PAPER ID-310746

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VII) THEORY EXAMINATION 2023-24
HYBRID VEHICLE PROPULSION

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

Q no.	Question	Marks	CO
a.	Define the term Hybrid Vehicle.	2	1
b.	Explain the term electric traction	2	1
c.	Describe the advantages of parallel hybrid system	2	2
d.	List the different subsystems of Electric Drive train	2	2
e.	Explain the method to control speed and torque of D.C. Motor	2	3
f.	Explain the principle of operation of DC motor used in EV.	2	3
g.	Discuss the requirements of batteries used in Electric Vehicle.	2	4
h.	Describe the advantages and disadvantages of Li-ion Battery	2	4
i.	Describe the efficiency map of I.C. Engine.	2	5
j.	Discuss in brief basic principle of rule-based strategies.	2	5

SECTION B

2. Attempt any *three* of the following:

a.	Describe the layout of electric vehicle with the help of neat sketch. Also discuss its different components	10	1
b.	Explain the series hybrid topology along with its application	10	2
c.	Discuss in brief chopper control of DC motor	10	3
d.	Describe the working of lead-acid battery along with its advantages and disadvantages.	10	4
e.	Explain the different implementation issues of energy management strategies.	10	5

SECTION C

3. Attempt any *one* part of the following:

a.	Describe the social and environmental impact of hybrid and electric vehicle	10	1
b.	Explain in detail the vehicle performance parameters.	10	1

4. Attempt any *one* part of the following:

a.	Describe the power flow control in series hybrid with the help of neat sketches.	10	2
b.	Discuss the various electric drive train topologies in detail	10	2

5. Attempt any *one* part of the following:

a.	Explain the operation of permanent magnet BLDC motors.	10	3
b.	Describe the construction of induction motor with help of neat sketch	10	3

6. Attempt any *one* part of the following:

a.	Describe the principle of super capacitors-based energy storage system in hybrid electric vehicles.	10	4
b.	Explain about fly wheel technologies as an energy storage device in electric vehicles	10	4

7. Attempt any *one* part of the following:

a.	Discuss in brief rule based (RB) methods used in hybrid and electric vehicles	10	5
b.	Describe about optimal control problem & problem formulation in hybrid and electric vehicles	10	5