Sem IV / Industrial Electronics / 16.06.14 MECH

QP Code : **NP-19862**

(3 Hours) [Total Marks :80

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

1. Solve any **five**:— 20
   (a) SCR is a semi-controlled device-Justify
   (b) Enlist applications of
      (i) Rectifier diode
      (ii) Zener diode
      (iii) Light emitting diode
      (iv) Photo diode
   (c) Explain use of
      (i) Multiplexer
      (ii) De-multiplexer
      (iii) Boolean algebra
      (iv) Encoder.
   (d) Discuss effect of R-L & R-L-E load on full wave rectifier operation.
   (e) Compare AC and DC motors.
   (f) Mention power consumption of MSP430 in different operating modes.
   (g) Explain applications of BLDC motor & servomotor.

2. (a) Explain any one application circuit of TRIAC-DIAC with wavefrom. 7
   (b) Draw different circuits of full wave controlled rectifier with R-load & calculate fining angle at which fully controlled full wave rectifier is to be operated to get output dc voltage of 110V from input voltage of 230V, 50 Hz. 7
   (c) Explain register related to configuration of digital input/output port of MSP 430 microcontroller. 6

3. (a) Draw circuit diagram and waveform of 3-phase bridge inverter with R-load (180^0 mode of conduction) 7
   (b) Explain frequency control scheme of 3-phase induction motor with the help of block diagram. 7
   (c) Draw the circuit diagram and write the output voltage equation of inverting amplifier and summing amplifier. 6

4. (a) Explain IC555 astable multivibrator. 7
   (b) Explain functional block diagram of MSP430 microcontroller. 7
   (c) Draw and explain block diagram of closed loop speed control of DC motor (with inner current loop) 6

5. (a) Discuss interfacing of 3V system with 5V system and heavy loads like motors. 7
(b) Write a short note on 'selection of motor & power rating for a pump'. 7
(c) Discuss accuracy, resolution and least significant bit regarding 10-bit ADC. 6

6. Compare the following:—
(a) Power transistor, SCR, MOSFET and IGBT. 7
(b) Microprocessor and microcontroller. 7
(c) TTL and CMOS technology. 6