Duration: 3 Hours   **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 and explain labeled characteristics of BJT, IGBT and SCR.

b) Describe logic level, noise and immunity for digital circuits.

c) Explain the working of single phase bridge inverter with R load.

d) Compare inverting and non-inverting amplifier with suitable examples.

e) List any five features of MSP430 microcontroller.

2   a) Explain the term commutation and explain any one method of

SCR turning on and turning off using suitable diagram.   [10]

b) Using block diagram, describe the speed control of AC three phase motor.   [10]

3   a) Describe working of an instrumentation amplifier with labeled diagram. State any

two applications.   [10]

b) Compare CMOS logic family with TTL logic family using any five points.   [10]

4   a) Explain the need of digital to analog conversion. How does ADC system work in

MSP430 microcontroller ?   [10]

b) Explain basic construction and working of BLDC motor. State four advantages of

BLDC motor over conventional motors.

5)   a) Explain the working of IC555 as timer. Enlist its two applications.   [10]

b) i) Write difference between assembly programming and C language programming.

ii) Enlist any four microcontroller applications.   [10]

6)   a) Describe speed torque characteristics of DC motor and AC motor. Explain their

selection criteria for industrial application.   [10]

b) Draw and explain UJT as triggering circuit for SCR as semiconductor switch.   [10]