EOE084

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B. Tech.

(SEM. VIII) THEORY EXAMINATION 2011-12

AUTOMATION AND ROBOTICS

Time : 3 Hours

Total Marks : 100

Note :- (i) Attempt all questions.

- (ii) Be precise in your answer.
- 1. Attempt any **two** parts of the following : $(10 \times 2=20)$
 - (a) Differentiate between ROBOT and ROBOTICS.
 - (b) Distinguish between open loop and close loop control system used for Robotic control.
 - (c) Explain the following technical features of an industrial robot :
 - (i) Work volume
 - (ii) Precision of movement
 - (iii) Type of drive system
 - (iv) Speed of movement.

2. Answer any four parts of the following :

(5×4=20)

(a) Draw a neat schematic diagram of robotic configurations :

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- (i) Polar co-ordinate configuration
- (ii) Jointed arm configuration.

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- (b) Discuss the benefits that result from the application of robot technology.
- (c) How do robots differ from other capital equipments used in industries for production of articles ?
- (d) What do you mean by robot arm kinematics? Differentiate between Direct kinematics and Inverse kinematics.
- (e) List and explain in brief the control functions of a 'teach box'.
- 3. Attempt any two parts of the following : $(10 \times 2 = 20)$
 - (a) With the help of suitable sketches, show the PTP, linear and contouring control of a robot.
 - (b) Classify different sensors and actuators used in robotics.
 - (c) What are the basic design requirements of robot for the following tasks :
 - (i) Spray painting
 - (ii) Workpiece handling.
- 4. Attempt any two parts of the following : $(10 \times 2 = 20)$
 - (a) What do you mean by robotics control system ? Write advantages, disadvantages and limitations of robotic controls.
 - (b) Differentiate among the following methods of robot programming:
 - (i) Lead through teaching
 - (ii) Walk through teaching
 - (iii) Off-line programming.
 - (c) Give a systematic procedure for planning and implementing a robotized project.

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5. Attempt any **two** parts of the following :

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- (a) Define and explain the following terms used w.r.t. a robot: Accuracy, Work Volume, Resolution, Repeatability and Speed of Movement.
- (b) How will you determine the position and orientation of end effectors ? Explain.
- (c) What do you mean by adaptive control system of Robots? Write advantages, disadvantages and limitations of Adaptive controls.

3