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**M.E. / M.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017**

**SECOND SEMESTER**

**COMPUTER AIDED DESIGN**

**CD16008 – INDUSTRIAL ROBOTICS AND EXPERT SYSTEMS**

**(Regulation 2016)**

**Q. Code: 881184**

**Time: Three Hours**

**Maximum : 100 Marks**

Answer **ALL** questions

**PART A - (10 X 2 = 20 Marks)**

1. What are the parameters of robot arm?
2. Define and sketch the “work volume”.
3. When are hydraulic actuators preferred in a robot system?
4. What is meant by inverse kinematics?
5. List the features of sensory capability of modern robots.
6. Define ‘quantization and encoding’.
7. What are the factors to be considered while selecting a robot for an industrial application?
8. What is meant by ‘Gantry Robot’?
9. State the methods of robot programming.
10. Define motion interpolation. List the different types of interpolation.

**PART B - (5 X16 = 80 Marks)**

11. (a) Explain forward transformation and reverse transformation of robot manipulator with 3 degrees of freedom (16)  
(OR)  
(b) Classify the robots according to the coordinates of motion. With a sketch and example, explain the features of each type. (16)

12. (a) Sketch and explain the pneumatic circuits to control different motions of cylindrical and cartesian coordinate's robot. (16)
- (OR)**
- (b) Explain the various drive system used with an industrial robot and compare their features, merits and demerits. (16)
13. (a) Explain the principle of range sensing and proximity sensing. Also state the applications and limitations of each sensor. (16)
- (OR)**
- (b) Briefly discuss the various techniques in Image processing and analysis. (16)
14. (a) What is meant by robot cell? Explain the different types of robotic cell layouts. (16)
- (OR)**
- (b) State the importance of robot cycle time analysis. Explain the methods used for cycle time analysis. (16)
15. (a) Describe the four elements of the "expert system", with the flow chart. (16)
- (OR)**
- (b) Describe in detail about the search techniques used in artificial intelligence of robots. (16)