KUMARAGURU
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Register Number: ……

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Seventh Semester

MECHATRONICS ENGINEERING

MCT118: Robotics And Machine Vision System

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Which of the following is an incremental motion machine?
   a) Shunt motor b) Series motor
   c) Stepper motor d) Induction motor
2. _____ is the smallest increment of movement into which the robot can divide its work volume.
   a) Spatial resolution b) Repeatability
   c) Workspace d) Accuracy
3. Find out the three axis Cartesian coordinate robot
   a) RRR b) RLR
   c) LLR d) LLL
4. VAL stands for
   a) Variable Arithmetic Logic b) Variable Assembly Language
   c) Variety of Assembly Line d) Various Assembly Languages
5. Choose odd one from the gripper selection criteria
   a) Part to be handled b) Gripper force
   c) Edge detection d) Temperature protection
6. Which of the following sensors are non-contact type robotic sensors?
   a) Proximity sensors b) Touch sensors
   c) Force sensors d) Position sensors
7. Typical fluorescent lamps are
   a) Imagers b) Collimators

c) Condenser projectors
d) Diffuse surface devices

8. Pick out the quantization level for an 8-bit converter
   a) 8
   b) 64
   c) 16
   d) 256
9. The technique used for distinguishing the object by analyzing the parameters like Area, Shape and Size is _____
   a) Region growing
   b) Feature extraction
   c) Edge detection
   d) Windowing
10. Which of the following is an object recognition technique?
   a) Windowing
   b) Template-matching
   c) Thresholding
   d) Segmenting

PART B (10 x 2 = 20 Marks)

11. State Isaac Asimov's three laws of robotics.
12. List any four programming languages for industrial robots.
13. Write the use of inverse kinematics.
14. Define trajectory.
15. What is meant by human machine interface?
16. Expand RCC and write about it.
17. Mention two image acquisition devices.
18. What is meant by quantization error?
19. Interpret the term ‘Thresholding’.
20. Mention the functions of a machine vision system.

PART C (5 x 14 = 70 Marks)

21. a) Define robot. Explain the basic configurations of a robot with neat sketches.

(OR)

b) (i) Discuss in detail concerning industrial applications of robot. (7)
   (ii) With a neat sketch describe the working of a stepper motor. (7)

22. a) Summarize in detail about robot controlling techniques with illustrations.

(OR)

b) (i) Draw workspaces for the kinematic configurations of rectangular, cylindrical and spherical coordinates. (9)
   (ii) Give details on types of joints used in commercial manipulators (5)

23. a) Explain in detail about the types of end effectors used in robots.

(OR)

b) (i) Illustrate and clarify the working principle of a force sensor. (8)

(ii) Describe any six features of sensors. (6)

24. a) (i) Write short notes on the image sensing of videcon camera. (7)

(ii) Discuss briefly the categories of basic types of lighting devices used in machine vision system (7)

(OR)

b) Explain the three phases of analog-to-digital signal conversion.

25. a) (i) Explain any two ways that are used to segment an image. (7)

(ii) Enumerate in detail about the three broad categories of applications of machine vision system (7)

(OR)

b) Describe the steps involved in image processing and analysis of a typical machine vision system.

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