

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Robotics and Machine Vision

Subject Code: 5TE01RMV1

Branch: M.Tech Mechanical (CAD/CAM)

Semester : 1

Date : 30/11/2018

Time : 2:30 To 5:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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SECTION – I

Q-1 Attempt the Following questions (07)

- a. Define: “Control Resolution”
- b. Give the important specifications of an industrial robot.
- c. Define the robot as per “JIRA”.
- d. Enlist the types of rotary joint notations.
- e. What is meant by manipulator?
- f. Define the link parameter “Link Length” in Kinematics.
- g. What are the types of encoder?

Q-2 Attempt all questions (07)

- a. Explain: ‘Roll, Pitch and Yaw’ angle of configuration. (07)
- b. Explain in detail “D-H representation of forward kinematics” with algorithm. (07)

OR

Q-2 Attempt all questions (07)

- a. Explain “Stepper motor” in control system. (07)
- b. Explain with figure the robot configuration. (07)

Q-3 Attempt all questions (07)

- a. Explain different factors which influence the selection and design of grippers. (07)
- b. Write a note on – “Proximity and range sensors”. (07)

OR

Q-3 Attempt all questions (07)

- a. Explain the various types of gripper mechanism with neat sketch. (07)
- b. Explain with Example “Forward and Inverse kinematics”. (07)



SECTION – II

Q-4 Attempt the Following questions. (07)

- a. What is segmentation?
- b. What is Work Volume?
- c. Write down any two types of robot programming.
- d. List the different types of tactile sensors.
- e. What is meant by quantization?
- f. What is meant by a teach pendant?
- g. What are the functions of machine vision system?

Q-5 Attempt all questions

- a. Explain with neat sketch “Charged Coupled Device (CCD) in Machine Vision System” (07)
- b. Explain general consideration about application of robot in material handling. (07)

OR

Q-5 Attempt all questions

- a. Explain Analog-to-Digital signal conversion for machine vision system. (07)
- b. Explain “Remote Centered Compliance (RCC)” device for assembly operation. (07)

Q-6 Attempt all questions

- a. Describe image processing and analysis in detail for robotic vision system. (07)
- b. Explain the different way of Lead through programming methods and also gives its limitations. (07)

OR

Q-6 Attempt all Questions

- a. Explain robot language structure in detail. (07)
- b. Write an algorithm for region growing and labeling for Binary Images in vision system. (07)

