

**Code No: 157BK****AWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year I Semester Examinations, February/March - 2022****ELECTRICAL AND HYBRID VEHICLES****(Electrical and Electronics Engineering)****Time: 3 Hours****Max. Marks: 75**

**Answer any five questions**  
**All questions carry equal marks**

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- 1.a) Explain the occurrence of the Global Warming due to Conventional Vehicles.
- b) State and explain the dynamic equation of vehicle motion. [8+7]
- 2.a) Explain the Drawbacks of Conventional Vehicles.
- b) Explain about the Vehicle power Source Characterization. [7+8]
- 3.a) Explain the Parallel Configurations of Electric Drive Train with Neat Diagram?
- b) Enlist the different architectures of hybrid electric drive train and explain the series hybrid electric drive train. [7+8]
- 4.a) What are the Environmental impacts of Hybrid Electric Vehicles?
- b) Explain the configuration of Power Flow Control in Complex Hybrid Control with Neat Diagrams. [7+8]
- 5.a) Explain the Series - Parallel Configurations of Electric Drive train with Neat Diagram.
- b) With neat sketch describe the operation of switch mode step-down dc voltage regulator. Draw the following waveforms of step-down switch mode DC voltage regulator: (i) current supplied by battery (ii) circulating current through diode and (iii) load current. [7+8]
- 6.a) A typical "Lynch" type 10 kW DC motor used in go-kart have motor speed = 70 rpm/V and armature resistance  $R_a = 0.010\Omega$ . If this motor is connected to a 48V battery supply and maximum allowable current for 5 sec during starting is 400A, calculate the maximum torque and maximum power.
- b) Explain the controlling methods of PMSM device. [8+7]
- 7.a) Explain the Techniques to Enhance of Hybrid Performance in Energy Storage based System.
- b) Explain the Sizing System of Electrical machines in Hybrid Electric Vehicles. [8+7]
- 8.a) Classify and explain the basic principle of Rule based energy management system. Elaborate on any one of the Rule based energy management system.
- b) Explain about design of a Battery Electric Vehicle (BEV). [8+7]

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