B.E. DEGREE EXAMINATIONS: NOV/DEC 2012

Seventh Semester

MECHATRONICS ENGINEERING

MCT118: 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 specification of Polar co-ordinate robot in terms of joints?

 a) RPP   b) RRR   c) PPP   d) RRP

2. Robot's ability to position its wrist end at a desired target with in the work volume is

 a) Accuracy   b) Repeatability   c) Spatial Resolution   d) Reverse kinematics

3. When the robot losses its DOF _____ occurs

 a) Degeneracy   b) Dexterity   c) Zero level   d) Nodal problem

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) Magnetic type   b) Vacuum cup   c) Adhesive type   d)Mechanical gripper

6. Which 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

7. For handling the glass materials following gripper is preferred

 a) Magnetic   b) Vacuum   c) mechanical   d) Adhesive

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. CCD is

 a) camera cleaning device   b) charge closing device

 c) camera coupled device   d) charge coupled device

10. Range finders is one of the techniques of

 a) Dilation   b) Erosion   c) Thickening   d) Depth measurement

PART B (10 x 2 = 20 Marks)

11. What is spatial resolution?

12. List the wrist movements.

13. What is inverse kinematics?

14. What is dexterity in robot?

15. Give the programming methods in robotics.

16. List the types of actuation in mechanical gripper.

17. Give some proximity sensors commonly used in robots.

18. What is voice synthesizer?

19. What is sampling?

20. What is dilation?

PART C (5 x 14 = 70 Marks)

21. a) Explain the various power transmission systems in robotics.

(OR)

   b) (i) Explain the precision movements in robotics   (10)

      (ii) List the arm and body motions in a robot.   (4)

22. a) Derive the forward and inverse kinematics of 2 DOF arm.

(OR)

   b) Discus the trajectory planning of an industrial robot with some suitable environment conditions.

23. a) (i) Explain the working of magnetic gripper.   (7)

      (ii) Write short notes on vacuum cup.   (7)

(OR)

   b) Explain the position sensors in robots.

24. a) Explain various lighting techniques used in image processing.

(OR)

   b) Explain the videcon tube with sketches.

25. a) (i) Describe the segmentation process in detail.   (10)

      (ii) Brief the object recognition.   (4)

(OR)

   b) Discuss Image Processing Vs Image Analysis.

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