M. Sc. (Sem. IV) (CBCS) Examination
April / May – 2015
Electronic : Paper - XIII
(Robotics)

Faculty Code : 003
Subject Code : 015401

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Notes: Answer all questions. Figures on right hand side indicate marks.

Q1.   Answer any seven from the following.   (14)

    1. Draw the figure and mention the safety zones in work cell.
    2. Explain lead through programming in robotics.
    3. Draw the block diagram of a simple positional servo system and explain the same.
    4. Explain the working of differential type stepper motor with its internal construction Diagram.
    5. Write very briefly on series wound DC motor.
    6. Draw the symbols of a 4-way button valve and FRL.
    7. List the categories of the grippers.
    8. Write characteristics of vacuum gripper.
    9. Draw and explain rotary actuator type gripper.
    10. How noise reduction is done in the pre-processing stage in robot vision?

Q2.   Answer the following (Any two).

    (A) Write on 'flexible manufacturing module', 'flexible manufacturing cell', and   (7)
        'flexible manufacturing group'. Draw proper diagrams.
    (B) Write on PTP motion control, linearly interpolated controlled path and   (7)
        Continuous path motion.
    (C) Write the advantages and disadvantages of pneumatic power drive. Draw the   (7)
        Schematic of the hydraulic power supply and explain the same.

Q3.   Answer the following.

    (A) Draw 3 DOF, 2-D manipulator and derive expression for θ_1, θ_2 and θ_3.   (7)
    (B) Describe different types of drive mechanisms.   (7)

OR

Q3.   Answer the following.

    (A) Write a note on stepper motor.   (7)
    (B) Explain Proportional and Integral control with proper diagram.   (7)

Q4. Answer the following.

    (A) Write on disc armature type and brushless DC motors. (7)

    (B) Draw and explain air lubricator. Write on two stage piston compressor. (7)

Q5. Answer any two from the following.

    (A) Draw and explain counter balance valve. (7)

    (B) Explain with the diagram the rack-pinion actuator and check valve. (7)

    (C) What do you understand by the pivoting or swinging type two figured gripper? (7)
        List their types and explain each one with proper diagram.

    (D) Write a detailed note on edge detection procedure carried out for a captured (7)
        Image.

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