Total No. of Questions : 6] **SEAT No. :**

P483

[Total No. of Pages : 2

TE/Insem/APR - 9
T.E. (Mechanical)
MECHATRONICS
(2012 Pattern) (Semester - II)

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) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) a) Draw suitable diagram and explain the construction and working of LVDT. **[5]**

b) A strain gauge is mounted on 6 mm diameter steel bar in the axial direction. The gauge has a resistance of 120 Ω. The gauge factor of strain gauge is 1.6. The modulus of elasticity of steel is 209 GPa. Determine the force applied on the bar when the gauge resistance increases by 0.3 Ω. **[5]**

OR

Q2) a) Define Gauge factor and derive the equation for the same. **[5]**

b) Explain with a neat sketch the construction and working of stepper motor. **[5]**

Q3) a) Compare open loop and closed loop control system with suitable example. **[5]**

b) Determine the transfer function of the system shown in fig. 1 **[5]**

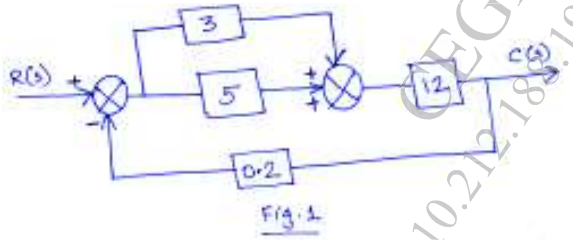

Fig. 1

P.T.O.

OR

Q4) a) Explain any one house hold application of mechatronics with suitable diagram. **[5]**

b) State the advantages and limitations of closed loop control system. **[5]**

Q5) a) Using a suitable sketch explain the working of voltage amplifier. **[5]**

b) A 4 bit R - 2R DAC has a reference voltage of 0 - 5V. If the binary input is 1011, find the equivalent analog output voltage. **[5]**

OR

Q6) a) Draw a suitable diagram and explain 4 bit successive approximation type ADC. **[5]**

b) Explain sample and hold circuit with a neat sketch. **[5]**

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