Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH(ME)/SEM-2/PTM-204(a)/2012

2012

ROBOT APPLICATION AND DESIGN

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

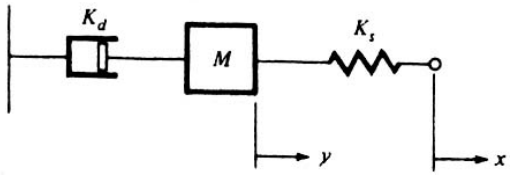
Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* questions. 5 × 14 = 70

1. What do you mean by automation ? Compare fixed, programmable and flexible automations. 2 + 12

2. Define a robot. Explain different motions involved with a robot wrist. State the specifications of a robot. 2 + 4 + 8

3. What is the function of a controller ? What is transfer function ? From the given figure find the transfer function and block diagram of the system. 2 + 2 + 10



4. Explain joint space and world space representation of robots. What are forward and reverse transformations of a robotic arm ? Derive the relation for forward and reverse transformations of a 2 degree of freedom robotic arm.

4 + 2 + 8

5. What is an end-effector ? Describe briefly vacuum and magnetic type grippers. 2 + 12

6. Define a transducer and a sensor. Name different types of sensors. What is a tactile sensor ? Discuss uses of sensors in robotics. 4 + 2 + 2 + 6

7. Discuss industrial applications of robots.

8. Write short notes on any *four* of the following : 4 × 3½

   a) Basic robot configurations

   b) Speed of response and stability of a robot

   c) Future applications of robots

   d) Bang-bang and point-to-point control robot

   e) Desirable features of a sensor

   f) Mechanical gripper.

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