



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Automobile Engineering

Semester End Examination; February - 2022

Vehicle Body Engineering and Safety

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

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|------|---|----|
| 1 a. | Mention the different types of passenger's cars. Explain few with neat sketch. | 10 |
| | b. With suitable sketch, describe the layout of bus and coach bodies. | 10 |
| 2 a. | With suitable diagram, explain the passengers seating dimensions for city, intercity and tourist vehicle. | 9 |
| | b. With suitable diagram, describe concept of visibility of a driver for both front and rear. | 11 |

UNIT - II

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|------|---|----|
| 3 a. | What are different types of materials used for vehicle body construction and explain briefly. | 10 |
| | b. Explain body trimming and mechanism. | 6 |
| | c. Mention the different types of glasses used in automobiles. | 4 |
| 4 a. | With block diagram, explain the sequence of painting process and procedure. | 10 |
| | b. Explain corrosion prevention and materials. | 4 |
| | c. Describe the importance of GRP and FRP materials. | 6 |

UNIT - III

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|------|---|----|
| 5 a. | With suitable diagram, explain the aerodynamic forces and moments are acting on a vehicle body. | 12 |
| | b. Discuss the optimization techniques to minimize the drag. | 8 |
| 6 a. | With suitable diagram, explain the aerodynamic coefficients of various vehicles shapes. | 10 |
| | b. With suitable diagram, explain the location of air intakes and outlets. | 6 |
| | c. With suitable diagram, explain stream lines around a car body. | 4 |

UNIT - IV

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|------|--|----|
| 7 a. | With neat sketch, explain the design of the vehicle body for safety. | 10 |
| | b. Explain the concept of crumple zone and safety sandwich construction. | 10 |
| 8. | Explain the following: | |
| | a) Engine location | |
| | b) Collapsible steering column | 20 |
| | c) Air bags | |
| | d) Principle of wind tunnel technology | |

UNIT - V

- 9 a. With suitable diagram, describe load distribution, shear force and bending moment diagram for a passenger bus. 15
- b. Explain how stress is induced in open and closed structures of a vehicle body? 5
- 10 a. Explain the following with neat sketch:
- i) Symmetric vertical loads 10
 - ii) Longitudinal loading
- b. Explain the term vehicle crash worthiness. 4
- c. Explain active and passive safety. 6

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