



R18 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 2E7BB

B.Tech VII Semester Supplementary Examinations, July 2022

HYBRID ELECTRICAL VEHICLES (ELECTRICAL AND ELECTRONICS ENGINEERING)

Maximum Marks: 70

Date:04.07.2022 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What are the different types of transmission characteristics used in Conventional Vehicles?
- 2 Define Grading and Rolling Resistance.
- 3 List the types of components used in a hybrid Vehicle.
- 4 Differentiate Electric and Hybrid Vehicles.
- 5 How does electric traction motor work in electric train?
- 6 Define the reluctance motor drive system efficiency.
- 7 State some requirements of energy storage system in hybrid and electric vehicles.
- 8 What are the types of electrochemical batteries used for energy Storage?
- 9 Give the significance of energy management strategy.
- 10 Why an energy management control system is required in an HEV?

Part-B

Answer All the following questions.

(10MX 5=50Marks)

- 11 Derive the dynamic equations of Vehicle Movements. (10)
- OR
- 12 Illustrate the types of mathematical models used for vehicle performance. (10)
 - 13 State and explain the power flow control modes in hybrid drive-train topologies. (10)
- OR
- 14 a. Discuss various impacts of modern drive-trains on energy supplies. (5)
b. What are the roles of HEV over air pollution? (5)
 - 15 Explain the configuration and control of Induction Motor drives with field weakening mode and constant torque mode. (10)

OR

- 16 Discuss on different types of concepts used in electric traction. Elaborate any one of them. (10)
- 17 What is meant by super capacitor? Analyze the super capacitor based energy storage system with example. (10)

OR

- 18 a) How the sizing of propulsion motor drive has been calculated? (5)
b) How the matching of electric machine and the Internal Combustion Engine (ICE) has been implemented? (5)
- 19 State and explain the types of energy management strategies used in hybrid and electric vehicles with example. (10)

OR

- 20 Design a Hybrid Electric Vehicle (HEV) of your own and discuss the strategies of your vehicle considering any of the energy management techniques. (10)
