

**B.Tech. – VIEP – MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

December, 2017

00682

BIMEE-016 : ROBOTICS

Time : 3 hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Use of scientific calculator is allowed.

1. (a) Give the classification of Robots on the basis of mechanical configuration. What elements are used in describing robot specifications ? 7
- (b) Explain the components of a robot connected to a manufacturing system with the help of a neat sketch. 7
2. (a) What are the Denavit-Hartenberg parameters ? Explain them using a sketch. 7
- (b) Differentiate between Vacuum and Electromagnetic gripper. 7

3. (a) Explain the working of a pneumatic drive control system with a neat sketch. 7
- (b) What is a Resolver ? What is the application of a resolver ? Explain. 7
4. (a) Explain the steps of forward kinematics for a 3-link 3-revolute jointed planar robot arm. 7
- (b) What are the various types of sensors applied in robots ? Explain any one type with a suitable sketch. 7
5. (a) Describe the recent trends and developments in safety measurements of the automobile industry deploying robots. 7
- (b) Sketch and explain the working of an AC servomotor. 7
6. (a) What is a Robot Language ? Give comparisons between robot oriented programming language and task-level programming language. 7
- (b) Describe the features of VAL robot programming language. 7

7. Write short notes on any **four** of the following :

$$4 \times 3 \frac{1}{2} = 14$$

- (a) Degree of Freedom
 - (b) Feedback Control
 - (c) Vision and Artificial Intelligence
 - (d) DC and AC Electric Drives
 - (e) Cartesian, Cylindrical and Spherical Robotic Reference Frame
 - (f) PID Control Techniques
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