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B.E. / B.Tech. DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011

MANUFACTURING ENGINEERING BRANCH

VIII SEMESTER

MN 507 ROBOTICS

(REGULATIONS 2004)

Time: 3 Hours

Maximum: 100 Marks

Answer ALL questions

PART A - (10 X 2 = 20 marks)

1. Define Robot.
2. How do you specify a Robot?
3. State true or false. Justify your answer. Electromagnetic gripper can be effectively used for handling explosive substances.
4. What are the merits and demerits of electric drive system of a robot?
5. State any four desirable features of robot sensor.
6. What is thresholding? Why is it necessary?
7. Distinguish between forward and inverse kinematics.
8. List out any four Robot programming languages.
9. What are the economic benefits available from the use of robots?
10. State any four examples of direct costs associated with the robot economics.

PART B – (5X16=80 Marks)

- 11 i) Enumerate with neat sketches common Robot configurations. (8)
- ii) Describe the applications of Robot in material handling. (8)

12 a i) List out different types of robot end-effectors. Describe any three. (10)

ii) Distinguish between two-point and three-point centering of robot gripper. (6)

(Or)

12 b i) Compare the features of most commonly used electric actuators in robotics. (8)

ii) Explain the features and applications of hydraulic actuators in robotics. (8)

13 a) Discuss with neat sketches the following sensors:

i) Touch sensor (8)

ii) Range sensor (8)

(Or)

13 b) Enumerate with neat diagram functions of machine vision system.

14a i) Discuss manual lead through and powered lead through Robot programming methods. (8)

ii) Enumerate any four commands used in VAL language. (8)

(Or)

14 b) Determine the homogenous matrix transformation matrix to represent the following sequence of operations.

i) Rotation of 60° about OX axis

ii) Translation of 4 units along OX axis

iii) Translation of -6 units along OC axis

iv) Rotation of 30° about OB axis (4X4=16)

15 a) List out various methods available for the investment analysis of robots.

Explain any two.

(Or)

15 b) Write short notes on

i) AGV (5)

ii) Safety considerations in robot operations (5)

iii) Implementation of robots in industries (6)