Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name : Robotics and Machine Vision

Subject Code : 5TE01RMV1 **Branch : M.Tech(CAD/CAM)**

Semester : 1 **Date :26/12/15** **Time :10:30 To1:30** **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.

SECTION – I

Q-1 **Attempt the Following questions** **07**

a. What is meant by accuracy of robot?
b. Define a Robot.
c. Enlist the types of rotary joint notations.
d. What is work volume?
e. What is meant by pitch in robotics?
f. What is an end effector?
g. What is robot Forward kinematics?

Q-2 **Attempt all questions**

a. Explain the main Robot anatomy with neat sketch. **07**
b. Sketch and explain the four basic robot configurations. **07**

OR

Q-2 **Attempt all questions**

a. Describe any two feedback devices used in robots. **07**
b. Explain the working of a stepper motor. **07**

Q-3 **Attempt all questions**

a. Write an algorithm of Denavit - Hartenberg representation for forward kinematics of Robot. **07**
b. Enlist different types of drive used in robotics system. Explain Each in detail. **07**

OR

Q-3 **a.** Enlist the factors considered for the selection and design of grippers. **07**
b. Derive the forward and reverse transformation of 2-Degree of freedom and 3- degree of freedom arm. **07**

SECTION – II

Q-4 **Attempt the Following questions** **07**

a. What is segmentation?
b. What are the functions of machine vision system?
c. What is a tactile sensor?
d. What are the types of encoders?
e. What are the types of grippers?
f. What is meant by quantization?
g. What is meant by Region growing?

Q-5 **Attempt all questions**

a. Describe the steps used for image processing. **07**
b. Explain "Error Detection and Recovery" in robot cell design. **07**

OR

Q-5
a. Explain the applications of robots in processing operations. **07**
b. Explain Analog to Digital signal conversion for machine vision system. **07**

Q-6 **Attempt all questions**

a. Explain 'robot language structure'. **07**
b. Explain 'lead through programming methods'. **07**

OR

Q-6 **Attempt all Questions**

a. Write an algorithm for region growing and labeling for Binary Images in vision system. **07**
b. Compare various lighting techniques used in machine vision and image processing analysis. **07**