



(d) the capacitance increases.

- 1-d. The conventional master cylinder and booster assembly is being replaced by. 1  
(CO4)
- (a) Actuator Control Unit (ACU)
  - (b) Hydraulic Electronic Control Unit (HECU)
  - (c) Electronic Stability Program (ESP)
  - (d) none of the above
- 1-e. Maximum demand charges are given in (CO5) 1
- (a) kWh
  - (b) kVA
  - (c) kVAr
  - (d) All of these

**2. Attempt all parts:-**

- 2.a. Define the term King pin inclination. (CO1) 2
- 2.b. What is a commutator? (CO2) 2
- 2.c. Write short note on Lithium-Ion battery. (CO3) 2
- 2.d. Define Constant Power Speed Ratio (CPSR). (CO4) 2
- 2.e. What is state of health in battery? (CO5) 2

**SECTION B**

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**3. Answer any five of the following:-**

- 3-a. What is idle start/stop? (CO1) 4
- 3-b. What is recuperation? (CO1) 4
- 3-c. What are the factors affecting energy consumption? (CO2) 4
- 3-d. Name the advanced methods of speed control of traction motors. (CO2) 4
- 3-e. Discuss the performance of super capacitor in electric vehicle. (CO3) 4
- 3-f. Explain CAN and LIN. (CO4) 4
- 3.g. Explain the meaning of Fuel and Energy substitution with examples. (CO5) 4

**SECTION C**

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**4. Answer any one of the following:-**

- 4-a. Describe working of torque converter. (CO1) 7
- 4-b. What is Turbocharger? Explain in detail. (CO1) 7

**5. Answer any one of the following:-**

- 5-a. Explain the operation of permanent magnet motors in detail? (CO2) 7
- 5-b. Explain the working principle of 3 phase motor. With what material the rotor of 3 phase motor is made? (CO2) 7

**6. Answer any one of the following:-**

- 6-a. Explain in detail the operational principle of Flywheel. (CO3) 7
- 6-b. Discuss about the technologies used in ultra capacitors. (CO3) 7

**7. Answer any one of the following:-**

- 7-a. In the supporting subsystems explain the steering system. (CO4) 7
- 7-b. In the supporting subsystems explain the braking system. (CO4) 7

**8. Answer any one of the following:-**

- 8-a. Explain the common battery types, their basic components with advantages and disadvantages. (CO5) 7
- 8-b. Write a short note on: Hydrogen Cell. (CO5) 7

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