01681

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) B.TECH. (AEROSPACE ENGINEERING) (BTAE)

Term-End Examination

December, 2013

BME-006 : MECHATRONICS

Time : 3 hours   *Maximum Marks : 70*

*Note :   Answer **any seven** questions. All questions carry equal marks.*

1. (a) Briefly explain the principles of operation   5
         of limit switch and proximity switch.

    (b) A 6 bit D/A convertor gives an output   5
         voltage of 8,625 volts for an input of 010111.
         What is the step size, the full range voltage
         and the percentage resolutions ?

2. (a) Write the transfer function of the following   5
         equation where x is input and output.

$$10 \, \frac{dy(t)}{dt} = 5x(t)$$

    (b) Define Hysterisis. Sketch the hysterisis   5
         curve.

3.	(a)	Describe the working of robot wrist sensor.	5
	(b)	With the help of suitable sketch show the purpose of CAM and follower.	5
4.	(a)	Describe the method of eliminating backlash in a ball screw.	5
	(b)	Explain the working of Solenoid Controlled Pilot operated valve with the help of neat sketch.	5
5.	(a)	Give the different types of positive displacement pump with their applications.	5
	(b)	Differentiate between a pressure relief valve and a pressure reducing valve.	5
6.	(a)	Describe various methods of speed control of a DC motor.	5
	(b)	Explain the basic principle of stepper motor.	5
7.	(a)	What is inverse kinematics ? Where is it used ?	5
	(b)	Explain the working principle of a relay.	5
8.	(a)	Compare microcontroller, microcomputer and microprocessor.	5
	(b)	Convert the following octal numbers to decimal equivalent, then convert that decimal number to equivalent hex numbers.	5

(i)   65

(ii) 244

9. (a) Draw the relay ladder rung for two push   5
        button switches, are normally open and both
        have to be closed for a motor to be operated.

    (b) What is the difference between open loop   5
        control and closed loop control. Explain
        with the help of suitable diagram.

10. Draw the block diagram for R-C Circuit shown   10
     below, Where V_i and V_o are the input and output
     variables respectively. Simplify the block diagram
     to a single block open loop diagram.

R-C Circuit