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Question Paper Code : 50771

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fifth/Sixth Semester

Mechanical Engineering

CME 380 — AUTOMOBILE ENGINEERING

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

(Also common to Minor Degree)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the various systems supported by chassis.
2. Mention the function of compression rings and connecting rod.
3. How a unit injection system differs from a conventional injection system in a diesel engine?
4. What is a three way catalytic converter? In which engine it is used?
5. Distinguish between a single plate and multi-plate clutches. Give an application for each.
6. Indicate the function of slip and universal joints.
7. Mention the function of a steering gear. List down any two types of steering gear.
8. What do you understand by ABS? Under what conditions ABS will be effective?
9. List down the major constituents of 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 hybrid electric system 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) Explain the salient features of variable valve timing system. How does it affect the performance of the engine? (6)

12. (a) With a neat sketch explain the principle of operation of a common rail direct 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 multi plate clutch with a neat sketch. (6)
- (ii) With a neat sketch discuss the principle of operation of a planetary gear system. (7)

Or

- (b) (i) Draw a neat sketch of a differential and explain its operation. (9)
- (ii) Distinguish between Hotchkiss drive and torque tube drive. (4)

14. (a) (i) Describe the principle of operation of hydraulic power system with a neat sketch. (8)
- (ii) Explain with a neat sketch how the road shocks are absorbed by the MacPherson strut? (5)

Or

- (b) (i) Discuss the principle of operation of ABS with a neat sketch. (8)
- (ii) With a neat sketch explain a method of obtaining traction control. (5)

15. (a) (i) What is a biodiesel? Which engine is more suitable for using biodiesel? Explain the salient features of using biodiesel in engines. (8)
- (ii) Discuss the modification to be made in the engine for using ethanol. (5)

Or

- (b) (i) Explain the principle of operation of an 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) Why hydrogen is projected to be the future energy carrier in automobiles? Discuss the challenges that need to be overcome for its commercialization.

Or

- (b) An engine when supplied with gaseous fuel is found to produce lower power. Explain the ways in which the power can be boosted?