

**Code: 9D04205****M.Tech II Semester Supplementary Examinations February 2018****MECHATRONICS****(CAD/CAM)**

(For students admitted in 2012, 2013, 2014, 2015 & 2016 only)

Time: 3 hours**Max. Marks: 60**

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Draw a block diagram of general mechatronic system and explain the function of each block.
(b) Describe the role of mechatronics in industries.
- 2 Design a mechanical system which can be used to:
(a) Move the tool at a steady rate in one direction and then quickly move it back to the beginning of the path.
(b) Transform a rotation into a linear back-and-forth movement with simple harmonic motion.
(c) Transform a rotation through some angle into a linear displacement.
- 3 Briefly explain ON/OFF controllers and their limitations and in what situation is such a control system commonly used.
- 4 Describe the function of adaptive control system. Briefly explain commonly used forms of adaptive control systems.
- 5 (a) Devise a circuit that could be used with a domestic washing machine to switch on pump to pump water for 100s into the machine, then switches off and switch on a heater for 50s to heat the water. The heater is then switched off and another pump is to empty the water from the machine for 100s.
(b) Devise a timing circuit that will switch an output on for 1s then off for 20s, then on for 1s, then off for 20 s and so on.
- 6 Create a program to start and stop a DC motor. Port C is used for the inputs and port B for the output to the motor, via a suitable driver. Draw a circuit diagram. The start button is connected to PC0 to switch from a 1 to a 0 input when the motor is to be started. The stop button is connected to PC1 to switch from a 1 to a 0 input when the motor is to be stopped.
- 7 Suggest a sensor system that could be used as part of a machine to control the thickness and temperature after it emerges from rollers. The sheet metal is in continuous motion and the measurement needs to be made quickly and enable corrective action to be made quickly. The measurement system has to supply an electrical signal.
- 8 Briefly explain with a suitable example for the following application in manufacturing by using the machine vision system:
(a) Inspection.
(b) Part identification.
(c) Visual guidance and control.
(d) Safety monitoring.

