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BIMEE-016

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

Term-End Examination

December, 2015

BIMEE-016 : ROBOTICS

Time : 3 hours *Maximum Marks : 70*

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

1. (a) Explain direct and inverse kinematics with suitable examples. 7

(b) How do the terms robot configuration and its application relate to each other ? Describe. 7

2. (a) Explain open loop and closed loop control of robots. 7

(b) What are robot's axes ? Explain the basic configuration of robots on the basis of work envelope. 7

3. (a) Sketch and explain the working of a magnetic stepper motor. 7

(b) Sketch and explain the working of a planetary lead screw. 7

4. (a) What are the problems related to the machine vision ? Explain. 7

(b) What is a tactile sensor ? Describe the working of a magneto resistive tactile sensor. 7

5. (a) Discuss the following safety methods used in robotic work cell design : 7

(i) Interlocks

(ii) Error detection and recovery

(b) Comment on the role of work envelope, speed, proximity to human and machine on design of a robot. 7

6. (a) Describe the adaptive control of robotic systems. 7

(b) Differentiate between adaptive control robot and artificial intelligence robot. 7

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Servo robot

(b) Normal binary code and Gray code

(c) Techniques of memory reduction in machine vision

(d) Brushless DC motor

(e) Different types of bearings used in robotic applications

(f) Different types of range sensors