

School of Engineering

**B.TECH Mechanical Engineering in E-Vehicles and Autonomous Vehicles
Semester End Examination - Jun 2024**

**Duration : 180 Minutes
Max Marks : 100**

Sem VI - G3UC604C - EV-HEV Power Train

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) What is the main difference between hybrid and electric vehicle? K1(2)
- 2) What is an extended-range electric vehicle? K2(4)
- 3) Illustrate battery management system and battery thermal management system with a block diagram. K2(6)
- 4) Explain AC and DC motors used in Evs. K3(9)
- 5) Determine the power at the wheels to overcome aerodynamic drag if the vehicle runs at 120 km/h with a coefficient of drag being 0.16 and frontal area 2.2 m². Assume air density to be 1.23 kgm³. If the above vehicle has an overall efficiency of 80%, calculate the mass of the battery required if it has specific energy of 500 kW/kg. K3(9)
- 6) Elaborate the sources of heat generation in battery of an EV? K5(10)
- 7) Explain the importance of the study of the crash behavior of a car. Name some of the suitable materials for EVs with crash resistance. K4(12)
- 8) Explain the working principle of lead acid battery with suitable chemical reactions and its block diagram. K5(15)
- 9) Elaborate the functions of a battery management system. K5(15)
- 10) Explain with a neat diagram the charging and discharging mechanism of a lead acid battery. K6(18)