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Question Paper Code : 90791

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Fifth/Sixth/Seventh/Eighth Semester

Mechanical Engineering

CME 380 — AUTOMOBILE ENGINEERING

(Common to : Mechanical and Automation Engineering/Mechatronics
Engineering/Robotics and Automation)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the various types of automobiles.
2. Indicate the function of variable valve timing.
3. How a rotary type injection system is different from a common rail injection system?
4. What are emission norms? What is its significance?
5. How an automatic transmission system is different from manual system?
6. Differentiate between Hotchkiss drive and torque tube drive.
7. List the types of front axles. How they are different?
8. What do you understand by traction control? Indicate the advantage of traction control.
9. Distinguish between natural gas and LPG.
10. Indicate the difference between an electric vehicle and a hybrid vehicle.

PART B — (5 × 13 = 65 marks)

11. (a) Draw the layout of an automobile with an electric motor and indicate the function of various components.

Or

- (b) (i) Discuss the various resistances encountered by an automobile. Indicate the effect of these resistances on the vehicle performance. (7)
(ii) Mention the function of any 6 components of the engine. (6)

12. (a) With a neat sketch explain the principle of operation of a unit injection system. Indicate the salient features of the system including the effect on fuel economy and emission reduction.

Or

- (b) Draw the layout of an electronic ignition system and mention the function of its components.

13. (a) (i) Discuss the construction and principle of operation of a single plate clutch with a neat sketch. (6)
(ii) With a neat sketch discuss the principle of operation of a torque converter. (7)

Or

- (b) Draw a neat sketch of a differential and explain its principle of operation.

14. (a) (i) Define camber, caster, toe-in and toe-out. (4)
(ii) Describe the principle of operation of a power steering system with a neat sketch. (9)

Or

- (b) (i) Discuss the principle of operation of hydraulic braking system with a neat sketch. (8)
(ii) What do you understand by electronic force distribution? Briefly discuss the working of the system. (5)

15. (a) (i) What is gasohol? Which engine is more suitable for using gasohol? Explain the salient features of using gasohol in engines. (8)
(ii) Discuss the modifications to be made in SI engine for using liquefied petroleum gas. (5)

Or

- (b) (i) Explain the principle of operation of a hybrid electric vehicle with a neat sketch. (7)
(ii) Discuss the principle of operation of a fuel cell with a neat sketch. (6)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Discuss the impact of electric vehicles on grid energy demand. Discuss the potential challenges in integrating a high number of electric vehicles into the power grid? (8)
- (ii) Why different countries have different emission norms? Briefly discuss. (7)

Or

- (b) (i) Explain the challenges that need to be overcome for using hydrogen in automobiles. Justify your answer. (8)
- (ii) An engine when supplied with gaseous fuel is found to produce lower power. Explain why it produces lower power and how the power can be boosted? (7)
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