Reg. No. :

# Question Paper Code : X10869

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Seventh Semester
Civil Engineering
OIE 751 – ROBOTICS
(Common to Aeronautical Engineering/Automobile Engineering/Robotics and Automation /Computer Science and Engineering/Electronics and Communication Engineering/Mechatronics Engineering/Mechanical Engineering/

Information Technology)

(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

PART – A
Answer ALL questions
**(10×2=20 Marks)**

1. State the laws of robotics.

2. Define work envelope in robotics.

3. List the factors to be considered in selecting the grippers.

4. Identify the applications of hydraulic drives.

5. Differentiate accuracy and precision.

6. List the requirements of a sensor.

7. Differentiate forward kinematics and inverse kinematics.

8. Infer the term ‘manipulator dynamics’.

9. Summarize the safety considerations for robot operations.

10. Identify the direct costs associated with a robot project.

PART – B **(5×13=65 Marks)**

11. a) Classify the different types of robots and explain the various parts of robot and their functions with neat sketches.

(OR)

b) Elaborate Robot anatomy, four common robot configurations and robot motions with neat diagrams.

12. a) Explain the different types of electrical drives used in robots with neat sketches.

(OR)

b) Explain the different types of end effectors with neat sketches.

13. a) Illustrate the principle, construction and working of position sensor and piezo electric sensor with neat sketches.

(OR)

b) Illustrate the principle, construction and working of LVDT and optical encoders with neat sketches.

14. a) Represent a 4-degree of freedom manipulator in three dimensions and illustrate the configuration, position and angle of manipulator in three dimensions.

(OR)

b) Classify the different types of robot programming languages and explain their salient features.

15. a) Explain the various steps involved in implementation of robots in industries.

(OR)

b) Explain Rail Guided Vehicle (RGV) and Automated Guided Vehicle (AGV) used in automation sector with necessary sketches and layouts.

PART – C **(1×15=15 Marks)**

16. a) Illustrate the various hardware's, their functions and operations of machine vision system with a neat layout.

(OR)

b) Write a program to instruct the robot to pick up bottles from a fixed location on a conveyor and insert them into a cardboard cartoon. Assume necessary dimensions and other parameters.

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