Total No. of Questions : 12]

SEAT No. :

P1148

[Total No. of Pages : 3

[4659]-508

B.E. (Production Sandwich) (Semester - I)

MECHATRONICS & ROBOTICS

(2003 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates :

1) ***Answers to the Two Sections should be written in separate books.***
2) ***Answer Three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) State the situation in which the closed loop control system or open loop control system is better. Discuss with an example. **[8]**

b) Explain the following with an example: **[10]**

i) Measurement System.

ii) Display System.

iii) Sequential Controller.

iv) Comparison element of a closed system.

OR

Q2) a) State and explain the signal conditioning processes. **[6]**

b) Discuss the following with neat sketches: **[12]**

i) Instrumentation amplifier.

ii) Optoisolators.

iii) Comparators.

Q3) a) Explain the following for a Microprocessor : **[9]**

i) Accumulator

ii) Assembler

iii) Instruction Pointer

b) Explain the following : **[7]**

i) Karnaugh maps

ii) D flip-flop

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OR

Q4) a) What is Sequential Logic? Explain the Synchronous Systems. **[6]**

b) Draw a neat block diagram of Microcomputer and explain each block. **[10]**

Q5) a) Prepare an algorithm/flowchart and write a program in assembly language to determine the maximum marks obtained from a list of given marks. **[8]**

b) State and explain the commonly used instructions that may be given to a microprocessor. **[8]**

OR

Q6) a) Explain the following with neat figures: **[8]**

i) Polling and interrupts.

ii) Peripheral interface adapters.

b) Explain the requirements of Interface. **[8]**

SECTION - II

Q7) a) Explain the following, with the help of a ladder diagram: **[8]**

i) Latching.

ii) Internal Relays

b) Explain the following with neat figure: **[8]**

i) Tachogenerator.

ii) Seebeck Effect.

iii) PVDF Tactile Sensor.

iv) Capacitive transducers.

OR

Q8) a) Explain the following with respect to PLC: **[8]**

i) Timers

ii) Mnemonics

b) Explain the following terms w.r.t. Fluid Pressure Sensors: **[8]**

i) Diaphragms.

ii) Capsules.

iii) Bellows.

iv) Tube Pressure Sensors.

Q9) What are the types of drives used for robotic applications? State the particular applications of each. **[16]**

OR

Q10) Explain following with neat diagram: **[16]**

a) Accumulator.

b) Pressure Control Valve.

c) Plug shapes.

d) Vane motor.

Q11) a) What are the various controllers used in Robots? Explain. **[6]**

b) Discuss the role of Robot in following applications : **[12]**

i) Quality Inspection.

ii) Welding.

OR

Q12) Explain the following terms : **[18]**

a) Spatial Resolution.

b) Roll, pitch, yaw.

c) Compliance.