Code No: 158DG

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech IV Year II Semester Examinations, July/August - 2022
FUNDAMENTALS OF ROBOTICS
(Common to CSE, IT)

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
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1.a) Describe the classification of Robots by control system.
b) Explain working of tactile sensors used in robots.
c) Explain the different types of actuators. [5+5+5]

2.a) What are the different robot applications in industry?
b) Compare hydraulic and electric actuator based on weight, operating pressure and cost. [5+10]

3.a) A rectangular block weighing 12 kg is gripped at middle and lifted vertically. If it accelerates at 25 m/s^2 and the coefficient of friction between gripping pad and block is 0.42. Calculate gripping force and draw gripper force analysis?
b) Differentiate forward and inverse kinematics? [10+5]

4.a) What factors to be considered in gripper selection?
b) Explain the role of D-H notation in Robotics. [7+8]

5.a) Solve fifth order polynomial trajectory planning with suitable example.
b) Sketch and explain procedure to obtain robot joint Jacobian matrix? [8+7]

6.a) Explain Newton-Euler formulation and its applications.
b) Discuss in detail trajectory planning of robot with suitable example. [7+8]

7.a) Explain robot program language structure with suitable example.
b) Discuss the following categories of programming instructions in VAL Robot programming:
i) Robot configuration control
ii) Motion control. [7+8]

8.a) Discuss the influence of the processing characteristics in robot cell design.
b) Explain the application of robot in industry for material handling. [8+7]

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