

Duration: 3hrs

[Max Marks:80]

- N.B. : (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Illustrate your answer with neat sketches wherever necessary.

- Q.1** Attempt **any four** from following five questions
- a Differentiate between 2WD and 4WD [05]
 - b Describe with neat sketch Front Engine Rear Wheel Drive Layout of a car. Also explain the advantages and disadvantages of both. [05]
 - c Describe the process of double declutching for shifting from lower gear to higher gear [05]
 - d Discuss the basic concepts of hybrid traction, introduction to various hybrid drive-train topologies. [05]
 - e Discuss the Fuel Energy losses incurred in conventional engine, with their tentative values in percentage. [05]
- Q. 2**
- a Describe with neat sketch the construction and working of 3 forward and 1 reverse speed synchromesh gearbox. [10]
 - b Discuss impact of Electric Vehicle on power grid and environment. [10]
- Q. 3**
- a Define different efficiencies associated with performance of conventional engine. Also state their tentative ranges. [10]
 - b Describe the construction and working of Recirculating Ball type of steering gear [10]
- Q. 4**
- a Determine brake thermal and indicated thermal efficiencies of a 4-stroke CI engine whose power developing capacity is 25 KW. The fuel consumption is 5 liters/hr. Mechanical efficiency of engine = 85%. Take specific gravity of oil = 0.85 and its CV = 42 MJ/kg. [10]
 - b Describe the construction and working of MCPerson Strut type of Suspension System [10]
- Q. 5**
- a Illustrate Plug in Hybrid Electric Vehicles with neat sketch and state its advantages over mild hybrid [10]
 - b Describe the construction and working of Master Cylinder used in hydraulic braking system [10]
- Q. 6**
- a With a neat sketch, explain the configuration of Series hybrid electric drive train. [10]
 - b Describe with neat sketch the construction and working of single plate dry friction clutch. [10]