

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name: Industrial Robotics

Subject Code: 4TE08IRO1

Branch: B.Tech (Mechanical, Automobile)

Semester: 8

Date: 18/4/2017

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & 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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- Q-1** **Attempt the following questions.** **(14)**
- a) Define: Spatial Resolution
 - b) What is meant by quantization?
 - c) Define Robot as per ISO.
 - d) What is Work Volume?
 - e) What is Artificial Intelligence?
 - f) What are the types of encoders?
 - g) List different types of Grippers.
 - h) Define the link parameter “Link twist” in Kinematics.
 - i) What is Machine Vision system?
 - j) List the different robot Joint parameters.
 - k) What is forward Kinematics in robot?
 - l) Name the important specifications of an industrial robot
 - m) Classify the Robot Cell Layouts.
 - n) Enlist the types of Tactile sensors.

Attempt any four questions from Q-2 to Q-8

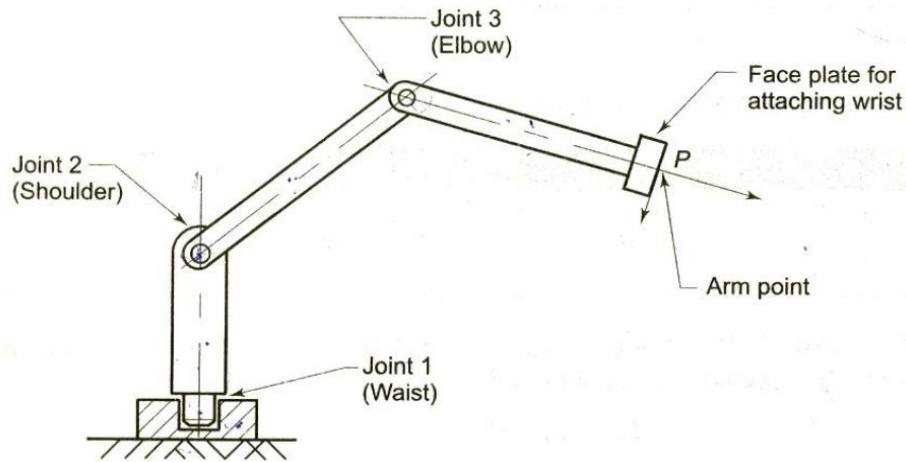
- Q-2** **Attempt all questions**
- (a) Enlist different types of drives used in robotic system. Explain each in detail. **(07)**
 - (b) Explain Different Robot Configurations with Figure. **(07)**
- Q-3** **Attempt all questions**
- (a) Explain Robot Application in “Material Transfer & Machine Loading/ Un Loading System”. **(07)**
 - (b) Explain different factors which influence the selection and design of grippers. **(07)**
- Q-4** **Attempt all questions**
- (a) Explain “Stepper motor” in control system. **(07)**
 - (b) Write short note on – “Proximity and range sensors”. **(07)**



- Q-5** **Attempt all questions**
- (a) Write an algorithm of D-H representation for forward kinematics of Robot. (07)
- (b) Explain the various types of gripper mechanism with neat sketch. (07)

- Q-6** **Attempt all questions**
- (a) Explain Analog-to-Digital signal conversion for machine vision system (07)
- (b) Describe image processing and analysis in detail for robotic vision system. (07)

- Q-7** **Attempt all questions**
- (a) Describe different search techniques used in Artificial Intelligence. (07)
- (b) Tabulate kinematic joint and link parameters of 3 – D.O.F. articulated robot arm by using D-H representation and derive kinematic equations by using arm matrices. (07)



- Q-8** **Attempt all questions**
- (a) Explain Robot Language structure in detail. (07)
- (b) Explain “lead through programming methods”. (07)