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**Question Paper Code : 40791**

**B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.**

**Fifth/Sixth Semester**

**Mechanical Engineering**

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**CME 380 – AUTOMOBILE ENGINEERING**

**(Common to : Mechanical Engineering (Sandwich)/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. Brief about monocoque construction.
2. What is the function of a camshaft?
3. State the function variable geometry turbocharger.
4. Compare the BS 4 and BS 6 emission norms.
5. Why is a wet multi-plate clutch used in motorcycles?
6. Elucidate the importance of a slip joint in the driveline.
7. Differentiate between toe in and toe out.
8. Distinguish between sprung and unsprung mass.
9. What is bioethanol produced from?
10. State the principle of a fuel cell.

**PART B — (5 × 13 = 65 marks)**

11. (a) With a layout, describe the constructional details and power flow of a front-engine all-wheel drive vehicle.  
Or  
(b) Describe the causes and effects of a car's aerodynamic forces and moments with sketches.

12. (a) Explain a Gasoline Direct Injection system's constructional details and working principle with a sketch.

Or

- (b) With a circuit, appraise a Capacitive Discharge Ignition system's constructional details and working principle.

13. (a) With a schematic sketch, narrate the working principle of a four-speed constant mesh gearbox.

Or

- (b) With sketches, summarize the constructional details of Hotchkiss and Torque tube drives.

14. (a) With a sketch, elaborate the constructional details and working principle of a rack and pinion steering system.

Or

- (b) Explain the components and working principle of a Traction Control System with a layout.

15. (a) With a block diagram, elaborate on the working principle of a Series-Parallel Hybrid Electric Vehicle.

Or

- (b) With a layout, explain the engine modifications required to use hydrogen as a fuel in vehicles.

**PART C — (1 × 15 = 15 marks)**

16. (a) With chemical equations, review the working principle of a three-way catalytic converter.

Or

- (b) Illustrate the working principle of an Electronic brake force Distribution system with a block diagram.