GUJARAT TECHNOLOGICAL UNIVERSITY
BE- IVth SEMESTER–EXAMINATION – MAY/JUNE- 2012

Subject code: 142002   **Date: 31/05/2012**

Subject Name: Basic Mechatronics

Time: 10:30 am – 01:00 pm   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** State the advantage and disadvantage of mechatronics systems.   **07**

(b) Give and discuss briefly the classification of hydraulic pumps.   **07**

Q.2 **(a)** State different types of robots and explain any two in details.   **07**

(b) Enlist the mechatronics systems that you can find in your everyday environment.   **07**

OR

(b) What is a proximity sensor? Explain briefly the optical proximity sensor.   **07**

Q.3 **(a)** State different types of temperature transducers and explain any two in details.   **07**

(b) Explain displacement measurement using capacitive transducer and using LVDT.   **07**

OR

Q.3 **(a)** (i) Consider a chemical tank for which there are three variables to be monitored. These variables are level, pressure, and temperature. Design a logic circuit such that an alarm is sounded when certain combinations of conditions of the variables occur. The alarm will sound if,   **04**
1. The liquid level is low and the pressure is high.
2. The liquid level is high and the temperature is high.
3. High liquid level with low temperature and high pressure.

(ii) Draw a block diagram of a filled thermal system for temperature measurement.   **03**

(b) Derive equations used to make simulink model of DC shunt motor showing electrical cut variables and mechanical cut variables.   **07**

Q.4 **(a)** What is a load cell? Explain briefly the construction and working of strain gauge load cell.   **07**

(b) (i) What do you understand by 'gear train'? Discuss the various types of gear trains.   **04**

(ii) How are pressure measurement instrument classified?   **03**

OR

Q.4 **(a)** State the advantage and limitation of CNC machine and discuss briefly the classification of CNC machine.   **07**

(b) (i) Explain with sketches the different types of cams and followers.   **04**

(ii) Discuss briefly the various types of belts used for the transmission of power.   **03**

Q.5 **(a)** Write a short note on microcontroller.   **07**

(b) Explain the speed control of D.C shunt motor by adding an armature resistance.   **07**

OR

Q.5 **(a)** What is the service unit in pneumatic system? Draw detailed and simplified symbols of service unit. Clearly mention functions of each unit of service unit.   **07**

(b) Draw the half wave rectifier and full wave rectifier circuits.   **07**

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