

**B. TECH.****THEORY EXAMINATION (SEM-VIII) 2016-17****AUTOMATION & ROBOTICS****Time : 3 Hours****Max. Marks : 100****Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.****SECTION-A****1 Explain the following:****(10×2=20)**

- a) What are the kinematics chains?
- b) List some of the important reasons for using robots instead of human to perform a task.
- c) What is program synthesis?
- d) State the types of joints commonly used in industrial robots.
- e) What is adaptive control?
- f) State advantages of rectangular co-ordinates.
- g) How to select robotic drive? Discuss.
- h) Discuss the applications of robotic system in assembly line.
- i) Comment on geometric classification.
- j) What do you understand by robot vision?

**SECTION-B****2 Attempt any five of the following:****(10×5=50)**

- a) Describe about parallel actuated and closed loop manipulators.
- b) What are the various levels of robot programming?
- c) What do you understand by robot coordinate system representation?
- d) Differentiate between external and internal sensors with suitable examples in support.
- e) Discuss various types of power sources used in robots. Also detail their relative merits and demerits.
- f) List relevant factors that must be considered for robotic applications in gripping operation.
- g) Discuss the process of digitization in detail.
- h) Discuss the general characteristics of industrial work situations that tend to promote the substitution of robots for human labour.

**SECTION-C****Attempt any two of the following:****(15×2=30)**

- 3 Discuss the difference between feed-back control and adaptive control. Differentiate between ACO and ACC types of adaptive control.
- 4 Sketch and describe the working of a Wrist mechanism with 2 degrees of freedom.
- 5 Give a list of factors that should be considered while evaluating a robot for welding capabilities. Give suitable explanations in support of your answer.