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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF INFORMATION SCIENCE

MAKE-UP EXAMINATION - JULY 2024

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| **Semester :** MAKE-UP | **Date : 09/07/24** |
| **Course Code :** PET2005 | **Time : 9:30 AM to 12:30 PM** |
| **Course Name** : Fundamentals of Instrumentation and Control Engineering | **Max Marks : 100** |
| **Program :** B.Tech | **Weightage : 50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 2M=10M** | | | |
| 1 | What is closed loop system? | (CO1) | [Knowledge] |
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| 2 | What is feedback control system? Give an example of feedback control system. | (CO1) | [Knowledge] |
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| 3 | What is open loop system give an example of open loop system. | (CO2) | [Knowledge] |
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| 4 | What are the fundamental elements of block diagram? | (CO3) | [Knowledge] |
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| 5 | What do you mean by set point and disturbance? | (CO3) | [Knowledge] |
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| 6 | What do you mean by ideal control system? | (CO4) | [Knowledge] |
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| 7 | Why an oil and gas separator comes under first order system? | (CO4) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 8 | Establish model equation of an open loop system with proper diagram and equation. | (CO1) | [Comprehension] |
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| 9 | A petrochemical company installed a separator for separate natural gas and water mixture. During the time of installation, they forgot to mention residence time in log book. During the time of operation operator observed gas and water are coming out as heterogeneous mixture. As a process control engineer you determine the general residence time to separate gas and water mixture from separator. | (CO2) | [Comprehension] |
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| 10 | An electric oven with a coil started for preparing food. It is observed while the switch is on, instantly it can’t use to prepare food or boiling water. Why it is happening justify in terms of time response. | (CO2) | [Comprehension] |
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| 11 | With the help of a diagram explain, how a typical feedback control loop is implemented suitable example? Comment on negative and positive feedback. | (CO3) | [Comprehension] |
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| 12 | You started a micro oven. How can you explain in terms of time response? | (CO3) | [Comprehension] |
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| 13 | “Human body is a complex organism”. Based on the following statement describe different control strategies implemented in our bodies. | (CO4) | [Comprehension] |
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| 14 | Consider the working of an air conditioner. An operator was trying to maintain room temperature in between 18˚C temperature. It was observed that ambient temperature was 26˚C. As a control engineer which type of loop system you suggest as if room temperature can reach 18˚C temperature. | (CO4) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** | | | |
| 14 | Establish model equation of  single tank system with proper diagram and equation. | (CO2) | [Application] |
|  | | | |
| 15 | The above figure indicates a block diagram of Shell Industries Limited. “R” Indicates the Crude and gas. C indicates crude only. Determine the relationship between C&R. | (CO3) | [Application] |
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| 16 | An O&G industry use a batch separator to separate natural gas from the mixture of crude gas and water. They decided to install a fully closed loop system to separate natural CH4 from the above mixture. For designing the separator, residence time is one of the major important parameter. As a petroleum engineer determine residence time for   1. Zeroth order system; (b) First order system; (c) nth order system. | (CO4) | [Application] |