

Mechanical/Automobile

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:—

- (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 waveform. 7
(b) Draw different circuits of full wave controlled rectifier with R-load & calculate firing 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° 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
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