

PART B — (5 × 13 = 65 marks)

11. (a) With indicative sketches, describe about the chassis layout used in front Engine Front Drive vehicles. (13)

Or

- (b) Explain about the construction and operation of a variable valve timing mechanism adopted in an IC engine. (13)

12. (a) Elaborate about the working of a Rotary Distributor type Diesel Injection system with a neat sketch. (13)

Or

- (b) (i) With the aid of a cutaway sketch, explain about the working of a three-way catalytic converter used in vehicles. (9)
(ii) Write down the various chemical reactions relevant to emission control in a three-way catalytic converter. (4)

13. (a) (i) Enumerate the need of a transmission system in an automobile (Any four points). (4)
(ii) Write short notes on any one positive displacement type clutch used in vehicles. (9)

Or

- (b) Enumerate the components used and brief about their functions in a Torque Tube drive configuration. Write a neat sketch. (13)

14. (a) With relevant sketches brief about the construction of the following steering gear boxes.
(i) Recirculating Ball type. (7)
(ii) Rack and Pinion type. (6)

Or

- (b) With a simple block diagram, analyze the working of a typical traction control system used in passenger cars. (13)

15. (a) Discuss about the challenges faced in production and storage of Hydrogen gas. (13)

Or

- (b) With aid of a simple sketch, discuss about the working of a Solid Oxide fuel cell. (13)

PART C — (1 × 15 = 15 marks)

16. (a) The aerodynamic drag coefficient of a car at the design conditions of 90 km/h is to be determined experimentally in a large wind tunnel in a full-scale test. The height and width of the car are 1.40 m and 1.65 m respectively. If the horizontal force acting on the car is measured to be 350 N, evaluate the total aerodynamic drag coefficient of the car. Take density of air as 1.2 kg/m^3 . (15)

Or

- (b) Express the technical specifications of any one electric car available in India. Describe the working principle of it and comment on the suitability to adopt EV's in India. (15)