Register Number: …….

B.E DEGREE EXAMINATIONS: NOV/DEC 2010

Seventh Semester

MECHATRONICS ENGINEERING

U07MH703: Robotics and Machine Vision Systems

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 =10 Marks)

1. What is the work volume of Cartesian co-ordinate robot?

   A) Spherical B) Rectangular C) Hemi-spherical D) cylindrical

2. SCARA means

   A) Small Cartesian Armed Robot Architecture B) Small Compliance Artificial Robot Arm

   C) Selective Compliance Assembly Robot Arm D) Selective Compliance Artificial Robot Arm

3. With known link lengths and joint angles finding the co-ordinates is

   A) Reverse kinematics B) Forward kinematics C) Two DOF D) 4 DOF

4. The path of the movement of end effector is called as

   A) Curvature B) Trajectory C) Cycloidal path D) Work Volume

5. For handling fabrics and other light weight material the following gripper is preferred

   A) Adhesive type B) Vacuum cup C) Magnetic type D) Mechanical gripper

6. FSR is

   A) Fume Sensing Robot B) Force Sensing Robot

   C) Force Sensing Resistor D) Front Swinging Resistor

7. _____ is a special type of force sensor composed of a matrix of force sensing elements

   A) Tactile array sensor B) Strain gauge C) Piezo-electric transducer D) Proximity sensor

8. The process of assigning sampled discrete time voltage level to a finite number of defined amplitude levels is

   A) Sampling B) Encoding C) Quantization D) Sensing

9. Reducing the number of gray levels used by the machine vision system is _____

   A) Windowing B) segmentation C) Encoding D) Digital conversion

10. Structural techniques of pattern recognition consider relationships between_____ of an object

    A) Pixels B) Sizes C) Colors D) Features (or) edges

PART B (10 x 2 = 20 Marks)

11. What is work volume?
12. What are the wrist movements?
13. Give some power transmission systems in robot.
14. What is degeneracy in robot?
15. List the programming methods in robotics.
16. What is an end effector?
17. What is voice synthesizer?
18. Give some position sensors compatible for robot.
19. Give some features for object recognition systems.
20. What is tracking?

PART C (5 x 14 = 70 Marks)

21. a) Discuss the various drive systems used in robotics.

(OR)

b) (i) Explain the precision movements in robot (10)
(ii) List the types of work volume. (4)

22. a) Derive the components of rotation matrices.

(OR)

b) Discus the trajectory planning of 3+1 DOF articulated robot with some suitable environment conditions.

23. a) (i) What are the factors to be considered in designing of grippers. (10)
(ii) List the advantages of magnetic grippers. (4)

(OR)

b) Explain the commonly available proximity sensors for robot.

24. a) Discuss Image Processing Vs Image Analysis.

(OR)

b) Explain any two image acquisition devices with sketches.

25. a) (i) Describe the feature extraction with example. (7)
(ii) Explain image resolution. (7)

(OR)

b) (i) Explain various lighting techniques used in image processing. (7)
(ii) Brief any two applications of vision system. (7)

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