

B.Tech-Sem-VII (2007 Course) Production Engg.: SUMMER-2018

SUBJECT : MECHATRONICS & MANUFACTURING AUTOMATION

Day : Tuesday
Date : 22-05-2018

Time : 2:30 P.M. TO 5:30 P.M.
Max. Marks : 80

S-2018-2820

N. B. :

- 1) Q. No. 1 and Q. No. 5 are **COMPULSORY**. Out of remaining attempt **ANY TWO** questions from Section – I and Section – II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in the **SEPARATE** answer books.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.
- 5) Assume suitable data if necessary.

SECTION - I

- Q. 1** a) A temp sensing device which can be modeled as a first order system having a time constant of 5.9 seconds. It is suddenly subjected to step input of 160°C from 30°C . Find the temperature after 15 seconds. (05)
- b) Explain transient and steady state response of zero order system. (05)
- c) Draw the circuit diagram of an operational amplifiers. (04)
- Q. 2** a) With a pencil drawn block diagram for a mechatronic system explain in detail, the function of each component in this block diagram. (07)
- b) Write classification of sensors. Explain any one in detail. (06)
- Q. 3** a) Give an example of first order system response. Put the system response curve and explain time constant. (07)
- b) Explain the step response of a first order system. Graphically explain the features of an under damped step response. (06)
- Q. 4** a) Using a suitable diagram explain "Sampling and Aliasing". Also explain the operation of D/A converter. (07)
- b) What are the specification of ideal inverting and non inverting amplifier? (06)

SECTION - II

- Q. 5** a) Define programmable automation and difference between general purpose and special purpose machine. (05)
- b) What is micro controller? Explain PIC microcontroller. (05)
- c) What is MLT and TLT? Explain Detroit type automation. (04)

P. T. O.

Q. 6 Draw and explain typical pneumatic circuit equivalent to AND gate, for a control of single acting cylinder. **(13)**

Q. 7 a) What is meant by 'precedence matrix' and precedence diagram? Can this be used to determine the (RPW) which are necessary for an assembly line balancing. **(07)**

b) The following data refers to the line balancing problem in a dedicated production flow. **(06)**

No. of stations	Work Element E_i	Work Element time t_i (mins)
1	E1, E2, E3	6, 4, 3
2	E4, E7, E6	8, 5, 4
3	E7, E5, E9	5, 2, 7

Find out the cycle time to be selected percentage balance delay and smoothness index of the line.

Q. 8 a) Write a PLC program to achieve following objections with two push-to-on buttons (No), two lamps namely Red and Green. **(07)**

i) When two push buttons are pushed only RED lamp should be ON.

ii) When two push buttons are not pushed only GREEN lamp should be ON.

b) What is 8085 microprocessor? Explain addressing mode of 8085 microprocessors. **(06)**

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