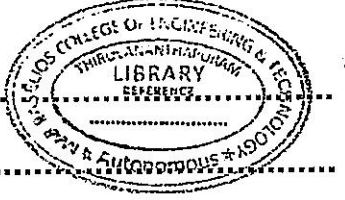


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N – 5745

Reg. No

Name :



Eighth Semester B.Tech. Degree Examination, April 2022

13.801 – ELECTRICAL DRIVES AND CONTROL (T)

(2013 Scheme)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer all questions, each question carries 2 marks)

1. Explain how voltage is developed in shunt connected DC generator.
2. Explain the speed torque characteristics of DC series motor.
3. Explain the construction of single phase induction motor.
4. List the important specification of MOSFETS.
5. Explain how a power IGBT can be protected against $\frac{dv}{dt}$.
6. Explain the principle of operation of two quadrant chopper.
7. Derive an expression for average output voltage for single-phase half-wave controlled rectifier.

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8. What are the advantages of using freewheeling diode in fully-controlled rectifier?
9. Draw the circuit diagram of half-bridge inverter and explain its principle of operation.
10. What are the differences between single pulse width modulation and Multipulse pulse modulation?

(10 × 2 = 20 Marks)

PART – B

Module – I

Answer **one** full question from each module, each module carries **20** marks.

11. (a) Describe in details the applications of different types of DC motors with reasons and justifications. **10**
- (b) A long shunt compound generator delivers a load current of 10 A at 230 V, and the resistances of armature, series and shunt fields are 0.02 Ω, 0.01 Ω and 250 Ω respectively. Calculate the generated emf and armature current. Allow 1.0V per brush for contact drop. **10**

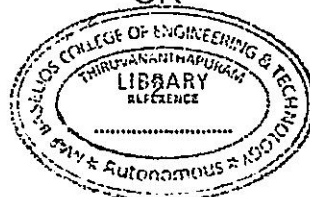
OR

12. (a) Explain the principle of operation of single phase induction motor. List the types of single phase induction motor with neat circuit diagram. **10**
- (b) Explain the types and construction features of three phase induction motor. **10**

Module – II

13. (a) Draw and discuss switching characteristics of an IGBT. **10**
- (b) Explain the design procedure of a gate drive circuit for power BJT. **10**

OR



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14. (a) Explain the principle of operation of step up chopper. Derive the expressions of output voltages. **10**
- (b) Explain the principle of operation of buck-boost chopper. Derive the expressions of output voltages. **10**

Module – III

15. Derive the expressions of output average voltages and rms output voltages for a fully controlled bridge converter connected with RL load. **20**

OR

16. In a single phase half-controlled rectifier connected to RL load having continuous load current with source voltage $V_s = 230$ V, $R = 10 \Omega$ and average output voltage is 110 V by, find its (i) delay angle (ii) average and rms output currents. **20**

Module – IV

17. (a) Explain V/f control of three phase induction motor drive with necessary equations and performance characteristics. **10**
- (b) Explain the advantages and applications of V/f controlled induction motor drives. **10**

OR

18. (a) Explain with neat sketch the operation of online and offline UPS. **10**
- (b) With necessary waveforms explain the working of single phase full bridge inverter. **10**

(4 × 20 = 80 Marks)

