Total No. of Questions :6]

SEAT No. : ____

P36

[Total No. of Pages :2

Oct./TE/ Insem. - 150

T.E. (E & TC)

MECHATRONICS

(2015 Pattern) (Semester-I)

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

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data, if necessary.***

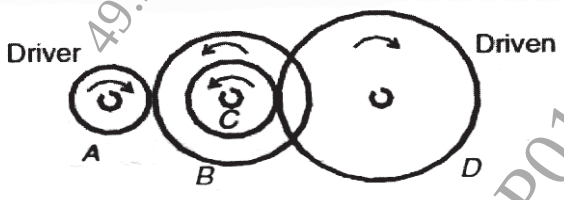
Q1) a) Demonstrate the working of a washing machine with suitable sketch. **[6]**

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) Discuss the phases of mechatronics design process. **[5]**

b) For a compound gear train shown in following figure, if A the first driver has 15 teeth, B has 30 teeth, C has 9 teeth and D the final driven wheel has 18 teeth then determine the overall gear ratio. **[3]**



c) A thermocouple is used to measure temperature from 10°C to 100°C. Determine its: **[2]**

i) Range

ii) Span

P.T.O.

Q3) a) If the spring transducer deflects 0.075 m when a force of kN is applied, find the input force for a displacement of 0.1 m. **[2]**

b) Explain the concept of active & passive transducer. **[2]**

c) Draw a neat diagram & explain working of inductive proximity sensor. List its one advantage & one disadvantage. **[6]**

OR

Q4) a) Explain how ultrasonic transducer is used for liquid level measurement. **[5]**

b) List any five factors which need to be considered while selecting a sensor. **[5]**

Q5) a) Determine the force needed to a piston of 2 cm radius in order to result a force of 6000 N at the woking piston of radius 6 cm. calculate the hydraulic pressure in bar. **[4]**

b) Describe the working of hydraulic system with the help of diagram. List its two advantages & two drawbacks. **[6]**

OR

Q6) a) Define the following terms with respect to hydraulic pump: **[4]**

i) Volumetric efficiency

ii) Power efficiency

b) With the help of a suitable diagram explain the working principle of swash plate axial piston pump. What is the significance of swash angle? **[6]**

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