(3 Hours) **[Total Marks: 80]**

N.B: (1) Question no.1 is compulsory
(2) Solve any three from remaining five 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)What is SCR and state it's application.
   (c)Realize basic gates using NAND gate.
   (d)Explain Back EMF in D.C motors.
   (e)State advantages of Digital Circuits.

2. (a)What is an inverter? Classify it according to their input supply and explain any one. 7
   (b) Derive the output voltage for full wave fully controlled rectifier and find firing angle for maximum output. 7
   (c) Compare power BJT, power MOSFET and IGBT. 6

3. (a) Explain in detail the concept of R-L-E load in converters 7
   (b) Draw and explain architecture of MSP430 microcontroller 7
   (c) Discuss Torque Speed characteristic of D.C motor? Classify types of load on the basis of Time duration. 6

4. (a) What is the necessity of inner current loop control circuit. 7
   (b) Explain IC 555 as a Monostable Multivibrator. 7
   (c) How SCR Gate Drive R-C Circuit Work. 6

5. (a) Explain any one application circuit of TRIAC-DIAC pair. Also, draw the V-I characteristics of TRIAC and DIAC. 7
   (b) Compare combinational and sequential circuits. Explain any one combinational circuit. 7
   (c) Explain minimum six distinguishing features of MSP430 Microcontroller 6

6. (a) Explain register related to configuration of digital input/output port of MSP 430 microcontroller. 7
   (b) Explain how to select a motor for water pumping application and describe with Speed Torque Characteristic? 7
   (c) What do you understand by a digital circuit? Elaborate following terms related to digital circuits:
   (i) Logic level (ii) Noise immunity (iii) Propagation delay
   (iv) Power dissipation (v) Fan out 6

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