

Total No. of Questions : 8]

P5478

SEAT No. :

[Total No. of Pages : 2

[5669]-545

T.E. (E & TC)

**MECHATRONICS**  
(2015 Pattern) (Semester - I)

Time : 2½ Hours]

Instructions to the candidates :

- 1) Answer any one questions out of Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data if necessary.

[Max. Marks : 70

**Q1) a)** A potentiometer which is used to measure the rotational position of a shaft has 850 turns of wire? The input range is from -160 to +160. The output range is from 0 to 12V. Determine [6]

- i) span
- ii) sensitivity in volts per degree
- iii) average resolution in volts.

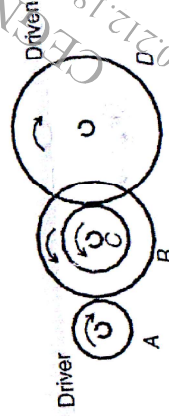
**b)** Explain the following in details related to Strain Gauge : [8]

- i) Stress & Strain
- ii) Gauge Factor
- iii) Output voltage of 4 gauge system
- iv) Temperature compensation

**c)** Explain the Function of an accumulator as shock absorber. Also, with neat sketch explain the Dead Weight Accumulator. [6]

OR

**Q2) a)** For a compound gear train shown in figure, if A, the first driver having 10 teeth, B having 30 teeth, C having 9 teeth and D the final driven wheel having 18 teeth, then determine the overall gear ratio. [4]



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**b)** Write Short notes on : [8]

- i) Proximity Sensor
- ii) Servomechanism

**c)** Draw a neat diagram of gear pump. Explain its construction & working principle. [8]

**Q3) a)** Draw & explain basic components of Pneumatic system. [10]

**b)** Explain chemical dryers with a suitable sketch. [8]

OR

**Q4) a)** Write short notes on the following : [10]

- i) Positive displacement compressor (Piston)
- ii) Dynamic displacement compressor (Screw)

**b)** Compare hydraulic & pneumatic system in mechatronics application. [8]

**Q5) a)** With the help of a neat sketch, explain the functioning of electromechanical & solid state relays. [8]

**b)** Explain in detail, working of any type of pneumatic air motor. [8]

OR

**Q6) a)** Draw the symbol & explain : [10]

- i) Solenoid operated 3/3 direction control valve.
- ii) 4/2 sliding spool valve.

**b)** Compare single acting & double acting cylinders. [6]

**Q7) a)** Discuss the necessity of High speed tilting Train. [8]

Explain principle of working, a control Schematic & its control using a pendulum. [8]

**b)** Using suitable block diagram explain working of boat autopilot. [8]

OR

**Q8) a)** Develop an automatic car parking system. Explain its sequence of operation, advantages & working with suitable sketch. [10]

**b)** Write a short note on anti-lock braking system technology. [6]

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