**B.Tech. SEM -VII Production 2014 Course (CBCS) : SUMMER - 2019**

**SUBJECT : MECHATRONICS & MANUFACTURING AUTOMATION**

Day : Monday
Date : 13/05/2019

Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

S-2019-2845

**N.B.**

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is allowed.
4) Neat diagram must be drawn wherever necessary.
5) Assume suitable data if necessary.

---

**Q.1** **a)** Define the term mechatronics and describe the key elements of the mechatronic. **(05)**

**b)** Explain the working principles of biometallic strip. **(05)**

**OR**

**a)** Explain factors to be considered in selection of sensors. **(05)**

**b)** Describe the role of mechatronics in industry. **(05)**

**Q.2** **a)** Explain natural response and forced response. **(05)**

**b)** Describe the term stability of control system. **(05)**

**OR**

Write short note on:

**a)** Bode plot **(05)**

**b)** Phase linearity **(05)**

**Q.3** **a)** Describe the operation of a summing amplifier using a neat sketch. **(05)**

**b)** Explain analog to digital conversion in data acquisition. **(05)**

**OR**

**a)** Discuss principle of operation of following amplifier with circuit diagram.
**i)** Inverting amplifier **ii)** Difference amplifier **(05)**

**b)** Explain the term virtual instrumentation in data acquisition. **(05)**

**Q.4** **a)** What is automation? Write basic elements of automated system. **(05)**

**b)** Differentiate special purpose machine and general purpose machine. **(05)**

**OR**

Draw a plant layout of any automated system used in industry. **(10)**

**Q.5** **a)** Describe group technology with its use merits, demerits and applications. **(05)**

**b)** Explain automated material handling system. **(05)**

**OR**

Draw the procedure diagram and carry out line balancing using RPW method (in 5 work stations). **(10)**

| Task | Work Station | Predecessor | Task Time (Unit in sec.) |
|---|---|---|---|
| A | 1 | - | 70 |
| B | 2 | A | 80 |
| C | 3 | A | 40 |
| D | 3 | A | 20 |
| E | 4 | A | 40 |
| F | 4 | B,C | 30 |
| G | 5 | D | 50 |
| H | 6 | DEFG | 50 |
| | | **Total** | 380 |

(Take Cycle Time is 90 sec)

P.T.O.

**Q.6** **a)** Explain logic gates and control. **(05)**

**b)** Describe computer based industrial control. **(05)**

**OR**

Develop and explain ladder diagram for the following: **(10)**

A motor is put on by the START button which is NO. A pump is started after a delay of 100 seconds after starting the motor. The motor is switched off by a STOP button. When the motor is switched off there should be delay of 10 seconds before the pump is switched off.

* * *