Total No. of Questions : 8]

SEAT No. :

P2503

[Total No. of Pages : 3

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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, Q7or 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 +/ - 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]**

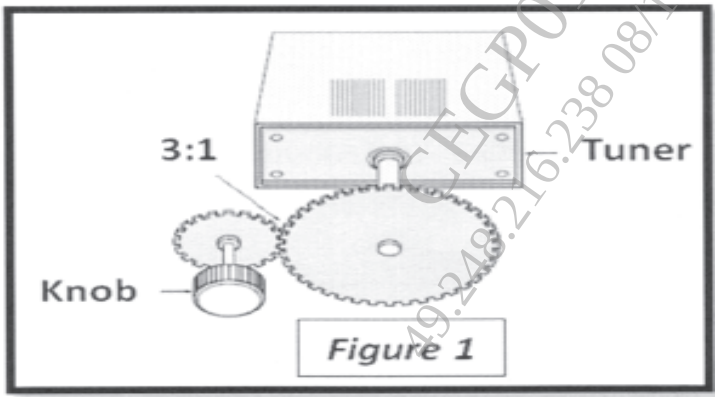

Figure 1

P.T.O.

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.

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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]**

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