

**Total number of printed pages – 4**      **B. Tech**  
**PEME 6409**

**Eighth Semester Examination – 2008**

**ROBOTICS AND ROBOT APPLICATIONS**

**Full Marks – 70**

**Time : 3 Hours**

*Answer Question No. 1 which is compulsory and any **five** from the rest.*

*The figures in the right-hand margin indicate marks.*



1. Write short answers to the following questions:

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- (a) What is a joint interpolated motion of a robot ?
- (b) What is teach pendent programming of a robot ?

- (c) What are the different classification systems of robots ?
  - (d) What is a forward transformation of 3DOF robot arm ?
  - (e) Name the three types of rotary actuators.
  - (f) Give few points on advantages of adhesive grippers.
  - (g) What is an accuracy of robotics sensors ?
  - (h) Why a gear pump is a positive displacement pump ?
    - (i) Name the different applications of a robot.
    - (j) Give two points on “why SCARA robots preferred for assembly operations”.
2. (a) Describe with neat sketch the work envelope of a robot in different systems.      7
- (b) Write briefly on types of controllers used in robotics.      3

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**Contd.**

3. (a) Distinguish between joint interpolated motion and controlled path motion. 4
- (b) How do you specify a robot and what are the benefits of introducing flexibility in manufacturing ? 6
4. (a) Write a brief note on homogeneous co-ordinates and transformation matrix. 3
- (b) What is the rotation matrix for a rotation of  $30^\circ$  about the OZ axis, followed by a rotation of  $60^\circ$  about the OX axis, followed by a rotation of  $90^\circ$  about the OY axis ? 7
5. (a) What are the advantages and disadvantages of stepper motors over dc servo motors ? 5
- (b) Write briefly with neat sketch about the drive circuit of a stepper motor. 5

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6. (a) Define a robot vision and what are the applications of a robot vision system ? 3
- (b) What are the types of actuators used a for robot end-effectors ? State the advantages of each actuator. 7
7. (a) Write short notes on LVDT and potentiometer. 5
- (b) What are the different types of sensors and functions of those sensors ? 5
8. (a) Write a short note on VAL system. 3
- (b) Describe about the welding instructions in robot languages with suitable example and give a program on weld curve with neat sketch. 7

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