



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Seventh Semester

ELECTRONICS & INSTRUMENTATION ENGINEERING

U18EIE0021 : Hybrid and Electric Vehicles

COURSE OUTCOMES

- CO1:** Identify the basic components of hybrid and electric vehicles.
CO2: Assess the characteristics and performance of the electric vehicle and select suitable electric propulsion and control systems for HEV
CO3: Choose proper energy storage systems for vehicle applications
CO4: Describe the operation of fuel cell and solar cell vehicles

Time: Three Hours

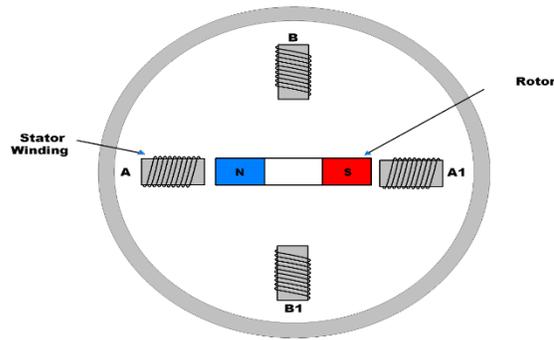
Maximum Marks: 100

Answer all the Questions: -
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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|---|-----|-------------------|
| 1. Differentiate between squirrel cage and slip ring induction motor with the aid of a schematic. | CO1 | [K ₂] |
| 2. What is the social importance of electric mobility | CO1 | [K ₂] |
| 3. Define speed and torque control of induction motor. | CO2 | [K ₂] |
| 4. List the merits and challenges in Ultra capacitors | CO2 | [K ₁] |
| 5. What are the different modes of charging batteries? | CO3 | [K ₁] |
| 6. Classify power flow control in electric drive train for HEV. | CO3 | [K ₁] |
| 7. What is vehicle simulation? | CO3 | [K ₂] |
| 8. Define Acceleration & Gradeability of HEV. | CO3 | [K ₂] |
| 9. List the factors affecting electrochemical energy conversion | CO4 | [K ₂] |
| 10. Define Solar cell tracking efficiency | CO4 | [K ₂] |

Answer any FIVE Questions: -
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

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| 11. Identify the motor used in the EV & HEV for driving the vehicle. Describe its limitations over its counterpart. | 16 | CO1 | [K ₃] |
|---|----|-----|-------------------|



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|-----|----|--|----|-----|-------------------|
| 12. | a) | Explain the types of batteries used in EV and HEV. | 8 | CO3 | [K ₂] |
| | b) | Describe the concept of charging and discharging of lithium-based batteries. | 8 | CO3 | [K ₂] |
| 13. | | With a neat sketch, explain the configuration of Series hybrid electric drive train. | 16 | CO2 | [K ₃] |
| 14. | | Compare the basic concept of hybrid architecture and electric architecture with its merits and de-merits. | 16 | CO2 | [K ₂] |
| 15. | | Classify and explain the different type of solar cell and compare with its efficiency and cost effect. | 16 | CO4 | [K ₂] |
| 16. | | Identify the tractive efforts used in the EV & HEV. Describe its limitations over its vehicle performance in large gear. | 16 | CO3 | [K ₃] |

