JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2023
B.Tech-VII Semester (CSE/IT/ECE/CE/BT/BI)

COURSE CODE (CREDITS): 20B1WEC731 (3) MAX. MARKS: 25

COURSE NAME: Automation and Robotics

COURSE INSTRUCTORS: Dr. Emjee Puthooran MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.
(b)Marks are indicated against each question in square brackets.
(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1. What is the functional configuration of a typical sensor system? Draw the block diagram and briefly explain each block. [CO3, 4M]

Q2. Explain the working strain gauge sensor. With a circuit diagram describe the force measurement using single element strain gauge and four element strain gauge sensor. What are the advantages of using four element strain gauge sensors? [CO3, 4M]

Q3. Write a Python program to simulate a mass-damper-spring system shown below. Plot the output of the system with unity feedback to a unit step input with a PID controller.

[CO2, 4M]
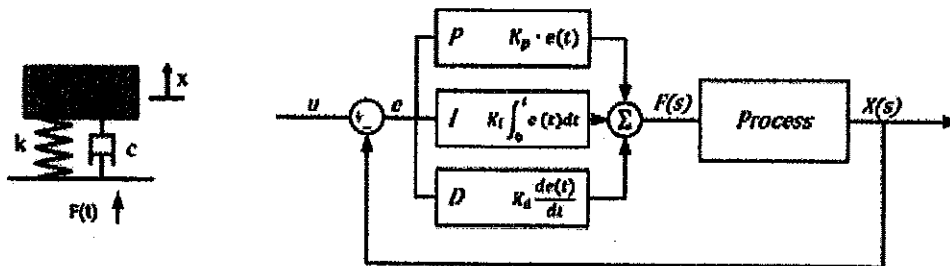
Q4. Oil is consumed randomly from an oil tank. The tank needs to be refilled by turning on a pump. Two hydrostatic switches are used to detect a high and low level. The pump should be switched ON if the oil level goes below the low hydrostatic switch. The pump should be switched OFF if the oil level goes above the high hydrostatic switch. Draw a suitable Ladder Logic Diagram for this problem and explain its function. [CO2, 4M]
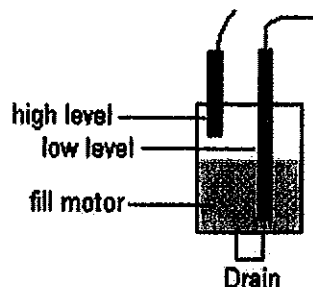
Q5. What is degree of freedom? Write with explanation the degrees of freedom of cylindrical joint, rotational joint and SCARA robot. [CO2, 4M]

Q6. Explain different classification of robots. [CO2, 5M]