MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

DEPARTMENT OF MECHATRONICS

VI SEMESTER B.TECH. (MECHATRONICS)
END SEMESTER EXAMINATION

SUBJECT: Power Sources for Electric Vehicles Subject Code: MTE 4084

Date: 08-05-2023

Time: 3 Hrs **Exam Time 2:30PM – 5:30PM** **MAX. MARKS: 50**

Answer All Questions

Q. No		M	CO	PO	LO	BL
1A.	Identify battery technologies for the applications listed below with necessary comments. a) Bus UPS systems. b) Smart Phones c) Environment friendly & high energy for Electric Vehicles. d) Rechargeable AA Battery based toys.	**4**	**1**	**1**	**1**	**3**
1B.	Recognize the key aspects of sodium-ion battery technology for electric vehicles in comparison with their counterparts.	**3**	**1**	**1**	**1**	**3**
1C.	Select suitable battery technology used in "ICE Engine Vehicles" with its typical chemistry principle and charging system block diagram.	**3**	**1**	**1**	**1**	**3**
2A.	Examine the attainment of sustainable development goals (SDG) considering case of smart phone electronic technology.	**4**	**2**	**2**	**7**	**4**
2B.	List out the key parameters for battery technology and their significance in Electric Vehicles applications.	**3**	**1**	**1**	**1**	**3**
2C.	Justify the statement "Li-Ion requires more complex Battery Management System (BMS) in comparison to Lead Acid".	**3**	**2**	**2**	**2**	**4**
3A.	Elaborate on the charging standards and role of Electric Vehicle Supply units in India.	**5**	**2**	**2**	**2**	**4**
3B.	Compare the Neural Network based SoC estimation with Book Keeping technique.	**3**	**2**	**2**	**2**	**4**
3C.	Make use of circuit diagram useful for hybrid sourcing with battery and supercapacitor including isolation.	**2**	**2**	**2**	**2**	**4**
4A.	Distinguish the supercapacitor with the flywheel technology.	**4**	**3**	**2**	**2**	**4**
4B.	Justify the statement "On-board Solar Photovoltaics are insufficient for Electric Vehicles".	**3**	**3**	**1**	**2**	**4**
4C.	Inspect the need for hybrid sourcing in electric vehicle technology with suitable converter topology.	**3**	**3**	**2**	**2**	**4**
5A.	Identify the color codes for hydrogen production with their key aspects.	**4**	**4**	**2**	**1**	**3**
5B.	Make use of block diagram to depict the usage of solar energy in Hydrogen production.	**3**	**4**	**2**	**1**	**3**

5C.	Make use of characteristics to depict the necessity of interleaved power factor correction boost topology for power processing the fuel cell in electric vehicles.	**3**	**4**	**2**	**1**	**3**