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Question Paper Code	12788
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Fourth Semester

Civil Engineering

20CEPC404 - HIGHWAY ENGINEERING

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. Summarize a short note on road ecology.	2	K2	CO1
2. What are the requirements of an ideal alignment?	2	K1	CO1
3. Define super elevation.	2	K1	CO2
4. Compare summit and valley curves.	2	K2	CO3
5. What are the design methods available in flexible pavement?	2	K1	CO4
6. Draw and define the critical load positions in rigid pavements.	2	K2	CO4
7. Differentiate between Tar and Bitumen.	2	K2	CO5
8. Why joints are provided in cement concrete pavements?	2	K2	CO5
9. What are the types of models in DBFOT?	2	K1	CO6
10. What are the types of highway user benefits?	2	K1	CO6

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Compare the three twenty year road development plan in India. 13 K2 CO1
- OR**
- b) Discuss how modern methods such as GIS and GPS may be used for the reconnaissance survey for highway alignment. 13 K2 CO1
12. a) The speeds of overtaking and over taken vehicles are 70 and 40 kmph, respectively on a two-way traffic road. If the acceleration of overtaking vehicle is 0.99 m/s^2 , calculate SSD, OSD and ISD. 13 K2 CO2
- OR**
- b) Write short notes on: 13 K2 CO2
- (i) Right of way (4)
 - (ii) Carriage way (3)
 - (iii) Camber (3)
 - (iv) Kerbs (3)

13. a) Explain the functions of the components of flexible pavements. 13 K2 CO4

OR

b) i) Explain about layer system concept. 6 K2 CO4

ii) Explain ESWL. 7 K2 CO4

14. a) Briefly explain the ductility test and softening point test in bitumen. 13 K2 CO5

OR

b) Classify the different types of failures in rigid pavement and mention the important causes of each. 13 K2 CO5

15. a) Calculate the annual cost of a stretch of highway with the following data: 13 K2 CO6

Item	Total Cost Rs. in lakhs	Estimated Life, in years	Rate of interest %
Land	30	90	7
Earthwork	45	30	8
Bridges, culvert and drainage	50	50	9
Pavement	90	15	10
Traffic signs, road appurtenances	20	5	10

OR

b) Explain the highway projects under PPP and its types. 13 K2 CO6

PART - C (1 × 15 = 15 Marks)

16. a) A valley curve is formed due to two gradients +2.5% and -1.75%. If the design speed of this highway is 80 kmph, determine the stopping sight distance and design the valley curve to fulfill both comfort and head light sight distance conditions. 15 K2 CO3

OR

b) Explain about traffic safety and road signs in detail. 15 K2 CO3