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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Automobile Engineering

Semester End Examination; - Dec. - 2019

Hybrid Vehicles

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a.	Explain in detail various forces and resistance acting on a vehicle.		8
b.	Briefly discuss the predication of fuel economy based on emission and BSFC.		7
c.	Explain in brief grid connected hybrids and mention their advantages and disadvantages.		5
2 a.	Explain the configuration of series hybrid electric drive train with a neat block diagram.		8
b.	What are the operating modes and control strategy of parallel mild hybrid electric drive train? Explain with a neat sketch.		7
c.	Explain Continuously Variable Transmission (CVT).		5

UNIT - II

3 a.	With neat sketches, explain the construction and operating characteristics of a, i) Series DC motor ii) Shunt motor		10
b.	Explain the principle, construction and working of brushless DC motor.		10
4 a.	Sketch and explain AC induction type motor. List advantages and disadvantages also mention their applications.		10
b.	Explain the working of a switched reluctance motor drive system and configuration with a neat sketch.		10

UNIT - III

5 a.	Explain Launching and Boosting.		6
b.	With suitable graph, explain the series and parallel RBS (Regenerative Braking System).		8
c.	Explain with example engine downsizing.		6
6 a.	Explain Hybrid electric drive matching with IC engine and mention its importance.		7
b.	With the help of schematic diagram, explain the hybrid population system in multi converter architecture.		7
c.	Explain the significance of sizing of power electronics.		6

UNIT - IV

7 a.	Explain the construction and working of lead acid with a neat sketch.		12
b.	Define the following: i) Battery capacity ii) Specific energy of battery iii) Depth of discharge iv) Ragone plots		8

Contd…2

8 a. With neat diagram, explain NiMH battery fits into the operation of hybrid vehicle. 10

b. Explain Lithium-Ion battery used in hybrid vehicle with neat sketches. 10

UNIT - V

9 a. List the various types of fuel cell. Explain a hydrogen-air fuel cell system and its characteristics. 10

b. Explain with a neat sketch Proton Exchange Membrane fuel cell (PEM) and mention its merits. 10

10 a. What are the methods are there for strorage of Hydrogen? Explain. 10

b. Explain hydrogen reform and explain any two types of reforms. 10

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