T1824 / T1023 INDUSTRIAL ELECTRONICS

Q.P. Code:18099

(3 Hours) [Total Marks: 80]

N.B: (1) Question no.**1** is **compulsory**
(2)Solve any **three** from remaining questions
(3)Assume **suitable** data if **necessary**
(4)**Figures** to the right indicate full marks

1. Solve any 4: 20
   (a) List the characteristics of an ideal op-amp.
   (b) Illustrate the VI characteristics of SCR and DIAC.
   (c) State and prove De Morgan's theorems.
   (d) What is linear actuator motor? Enlist two applications.
   (e) What is a rectifier? Classify single phase controlled rectifiers with their waveforms.

2. (a) Explain single phase inverter operation with neat circuit diagram and waveforms. 7
   (b) Describe in detail Op-amp as Schmitt trigger with necessary waveforms. 7
   (c) Draw and explain speed- torque characteristics of D.C shunt and series motors. Also, state the application of each. 6

3. (a) What are inverting and non-inverting amplifiers. Write their gain equations. Draw the circuit diagram for op-amp as a summer and write its output voltage equation. 7
   (b) With neat circuit diagram and waveforms, explain 180° mode of conduction for a 3 phase bridge inverter circuit. 7
   (c) Analyze torque-speed characteristics of induction motor. State various methods of speed control of induction motors. 6

4. (a) Draw and explain architecture of MSP430 microcontroller. 7
   (b) Explain with block diagram IC555 timer as astable multivibrator. 7
   (c) Compare power BJT, power MOSFET and IGBT. 6

5. (a) Classify the triggering methods of SCR. Explain any one in detail. 7
   (b) Explain multiplexer and demultiplexer in digital circuits. Enlist their applications. 7
   (c) Compare microprocessor and microcontroller. 6

6. (a) Why is MSP430 called as mixed signal processor? Explain different peripherals of MSP430. 7
   (b) Explain any one method for the speed control of D.C motors. 7
   (c) What are flip flops? Why are they needed in digital circuits? Compare the different types of flip flops. 6

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