Total No. of Questions : 10]

SEAT No. :

P3256

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T.E. (Mechanical)

MECHATRONICS

(2012 Pattern) (End Semester)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is digital optical encoder? Explain the working of incremental encoder with a neat sketch. **[6]**

b) Compare open loop control system and closed loop control system. **[4]**

OR

Q2) a) Explain the working of servo motor with suitable sketch. **[6]**

b) State the applications of mechatronics systems used in household and automotive. **[4]**

Q3) a) Define transfer function. **[2]**

b) Define the following terms :- **[8]**

i) Bit width

ii) Aliasing

iii) DAQ system

iv) Sampling theorem.

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OR

Q4) a) State the advantages and disadvantages of open loop control system. **[2]**

b) Explain analog to digital converter with suitable diagram. **[8]**

Q5) a) What are the criteria that need to be considered for selection of PLC. **[4]**

b) Draw the ladder logic program for AND, OR & NOR logic gates. **[9]**

c) Explain latch circuit with ladder program. **[3]**

OR

Q6) a) Explain the basic structure of PLC with suitable block diagram. **[8]**

b) Draw the ladder logic program for NAND and exclusive or (XOR) logic gate. **[8]**

Q7) a) Explain the building blocks of mechanical system with suitable example. **[8]**

b) Define the following terms : **[8]**

i) Rise time

ii) damping factor

iii) Overshoot

iv) Damping frequency.

OR

Q8) a) Explain the building blocks of thermal system with suitable example. **[8]**

b) Differentiate between time domain analysis & frequency domian analysis. **[8]**

Q9) a) Explain the proportimal control mode. State its characteristics. **[8]**

b) Explain the turn PID tuning and explain the steps for manual PID tuning. **[8]**

c) Define steady state error **[2]**

OR

Q10)a) Explain derivative control mode. State its charateristics. **[8]**

b) Explain PI control mode, stating its characteristics. **[8]**

c) Define delay time. **[2]**

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