Total No. of Questions: 22

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

CE3CO30 Transportation Engineering -II

Programme	:	B.Tech.	**Branch/Specialisation**	:	CE
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. Which of the following is not a classification pattern of roads? **1 1 1**

- ○ National Highways
- ○ Expressways
- ○ District Roads
- ◉ Canal Roads

Q2. What is the primary purpose of extra widening at curves? **1 4 2**

- ○ Reduce vehicle speed
- ◉ Improve vehicle manoeuvrability
- ○ Increase road aesthetics
- ○ Reduce pavement cost

Q3. The PIEV theory is used in- **1 2 2**

- ○ Pavement Design
- ◉ Traffic Studies
- ○ Highway Maintenance
- ○ Material Testing

Q4. The critical load position in rigid pavements is determined based on- **1 4 1**

- ○ Traffic flow
- ○ Climate conditions
- ◉ Equivalent single wheel load
- ○ Type of pavement material

Q5. The primary objective of Marshall Mix design is- **1 4 2**

- ○ Determine aggregate shape
- ◉ Calculate optimum bitumen content
- ○ Optimize the mix
- ○ Measure pavement thickness

Q6. The function of dowel bars in rigid pavements is- **1 4 2**

- ◉ Transfer load across joints
- ○ Reduce pavement cost
- ○ Improve traffic capacity
- ○ Absorb water

Q7. Pavement overlays are designed primarily to- **1 4 2**

- ○ Reduce pavement temperature
- ○ Improve road capacity
- ◉ Strengthen existing pavement
- ○ Change road alignment

Q8. Flash and fire point tests are used for- **1 3 2**

- ◉ Safety/Hazardous Precautions while working
- ○ Aggregate strength
- ○ Pavement load capacity
- ○ Water absorption

Q9. The main cause of pavement fatigue failure is- **1 2 2**

- ◉ Repeated load applications
- ○ Climate change
- ○ Incorrect geometric design
- ○ Insufficient drainage system

Q10. The main purpose of road drainage is- **1 3 2**

- ○ Reduce maintenance costs
- ○ Increase road lifespan
- ○ Prevent water accumulation
- ◉ All of the above

Section 2 (Answer all question(s))

Marks CO BL

Q11. Explain the importance of sight distance in highway geometric design. **2 4 2**

Rubric	Marks
for correct answer	2

Q12. (a) What do we understand by superelevation? Derive the expression for same with a neat diagram. **8 3 3**

Rubric	Marks
3 marks for correct explanation.	3
5 marks for derivation and diagram.	5

(OR)

(b) Why extra widening is provided on roads? Calculate the SSD of a vehicle moving with a design speed of 50 KPH in a two lane road with reaction time of driver 2.3 seconds and coefficient of friction 0.38.

Rubric	Marks
for correct answer of extra widening give 3 marks, and for numerical 5 marks.	8

Section 3 (Answer all question(s))

Marks CO BL

Q13. What is traffic volume study? Why is it important in highway planning? **2 2 2**

Rubric	Marks
for correct answer	2

Q14. Discuss the factors affecting signalized intersection design and performance. **3 2 2**

Rubric	Marks
for correct answer	3

Q15. (a) How does traffic engineering contribute to pavement design and maintenance? Explain with case studies. **5 3 3**

Rubric	Marks
for correct answer	5

(OR)

(b) What is the purpose of O-D survey? Explain O-D survey with any four methods in detail.

Rubric	Marks
for correct explanation definition 1 marks, 4 types 4 marks. (1 mark each)	5

Section 4 (Answer all question(s))

Marks CO BL

Q16. Discuss the influence of traffic loads on the design of flexible pavements. **3 4 2**

Rubric	Marks
for correct explanation	3

Q17. (a) Explain the significance of pavement material properties in flexible pavement performance. **7 2 3**

Rubric	Marks
for correct answer	7

(OR)

(b) Explain in detail the procedure of the test with neat diagrams for calculating the optimum bitumen content.

Rubric	Marks
for correct answer of procedure give 3 marks, graphs 2 marks and fomulas 2 marks	7

Section 5 (Answer all question(s))

Marks CO BL

Q18. Explain the role of expansion and contraction joints in rigid pavements. **4 4 3**

Rubric	Marks
for correct answer	4

Q19. (a) Determine the wheel load stresses at interior, edge and corner regions for Wheel load, P = 5100 kg, Modulus of elasticity of cement concrete, E = 3.0 x 105 kg/cm^2, Pavement thickness, h = 18 cm Poisson's ratio of concrete, μ = 0.15, Modulus of subgrade reaction, K = 6.0 kg/cm^3 and Radius of contact area, a = 15 cm. **6 2 3**

Rubric	Marks
for correct answer 2 marks for each stresses	6

(OR)

(b) Explain how climate and environmental factors influence rigid pavement design and durability.

Rubric	Marks
3 factors each of 2 marks	6

Section 6 (Answer any 2 question(s))

Marks CO BL

Q20. Discuss different types of pavement maintenance strategies. **5 2 2**

Rubric	Marks
5 maintenance strategies 1 mark each	5

Q21. Explain any five types of flexible pavement failures with diagrams. **5 2 3**

Rubric	Marks
5 failure with digrams, each of mark 1	5

Q22. Explain surface and subsurface drainage systems with diagrams in detail. **5 3 1**

Rubric	Marks
2.5 marks each drainage system.	5

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