Total No. of Questions :6]

SEAT No. :

P5680

[Total No. of Pages :2

TE/INSEM./OCT.-126

T.E. (E & TC)

MECHATRONICS

(2015 Pattern) (Semester - I) (304185)

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

Instructions to the candidates:

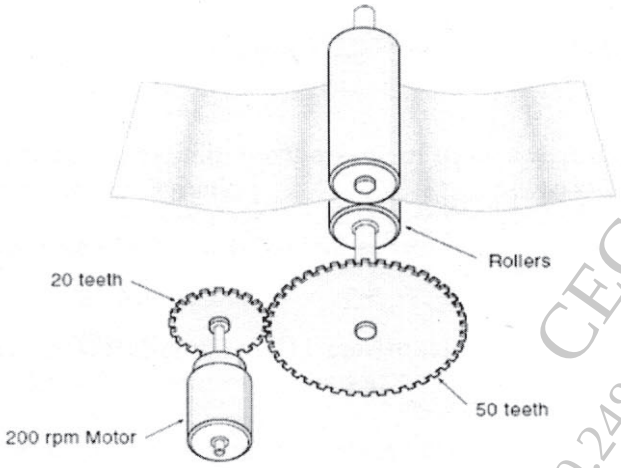
1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data if necessary.***

Q1) a) Draw a block schematic of mechatronics system. Explain its key elements. **[6]**

b) The individual sensitivities of different elements comprising a temperature measuring system are: transducer = 0.3 ohm/C; Wheatstone bridge = 0.01 V/ohm; amplifier gain = 80 V/V; pen recorder = 1.2 mm/V. Determine the overall sensitivity & the temperature change corresponding to a pen recorder movement of 30 mm. **[4]**

OR

Q2) a) A small motor running at 200 rpm drives a paper roller in a business machine. The gear on the motor has 20 teeth, and the gear on the roller has 50 teeth. How fast is the roller turning? **[4]**



b) Discuss the operation of washing machine with a suitable sketch. **[6]**

P.T.O.

Q3) a) Does ultrasonic transducer is useful in position measurement? If yes, justify with suitable sketch. **[6]**

b) A resistance wire strain gauge with a GF of 2.5 is bonded to a steel structural member subjected to a stress of 120 MN/ m^2.The modulus of elasticity of steel is 250 GPa. Find the percentage change in the value of the gauge resistance, due to applied stress. **[4]**

OR

Q4) a) With a suitable schematic, explain the working of inductive proximity sensor. **[6]**

b) Write a short note micro-electromechanical sensor (MEMS). **[4]**

Q5) a) Write a short note on: **[8]**

i) Relief valve

ii) Centrifugal pump

b) How pressure is regulated in hydraulics system? **[2]**

OR

Q6) a) Draw a diagram of vane pump. Explain its construction & working principle. **[6]**

b) The hydraulic cylinder is of 8 cm diameter. Find the force exerted on the piston if the pressure is 700 kPa. **[4]**

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