

(3 Hours)

(Marks: 80)

N.B.

- 1) Question No. 1 is compulsory.
- 2) Solve Any Three of the remaining Five questions.
- 3) Assume suitable data if necessary and state it clearly.

Q.1 Solve any Four out of Six.

- A. Explain Conventional fuels used in I.C. Engines (5)
- B. Explain SAE rating of lubricants. (5)
- C. What are the constituents of exhaust emissions? (5)
- D. Explain Electric system components for HEV. (5)
- E. Explain the need and importance of EV & HEV. (5)
- F. Explain Energy Sources for EV & HEV. (5)

Q.2

- A. Explain the Fuel injection systems used in SI and CI engine (10)
- B. Explain Oxygen sensors, their construction and importance in ECM. (10)

Q.3

- A. Explain drive train topologies of EV & HEV. (10)
- B. I) What are the Methods of controlling emissions. (5)
II) What is the Necessity of engine cooling and the disadvantages of overcooling? (5)

Q.4

- A. What are the Power energy supply requirement for EV & HEV applications? (10)
- B. How would you calculate the torque, power, battery capacity RPM etc for EV. (10)

Q.5

- A. Explain Fuel cells, flywheels and ultra-capacitors as energy sources for EV & HEV. (10)
- B. Explain the Functions and working of the ignition coil. (10)

Q.6

- A. What are the types of lubricants and their properties? (5)
- B. Describe its harmful effect on the environment and human health. (5)
- C. Discuss different types of Motors used in EV & HEV. (5)
- D. What are the components of a charging station? (5)