



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; - Dec. - 2019

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. | Discuss in detail the special features of different types of car bodies. Explain them briefly. | 10 |
| | b. Sketch and explain the concept of visibility of a driver for both front and rear. | 10 |
| 2 a. | Explain the different seating layouts of buses with neat sketches. | 10 |
| | b. List the different methods of construction of vehicle body and explain them briefly. | 10 |

UNIT - II

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|------|--|----|
| 3 a. | Mention the different types of plastics used in vehicle body construction? Explain their functions, specifications and properties. | 10 |
| | b. Explain briefly the body trims items and body mechanisms. | 10 |
| 4 a. | With a neat block diagram, explain the process and selection of painting. | 10 |
| | b. Write short notes on GRP Fiber in passenger body construction. List out the Merits. | 10 |

UNIT - III

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|------|---|----|
| 5 a. | What are the Aerodynamic force and moments acting on a Vehicle body? Explain them with suitable sketch. | 10 |
| | b. Discuss the optimization techniques to minimize the drag. | 10 |
| 6 a. | With a neat sketch, explain the wind tunnel test to determine the coefficient of drag for a vehicle. | 10 |
| | b. Illustrate with example, flow Visualization techniques. | 10 |

UNIT - IV

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|------|---|----|
| 7 a. | Explain the complete design considerations for driver's seat of a car, with a neat sketch. | 10 |
| | b. Write short notes on : | |
| | i) Crumble Zone | 10 |
| | ii) Sandwich panel construction | |
| 8 a. | Explain briefly the working of collapsible steering column with a neat sketch. | 10 |
| | b. List the safety precautions considered for driver and passenger. Explain with suitable diagrams. | 10 |

UNIT - V

- 9 a. Discuss the following loading cases for vehicle body design :
- | | | |
|---------------------------|------------------------|----|
| i) Symmetric loading | ii) Asymmetric loading | 16 |
| iii) Longitudinal loading | iv) Static loading | |
- b. Explain how stress is induced in open and closed structures of a vehicle body? 4
- 10 a. Explain the term vehicle crash worthiness. Discuss the crash worthiness requirements with respect to frontol, side and rear impact. 10
- b. What is sled and scale barrier impact? Explain about active and passive safety. 10

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