Total No. of Questions : 8]

SEAT No. :

P3364

[Total No. of Pages : 3

[5353] - 555

T.E. (E & TC) (Semester - I)

MECHATRONICS

(2015 Pattern)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to candidates:

1) ***Answers any one Questions out of Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) With the help of a block diagram explain servomechanism. State its applications. **[6]**

b) What are rotary encoders? Explain how angular displacement can be measured using optical rotary encoders. **[8]**

c) Explain the hydraulic system and state the use of Accumulator in a Hydraulic system. **[6]**

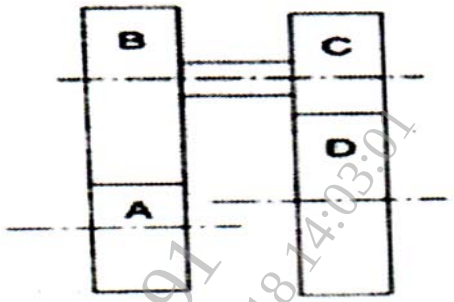
OR

Q2) a) What is the use of Pump in a hydraulic system? Compare positive displacement (Hydro static) type and Non- Positive Displacement (Hydrodynamic) type of Pumps. **[8]**

b) Write a short note on load cell. Discuss its use to measure force, signal conditioning requirement and its applications. **[6]**

c) In the double reduction gear train shown in the following, figure, B & C from a compound wheel free to rotate on the lay shaft. The speed of D is to be one-tenth of the speed of A. For A the number of teeth are 80, for C they are 80 & for D they are 160. Find the suitable number of teeth for wheel B. **[6]**

P.T.O.



Q3) a) Explain the working of Adsorption and Absorption type of Dryers. State its advantages and disadvantages. **[8]**

b) Elaborate on Air treatment stages in a Pneumatic System. **[8]**

OR

Q4) a) Explain with the help of diagram working of Pick and Place Robot. **[8]**

b) Draw a neat labeled diagram to explain the working of a lubricator in a Pneumatic System. **[6]**

c) Draw symbol of 4/3 solenoid type and push button type DCV. **[2]**

Q5) a) Represent 4/2 and 5/3 DCV symbolically.

With the help of a diagram explain the actuation of a double acting cylinder using 4/3 DCV in a Pneumatic system. Explain every component used in the system. **[10]**

b) What is a stepper motor? With the help of a diagram explain its working. **[4]**

c) A four stack variable reluctance motor has a step angle of 1.8°, find number of its rotor and stator teeth **[4]**

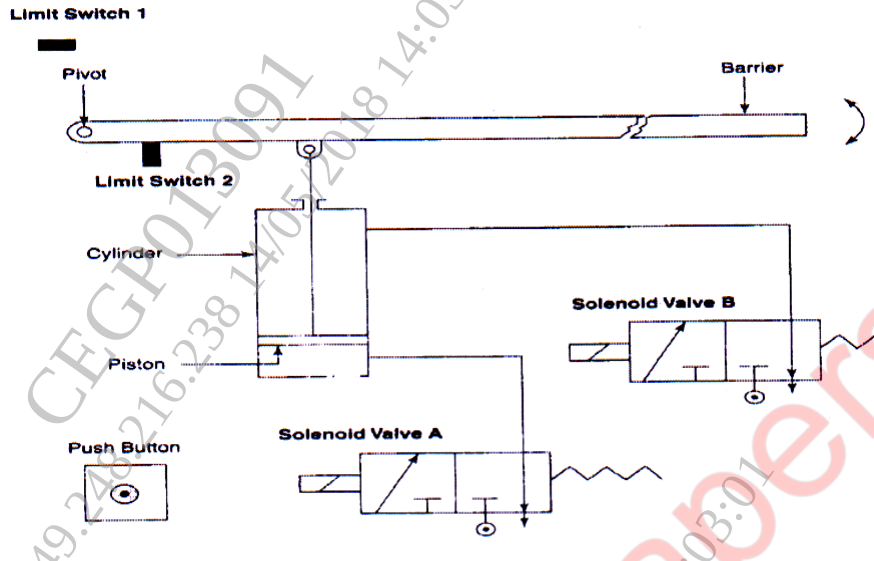
OR

Q6) a) State different types of Control Valves. Explain working and the selection of a solenoid valve. **[6]**

b) What are Electro mechanical relays? State its use. **[6]**

c) State and compare different types of Actuators, state their advantages and disadvantages. **[6]**

Q7) a) The figure below shows the entry of the car Parking system. Consider appropriate inputs and outputs and explain the working of the same using PLC ladder diagram or any other approach. **[8]**



b) What is an Engine Management System (EMS)? State its main components and explain the various sensors used in an EMS with the help of a schematic. **[8]**

OR

Q8) a) What are the main components of a Computer Numerical Control (CNC) Machine? Explain the functionality of each component with the help of neat block diagram. Compare the conventional NC with CNC machine. **[10]**

b) With the help of a block diagram explain the Anti Lock Braking system. State its significance in a vehicle. **[6]**