| BIMEE-016 |

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

Term-End Examination

June, 2015

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BIMEE-016 : ROBOTICS

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Standard notations have their usual meaning.*

1. (a) Sketch the robot configuration for (i) TTT (ii) TRT (iii) TRR (iv) RRR.   7

   (b) Define Resolution, Accuracy and Repeatability of a robot. Briefly explain the various factors on which these quantities depend.   7

2. (a) Sketch and explain the different mechanical end effectors. Give main applications of each type of end effector.   7

   (b) Differentiate between vacuum and electromagnetic gripper.   7

3. (a) Sketch and explain the working of a recirculating lead screw. 7

(b) Explain the different layouts used in robotic systems. 7

4. (a) Explain with an example the static characteristic parameters of a sensor. 7

(b) What is a resolver ? What is the application of a resolver ? Explain. 7

5. (a) Sketch and explain the working of an AC servomotor. 7

(b) Describe the features of VAL robot programming. 7

6. (a) Explain how robots can be used in hazardous and hostile working conditions. 7

(b) Discuss how the factors such as (i) robots and machine interface, (ii) operator interface and (iii) robot cell layout, relate to robot safety. 7

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

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

(i) Bowl feeder mechanism

(ii) Bendix wrist mechanism

(iii) Optical range finder

(iv) Robotic reference frame

(v) Different types of position sensors used in robots