

Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :2

P36

Oct./TE/ Insem. - 150

T.E. (E & TC)

MECHATRONICS

(2015 Pattern) (Semester-I)

Time : 1 Hour]

[Max. Marks :30

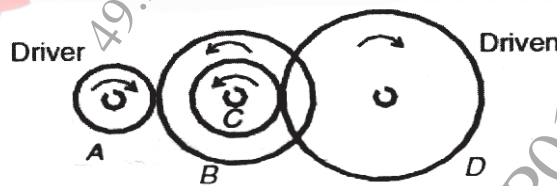
Instructions to the candidates:

- 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 working 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]

