

**Duration: 3hrs**

**[Max Marks:80]**

- N.B. : (1) Question No 1 is Compulsory.  
(2) Attempt any three questions out of the remaining five.  
(3) All questions carry equal marks.  
(4) Assume suitable data, if required and state it clearly.

- 1 Attempt **any FOUR** [20]
- a Draw characteristics of power BJT, power MOSFET & IGBT.
  - b Explain equivalent circuit of an OP-AMP.
  - c Implement basic gates using NAND gate.
  - d List the features of MSP 430.
  - e Compare AC and DC motors.
- 2 a What is GTO? Explain switching characteristics of GTO. [10]
- b Explain BLDC motor. State its advantages. [10]
- 3 a Draw and explain Astable mode of operation of IC 555. [10]
- b Explain the different peripherals of MSP430 microcontroller. [10]
- 4 a Compare CMOS logic family with TTL logic family. [10]
- b Draw and explain single phase full wave fully controlled rectifier with the help of waveforms for R load. [10]
- 5 a Explain the application of piezo-electric actuator drive. [10]
- b Draw and explain the circuit diagram and waveforms of single-phase bridge inverter with R load. [10]
- 6 a Explain instrumentation amplifier. State its advantages and disadvantages. [10]
- b Draw and explain UJT triggering method of SCR. [10]