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:

   2 ×10

   (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

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° about the OZ axis, followed by a rotation of 60° about the OX axis, followed by a rotation of 90° 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

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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