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SEAT No. :

[Total No. of Pages : 2

BE/INSEM/APR - 522

B.E. (Mechanical)

402049C: ROBOTICS

(2015 Pattern) (Elective - III) (Semester - II)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

- 1) Answer Qu. 1 or Qu 2, Qu 3 or Qu 4, Qu 5 or Qu 6.
- 2) Figures to the right side indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Use of scientific calculator allowed.

Q1) a) Define Robot. Explain anatomy of robot with neat sketch. [6]

b) What is end effector? Explain briefly. [4]

Q2) a) Classify Robots and explain any one Robot configuration in detail. [6]

b) A rectangular block of 5 kg is gripped in middle and lifted vertically at a velocity of 1 m/s. If it accelerates to this velocity at 27.5 m/s^2 and the coefficient of friction between the gripping pads and block is 0.48, estimate minimum force required to prevent slip. (Assume two finger gripper). [4]

Q3) a) Explain the construction & working of Tactile sensor. [5]

b) Discuss: Role of Control System in Robot. [5]

OR

Q4) a) List down different types of robot controllers. Explain P+I+D controller with block diagram and characteristic equation. [5]

b) Classify Sensors used in Robots. Discuss any one type of Robotic Sensor with neat sketch. [5]

P.T.O.

Q5) a) What is D-H parameter? With neat sketch explain Denavit-Hartenberg (D-H) parameter. [6]

b) For the point $3i + 7j + 5k$ perform the following operations : [4]

- i) Rotate 30° about X, then translate 6 units along Y
- ii) Translate 6 unit along y, then 30° about X

OR

Q6) a) Discuss : Direct and Inverse Kinematics. [6]

b) Explain the importance of homogeneous transformations. [4]
