .....

**SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**FOURTH SEMESTER B.TECH DEGREE EXAMINATION (S), SEPT 2022****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. Draw the typical cross section of a two lane urban road in an embankment and mark the salient features?
2. Explain how obligatory points control the alignment of highways ?
3. Specify the various tests for judging the suitability of bitumen to be used in pavement construction.?
4. Calculate the extra widening required for a pavement of width 7m on a horizontal curve of radius 250m, if the longest wheel base of vehicle expected to be 7.0m. Design speed is 70kmph.?
5. What is meant by cant deficiency? What are the objects of providing superelevation on curves?
6. What is coning of wheels? Why it is necessary?
7. Explain the functions of dry docks?
8. What are the different cross sections of a tunnel?
9. What are the factors to be considered for the airport site selection?
10. Explain briefly the factors which affect the layout of a taxiway

**PART B***(Answer one full question from each module, each question carries 14 marks)***MODULE I**

11. a) What are the factors affecting the geometric design of highways? (5)  
b) Calculate the length of transition curve and the shift using the following data:  
Design Speed =65kmph. Radius of circular curve =220m. Allowable rate of introduction of superelevation (pavement rotated about the centre line) =1 in 150. Pavement width including extra widening =7.5m. (9)

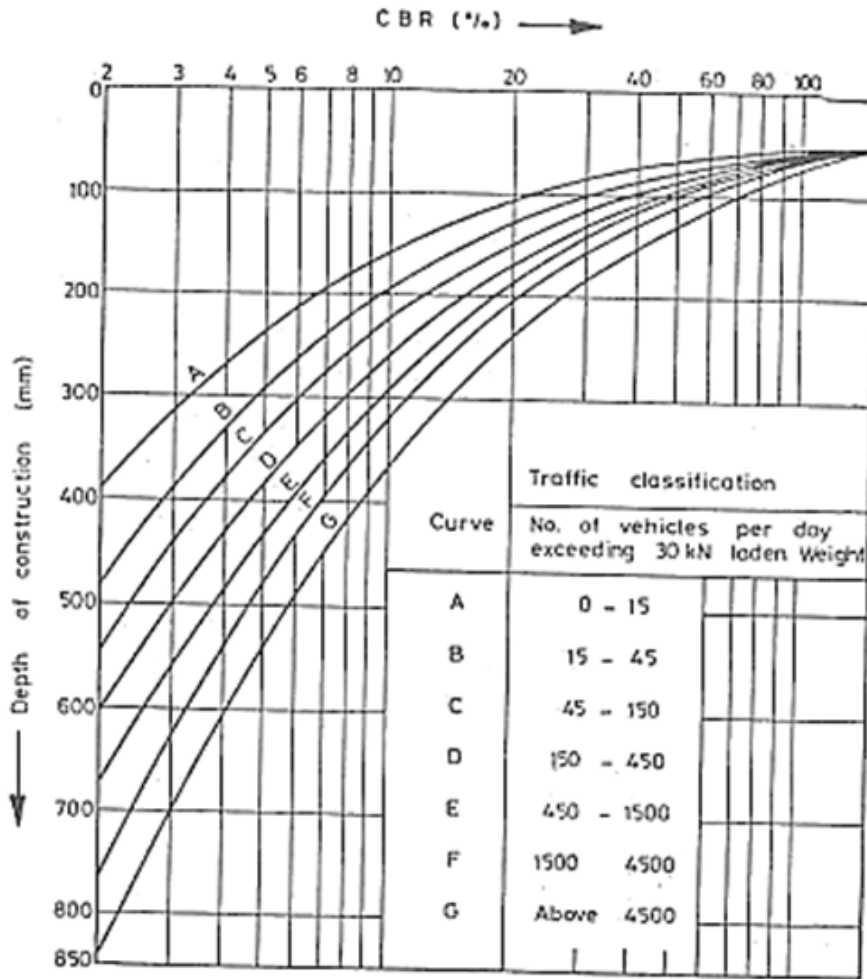
**OR**

12. a) Explain the classification of roads based on as suggested by Nagpur Road plan? (5)  
b) The speeds of overtaking and overtaken vehicle are 80 and 60kmph respectively. If the acceleration of the overtaking vehicle is 2.5kmph/sec, calculate the safe passing sight distance for a) one way traffic b) two way traffic? (9)

**MODULE II**

13. a) What are the functions of various components of flexible pavement? Draw a neat sketch showing the cross section of the pavement? (4)
- b) Design a flexible pavement using CBR curves, given the following data:
- i) subgrade soil CBR = 5%
  - ii) Laterite sub-base CBR = 15%
  - iii) Water bound macadam base CBR = 95%

Present heavy vehicle counts is 150 and the project is proposed to be completed in 5 years. Design life is 15 years and there is an annual increase in heavy vehicle count by 5%.



(10)

OR

14. a) Explain any two desirable properties of aggregate to be used in different types of pavement construction? (4)
- b) Explain the construction procedures for Bituminous Concrete? (10)

**MODULE III**

15. a) What are the factors affecting Capacity and Level of service? (4)
- b) List out the various traffic studies carried out to analyse the traffic characteristics. Explain the various methods for carrying out traffic volume studies and how the data are presented? (10)

OR

16. a) Illustrate the various types of intersections with figures? (4)  
 b) A fixed time 2-phase signal is to be provided at an intersection having four arms. The design hour traffic and saturation flow are

	North	South	East	West
Design hour flow, PCU/hr	800	400	750	600
Saturation flow, PCU/hr	2400	2000	3000	3000

(10)

Time lost per phase due to starting delay is 2 sec and All red period is 4 sec. Design two phase traffic signal using Webster’s method. Draw the phase diagram.

**MODULE IV**

17. a) What is the equilibrium cant on a 2° curve on a BG track, if the speed of various trains are 10 trains at 50 kmph, 8 trains at 55 kmph and 4 trains at 60 kmph respectively? (4)  
 b) Explain the functions of the various component parts of a railway track with the help of a neat sketch? (10)

**OR**

18. a) What are the functions of breakwaters? (4)  
 b) How is transferring of center line into the tunnel carried out? Explain with the help of neat diagram? (10)

**MODULE V**

19. a) Explain the term basic runway length? (4)  
 b) Illustrate the procedure for the runway orientation? (10)

**OR**

20. a) Explain the purpose of providing holding aprons? (4)  
 b) The length of a runway under standard conditions is 1500m. The airport is to be provided at an elevation of 110m above mean sea level. The airport reference temperature is 22°C. Following data refers to the proposed longitudinal section of runway. Determine the corrected length of runway. (10)

End to end of runway	Grade
0 to 200	+1.00
200 to 600	-1.00
600 to 1200	+0.80
1200 to 1600	+0.2

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