Total No. of Questions : 6]

SEAT No. :

P510

[Total No. of Pages : 2

APR - 18/TE/Insem. - 109

T.E. (Mechanical)

MECHATRONICS

(2015 Pattern) (Semester - II) (302050)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***
5) ***Use of log table, calculator and steam table is permitted.***

Q1) a) A stepper motor is to be used to rotate the arm of an industrial machining robot in the steps of 90 degrees. For this, draw a diagram that depicts the construction of the stepper motor and explain the working of the said motor. **[6]**

b) Write four exclusive points of comparison between open loop control and closed loop control. **[4]**

OR

Q2) a) Draw a suitable diagram and explain the working of a 3 bit R-2R type Digital to Analog Converter. **[6]**

b) Following resistance values of a RTD were measured at a range of temperatures. Determine the measurement sensitivity of the RTD. **[4]**

Resistance in Ω	307	314	321	328
Temperature in °C	200	230	260	290

Q3) a) Reduce the block diagram shown in Figure 3a below and determine the transfer function, C/R. **[6]**

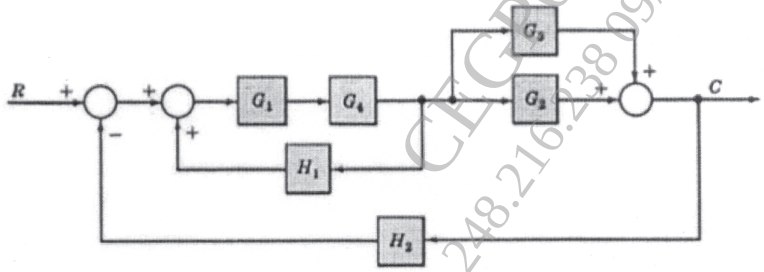

Figure 3a

P.T.O.

b) A LVDT is to be selected for measurement of position. Discuss any four criterions for selection of the said LVDT. **[4]**

OR

Q4) a) Draw a suitable block diagram and discuss the application of Mechatronics in any one of the below : **[6]**

- Anti-lock braking in four wheel automobiles.
- Household refrigerator.

b) Draw a suitable circuit diagram and explain the working of two stage voltage amplifier. **[4]**

Q5) a) A 4-bit ADC has a reference voltage of 10 volts. If the ADC is supplied with an analog input of 6.75 volts, determine the equivalent digital output. **[6]**

b) Draw a suitable block diagram of a generic mechatronic system and list the key elements in the system. **[4]**

OR

Q6) a) Strain in a cantilever beam is to be measured using strain gauges. For this, draw the set-up and explain the principle of working. **[6]**

b) Draw a suitable block diagram and explain, in brief, the working of the Data Acquisition system. **[4]**