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Total Number of Pages: 2

B.Tech
PEME5305

6th Semester Regular / Back Examination 2016-17
ROBOTICS AND ROBOT APPLICATIONS

BRANCH: Mech

Time: 3 Hours

Max Marks: 70

Q.CODE: Z292

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)**
- a) What is robot?
 - b) Describe about laws of robotics.
 - c) Name the important specifications of an industrial robot
 - d) List the different robot parameters.
 - e) What is Jacobian singularity?
 - f) Give example of a manipulator transformation matrix.
 - g) Name different types of sensors used for robot.
 - h) Which type of drive system is more suitable for heavy load robot application?
 - i) List any two important advantages and disadvantages of a pneumatic gripper.
 - j) What is joint space planning? bput question papers visit <http://www.bputonline.com>
- Q2 a) Classify the robots based on the arm geometry, power sources applications, and control techniques. (5)**
- b) Explain the various parts of a robot with neat sketch. (5)**
- Q3 a) Describe the computation of kinematic parameters using DH algorithm. (5)**
- b) A robot arm with present position of P (10,10,15) units is having a rotation about the global coordinate frame Z by an angle of 30° , then rotation about the global coordinate frame Y by an angle of 50° , then translation about the global coordinate frame x by 10 units. Find the final position of point P after it taken up the above movements. (5)**
- Q4 a) How direct kinematics is different from inverse kinematics? Explain with an example. (5)**
- b) Briefly describe about Lagrange-Euler formulation applied to robot. (5)**

- Q5 a)** Describe the classification of sensors and the factors to be considered for its selection. **(5)**
- b)** With suitable sketch and an application example, explain the principle of working of the proximity sensor. **(5)**
- Q6 a)** Discuss the performance characteristics of actuators. Compare electrical, hydraulic actuators for their characteristics. **(5)**
- b)** With neat sketch, explain how a Stepper motor works. **(5)**
- Q7 a)** Describe about Joint Interpolated motion and Controlled Path motion. **(5)**
- b)** What is trajectory planning? Explain the steps involved in trajectory planning? **(5)**
- Q8 a)** How robots are used for inspection? Explain with help of an example. **(5)**
- b)** Describe about robotic assembly procedures. **(5)**

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