

Total No. of Questions : 10]

SEAT No. :

P3542

[Total No. of Pages : 2

[4959]-1227

B.E. (Automobile) (Semester-I)

**HYBRID AND FUEL CELL VEHICLE (Elective II(a))
(2012 Pattern)**

Time : 2 1/2 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Figures to the right side indicate full marks.
- 3) Assume suitable data, if necessary.

Q1) a) What are the components of an electric vehicle? Give advantages and disadvantages of electric vehicles. [5]

b) Explain DC motor and its types with neat circuit diagrams. [5]

OR

Q2) a) Discuss the construction and working of BLDC motors with neat sketch. [5]

b) Explain the configuration and operating modes of parallel mild hybrid electric drive train. [5]

Q3) a) Define road load force and illustrate the forces acting on a vehicle. [5]

b) Give the advantages and limitations of series hybrid vehicles. [5]

OR

Q4) a) Draw typical performance characteristics of electric motors for traction and explain briefly. [5]

b) What is the mild hybrid technology? Explain the energy recuperation in mild hybrid. [5]

P.T.O.

- Q5)** a) What are the different battery parameters? Describe nickel-cadmium battery with neat sketch. [8]
b) Explain the sizing of an electric motor. [8]

OR

- Q6)** a) What are the types of batteries? Explain the construction and working of lead-acid battery. [8]
b) Describe and explain I. C. engine force-velocity characteristics and road-load characteristics. [8]

- Q7)** a) Explain construction and working of molten carbonate fuel cell with neat sketch. [8]
b) Explain fuel cell electric vehicle with neat sketch. [8]

OR

- Q8)** a) What are the characteristics of fuel cell. Explain direct methanol fuel cell with neat sketch. [8]
b) Explain supercapacitors and ultracapacitors. [8]

- Q9)** a) Explain hydraulic accumulators and pumps. [8]
b) Explain continuously variable transmission briefly. [10]

OR

- Q10)** a) Explain ultra high speed flywheel with neat sketch. [8]
b) Explain pneumatic hybrid engine system operation modes. [10]

