

Register No.: ..... Name: .....

## SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2024**

**MECHANICAL ENGINEERING**

**(2020 SCHEME)**

**Course Code : 20MET451**

**Course Name: Hybrid and Electric Vehicles**

**Max. Marks : 100**

**Duration: 3 Hours**

### PART A

*(Answer all questions. Each question carries 3 marks)*

1. Prepare short note on H.E.V.
2. List the resistive forces acting on a car.
3. How does BLDC motor work?
4. What is Neodymium?
5. Explain about MOSFET?
6. Why are inverters used in an EV?
7. List the different types of EV charging methods.
8. Illustrate a Li-ion battery.
9. What are OBDs in passenger cars?
10. What is vehicle management system in automobiles?

### PART B

*(Answer one full question from each module, each question carries 14 marks)*

#### MODULE I

11. Explain the supporting subsystems in an electric/hybrid vehicle? (14)

**OR**

12. Explain the classification of hybrid electric vehicles. (14)

#### MODULE II

13. Draw and explain the ideal traction power plant and power source parameters used in electric and hybrid vehicles. (14)

**OR**

14. Explain the working of different types of motors used in EV and HEV. (14)

#### MODULE III

15. How is the selection of gears done for an EV? (14)

**OR**

16. a) Classify the electric drives used for EV. (7)  
b) List out the drive (Motors) features for EV. (7)

**MODULE IV**

17. What are the factors affecting the performance of EV batteries? (14)

**OR**

18. How is a battery pack for an EV made? Explain the battery performance parameters. (14)

**MODULE V**

19. Explain different types of EV chassis configurations used in present vehicles. (14)

**OR**

20. What are the six different levels of EV validation? (14)

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