

Reg. No.

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**B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019**

Seventh Semester

**ME16011 – ROBOTICS***(Mechanical Engineering)***(Regulation 2016)****Time: Three Hours****Maximum : 100 Marks**

Answer ALL questions

**PART A - (10 X 2 = 20 Marks)**

	CO	RBT
1. Define a “Robot”.	1	R
2. Brief about scheme of joint notation.	1	U
3. Give examples of tools used as end effector.	2	U
4. Describe any two gripper mechanisms and mention their industrial applications.	2	AP
5. Define segmentation.	3	R
6. Differentiate between transducer and sensor.	3	U
7. List the different robot programming methods.	4	U
8. Describe the role of AI in smart robots.	4	AP
9. What do you infer from continuous transfer system?	5	U
10. What are the drawbacks of payback method?	5	U

**PART B - (5 X16 = 80 Marks)**

11. (a) Explain different robot configurations with neat sketches and individual merits and demerits and applications. (16) 1 U

**(OR)**

- (b) (i) Sketch a robot wrist and indicate wrist pitch, wrist yaw and wrist roll and show 3 DOF associated with wrist. (8) 1 U
- (ii) Compare Hydraulic, Pneumatic and Electrical drives. (8) 1 U

12. (a) Explain the steps to solve forward and inverse kinematics of a four axis manipulator. (16) 2 U

(OR)

- (b) (i) Discuss various consideration for selection of grippers in robots. (8) 2 U  
(ii) Explain vacuum grippers, with reference to the principle use and the application. (8) 2 U

13. (a) Explain the Machine vision systems of Robot with a block diagram. (16) 3 U

(OR)

- (b) (i) Prepare the factors to be considered for selection of sensors and write down the classifications of sensors. (8) 3 U  
(ii) Briefly explain the characteristics of Sensors. (8) 3 U

14. (a) Write the list of commands used in VAL programming and describe the function. (16) 4 U

(OR)

- (b) Explain the following terms in AI (i) problem representation, (ii) problem solving and (ii) search techniques (16) 4 U

15. (a) (i) Explain various step involved for implementing robots in industries (8) 5 U

- (ii) Explain in detail safety sensors and safety monitoring of robots (8) 5 U

(OR)

- (b) Suppose the total investment on the robot is estimated to be Rs.5,00,000. There is one shift operation of 2000 hours and 1 man replaced. Assuming labor rate including direct overheads to be Rs80/hour, robot running costs including maintenance and depreciation to be Rs100000 and added value of increased output be Rs.120000 determine the payback period. (16) 5 AP