Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech**
PEME5407

8th Semester Regular / Back Examination 2016-17
MECHATRONICS

BRANCH(S): CSE, IT, ITE
Time: 3 Hours
Max Marks: 70
Q.CODE: Z404

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What is meant by the term "Real time mechatronics system"?
b) State any two differences between micro switch and reed switch.
c) What do you understand by memory mapping?
d) Domestic washing machine is a mechatronic approach – Justify.
e) Define power rating of a potentiometer.
f) What is latching in PLC'S?
g) How a traditional design of pressure control in a large tank is improved by mechatronic design?
h) What are the steps involved in the operation of a digital controller?
i) What is Shift register? What is the data required for a shift register?
j) How does a microcontroller differ from a microprocessor?

Q2 **a)** Explain the principle of operation of inductive proximity sensor with a neat diagram. **(5)**
b) With an aid of a neat sketch, describe the working of an absolute encoder. **(5)**

Q3 **a)** Explain the various stages in mechatronics design approach and state how it differs from the traditional approach. **(5)**
b) With a neat diagram, describe the working of a Directional control valves. **(5)**

Q4 With the help of a proper control circuits explain the speed control of AC and DC motors. **(10)**

Q5 **a)** Explain the configuration of PLC. List the considerations in selecting a PLC. **(5)**
b) With a suitable graph, discuss the specifications and characteristics of a stepper motor. **(5)**

Q6	**a)**	A potentiometer which is used to measure the rotational position of the shaft has 850 Turns of wire. The input range is from –160° to + 160°. The output range is from 0 V to 12 V. Determine (i) The span (ii) Sensitivity (iii) Average resolution in volts.	**(5)**
	b)	Explain about the hydraulic and pneumatic actuation systems used in automation.	**(5)**
Q7	**a)**	Explain the working of PID controller with a neat sketch.	**(5)**
	b)	Investigate the analog-to-digital converters used in mechanical measuring systems. Find the sampling rate, the quantization bits, and the technique used for the conversion.	**(5)**

Q8 **Write short notes on any two:** **(5 x 2)**

a) Multiplexers
b) Rotary actuators
c) Fluid system building blocks
d) Adaptive control