

Total No. of Questions : 8]

SEAT No. :

P2503

[Total No. of Pages : 3

[5253]-526

T.E. (E & TC)

MECHATRONICS

(2015 Pattern) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

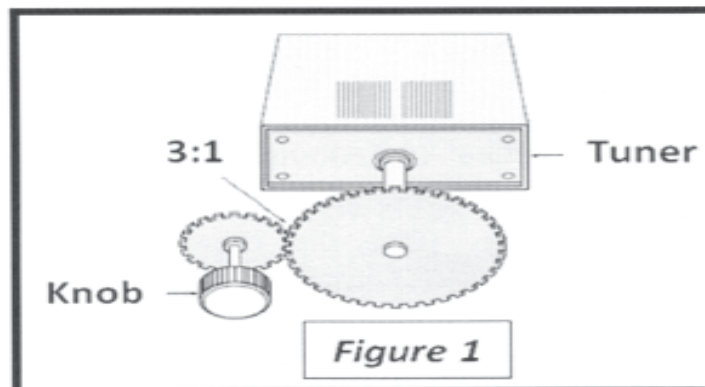
Instructions to the candidates:

- 1) Answers 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.

- Q1)** a) A tachometer generator, used to measure the speed of rotation of IC engines, has an ideal rating of 6 V per 1000 rpm, a range of 0 - 4000 rpm & an accuracy of $\pm 0.4\%$ of full scale. If the output of the tachometer generator is 18 V, what is the ideal value of the speed? What are the minimum & maximum possible values of the speed? [4]
- b) Write short notes on : [8]
- i) MEMS
 - ii) Nano sensor
- c) Draw a diagram of gear pump. Explain its construction & working principle. [8]

OR

- Q2)** a) As shown in Figure 1, a radio tuner is connected to the tuning knob through a 3:1 gear mesh. If the knob is turned 70 degree, how many degrees does the tuner rotate? [4]



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- b) Explain the working of gyroscope with a suitable sketch. [8]
- c) Explain in details : [8]
- i) Relief valve
 - ii) Centrifugal pump

- Q3)** a) Explain the following in details : [10]
- i) Air filter & water trap
 - ii) Refrigerated dryer
- b) Explain with a suitable sketch, how lubricator is used for lubrication. [4]
- c) A pneumatic cylinder is required to move a 1000N load 150mm in 0.5s. What is the output power? [4]

OR

- Q4)** a) Write short notes on the following : [10]
- i) Double acting cylinder
 - ii) Air receiver
- b) Compare hydraulic & pneumatic systems in mechatronics applications. [4]
- c) Explain the working of diaphragm compressor. [4]

- Q5)** a) What is relay? How is it useful in indirect switching of high voltage circuit? [8]
- b) Explain power cables and signal cables. Where are they used in Mechatronics automation systems? [8]

OR

- Q6)** a) Explain the working of solenoid. [6]
- b) Draw the symbol & explain the working of [10]
- i) 4/2 directional control valve (DCV)
 - ii) 3/2 way spool valve.

- Q7)** a) Discuss the necessity of autopilot system for boat. Explain its construction & working with a suitable sketch. [10]
- b) Write a short note on CNC machine. [6]

OR

- Q8)** a) Develop an engine management system. Explain its construction, working & applications with a suitable sketch. [8]
- b) Explain anti-lock braking system (ABS) technology. What are its major components? [8]

