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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

END TERM EXAMINATION – JAN 2023

Semester: Semester V – B.Tech PET - 2020

Course Code: PET2005

Course Name: Sem V – PET2005 -Fundamentals of Instrumentation
and Control Engineering

Program & Sem: B.Tech. Petroleum Engineering

Date: 04-01-2023

Time: 09:30 am to 11:30 pm

Max Marks: 60

Weightage: 30%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
- (ii) Question paper consist of 3 parts
- (iii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

ANSWER ALL THE FIVE QUESTIONS

(5Qx 2M=10M)

1. Define Control Variable. (C.O.No.1) [Knowledge]
2. Identify the damping ratio for which the steady state is never achieved. (C.O.No.2) [Knowledge]
3. Describe controller gain for controllers in process control. (C.O.No.3) [Knowledge]
4. List out the functions of a controller in process control. (C.O.No.3) [Knowledge]
5. Select the controller used in conditions where the error is very small (C.O.No.3) [Knowledge]

Part B [Thought Provoking Questions]

ANSWER ALL THE THREE QUESTIONS

(3Qx10M=30M)

6. Identify and explain the damping ratios in the following situations.
 - a) Throwing a stone in a stagnant water due to which ripples are caused in the water.
 - b) Response of a single tank system, when giving a step input of 5 LPM. (C.O.No.2) [Comprehension]

7. Explain the difference of positive feedback system and negative feedback with the help of a proper example. Explain why the positive feedback system is not suggested to be used in the industry. (C.O.No.1) [Comprehension]
8. Considering the situations given below. Advice which controllers to be used and Explain the controller in detail.
- a) This process requires the current of an equipment to be at 25 ampere. It was found that the error in the process was very small 0.25 ampere. Advice which controllers to be used in this process.
- b) This process requires the flow rate to be 10 LPM. It was found that the error in the process was changing with time. The flowrate changes between 5 to 15 LPM with time. Advice which controllers to be used in this process. (C.O.No.3) [Comprehension]

Part C [Problem Solving Questions]

ANSWER THE ONE QUESTION

(1Qx20M=20M)

9. The two tank system consist of pump, rotameter valve , process tank , supply tank, rotameter, main power, supply switch, pump switch. The fluid level or liquid level in tank is measured by scale. The rotameter measures, the flow through the pipe and control valve's control the liquid flow, in an interacting tank system the two tanks are connected in series, the output of first tank is connected to the input of the second tank. Identify and explain all the process variables for this experiment and explain them in detail. (C.O.No. 1) [Application]
