



B.E DEGREE EXAMINATIONS: APRIL 2015

(Regulation 2009)

Eighth Semester

AUTOMOBILE ENGINEERING

AUE129: Electric and Hybrid Vehicles

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The following are characteristic of a hybrid electric vehicle (HEV), except
 - a) High voltages (safety issue)
 - b) Lower fuel economy
 - c) Lower amount of carbon dioxide released to the atmosphere
 - d) Quiet
2. Electric motors are better than an internal combustion engine to propel a vehicle because
 - a) They produce high torque at low speeds
 - b) They do not burn fuel and therefore do not release carbon dioxide into the environment
 - c) They are quiet
 - d) All of the above are correct
3. What type of vehicle is GM EV1?
 - a) Totally electric powered
 - b) A first-generation hybrid electric vehicle (HEV)
 - c) A series-type HEV
 - d) A parallel-type HEV
4. Which type of hybrid uses 36 to 42 volts?
 - a) Mild hybrid
 - b) Medium hybrid
 - c) Full hybrid
 - d) Strong hybrid
5. In a D.C generator , magnetic and mechanical losses are collectively known as
 - a) Eddy current losses
 - b) Stray losses
 - c) Variable losses
 - d) Electro-magnetic losses
6. The efficiency of a D.C generator is maximum when its
 - a) Variable losses equal constant losses
 - b) Variable losses is more than constant loss
 - c) Variable losses is less than constant loss
 - d) none of the above

7. A 12 V lead acid battery consists of
 - a) Three cells in series
 - b) Three cells in parallel
 - c) Six cells in series
 - d) Six cells in parallel
8. A solar cell converts
 - a) Heat energy into electrical energy
 - b) Solar energy into electrical energy
 - c) Heat energy into light energy
 - d) Solar energy into light energy
9. Developing solar energy is important because it:
 - a) Does not produce pollution
 - b) Can be utilized in most regions of the India
 - c) Reduces our dependency on imported energy
 - d) All of the above
10. Improving the efficiency of a PV cell can be done by:
 - a) Adjusting the light facing angles all day
 - b) Placing colored acetates on the cell
 - c) Heating the cell
 - d) Changing its direction to north

PART B (10 x 2 = 20 Marks)

11. What are the main components of electric vehicles?
12. Define maximum tractive effort.
13. Mention the classification of hybrid vehicles.
14. What is meant by Hybrid vehicle?
15. What is meant by regenerative braking?
16. What are the ways of speed control in dc motors?
17. What is battery life cycle?
18. What is an ultra capacitor?
19. What is the difference between a fuel cell and a battery?
20. Mention any four types of fuel cell.

PART C (5 x 14 = 70 Marks)

21. a) With a layout diagram, explain the working features of electric vehicle.

(OR)

- b) (i) What are the advantages and limitation of an electric vehicle (4)
- (ii) Describe briefly electronic control systems used in electric vehicle (10)

22. a) Explain the working of Hybrid vehicle with a neat sketch

(OR)

b) With block diagram explain the concept of series and parallel hybrid trains

23. a) With a neat sketch, explain the working of a D.C generator.

(OR)

b) Explain the method of regenerative braking employed in DC Motors.

24. a) Describe the working principle of a lead acid battery with the help of neat sketch.

(OR)

b) With a neat sketch, explain the working of a lithium based batteries.

25. a) Explain the principle of operation of fuel cell with neat sketch and give their advantages and disadvantages.

(OR)

b) With a neat sketch, explain the working of different types of photo voltaic cell.
