Total No. of Questions : 8]

SEAT No. : [ ]

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T.E. (Honors)

ROBOTICS

Principles of Robotics - I

(2019 Pattern) (Semester - I) (304181HR)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.***
2) ***Draw sketches where required.***

Q1) a) Explain with neat sketch mechanical grippers. **[6]**

b) State the factors in selection & Design of grippers. **[6]**

c) Classify grippers based on various criteria. **[6]**

OR

Q2) a) State and explain various tools used as end effectors. **[6]**

b) Explain with neat sketch tactile sensor gripper. **[6]**

c) Explain with neat sketch vaccum grippers. **[6]**

Q3) a) Explain with neat sketch LVDT sensor. **[6]**

b) Explain with neat sketch Piezo electric sensor. **[5]**

c) Explain with neat sketch construction of range sensors. **[6]**

OR

Q4) a) Explain with neat sketch force sensors. **[5]**

b) Explain working principles of capacitive densors. **[6]**

c) Explain with neat sketch touch sensors. **[6]**

P.T.O.

Q5) a) Enlist steps in forward kinematic analysis. **[6]**

b) Explain with neat sketch D.H. parameter. **[6]**

c) Define joint coordinates of a robot. **[6]**

OR

Q6) a) Write a short note on Jacobian transformation with one example. **[6]**

b) Compare, illustrate & explain direct & inverse dynamics applicable to Robotics alongwith its applications. **[6]**

c) A 2-DOF planar R-R- manipulator has L_1 = 120mm, & L_2 = 75mm. Determine joint angles using geometric approach. So that face end is located at (100,70). **[6]**

Q7) a) Explain various image processing techniques in robotics. **[6]**

b) State & explain economic aspects in robotics. **[5]**

c) What are the application of robots in industry. **[6]**

OR

Q8) a) What is robot safety. Explain 5 groups of humans that are at direct injury from robot. **[8]**

b) Write notes on : any (2) **[9]**

i) Agriculture

ii) Home sector

iii) Research & exploration