KATHMANDU UNIVERSITY
End Semester Examination [C]
December, 2024

Marks Scored:

Level : B.E.
Year : III

Course : EPEG 317
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 20 DEC 2024

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle in the most appropriate option from each set of choices

1. Which of the following is an example of an open loop system?
   a. Fan
   b. Room air conditioning
   c. Refrigerator
   d. Difference amplifier

2. Calibration is important to:
   a. Measure the accuracy of equipment
   b. Find the sensitivity of equipment
   c. Weight of equipment
   d. Velocity of equipment

3. Electrical transducer performs transformation of
   a. Electrical quantity to physical quantity
   b. Physical quantity to electrical quantity
   c. Physical quantity to other physical stages
   d. Electrical quantity to other electrical stages

4. Photovoltaic cell is an example of
   a. Infra-red transducer
   b. Passive transducer
   c. Thermal sensor
   d. Active transducer

5. Which signal conditioning circuit provides a linear output?
   a. Voltage divider
   b. Op-amp based
   c. High frequency amplifier
   d. Filter circuit

6. The major advantage of a flash ADC is
   a. High resistance values
   b. Small resistance values
   c. Slower conversion time
   d. Faster conversion time

7. Which wireless transmission will you choose for short distance, low energy consumption for data transmission?
   a. WiFi b. Bluetooth c. LoRA d. Starlink

8. Energy meter measures the amount of _____ consumed by the load over a time period.
   a. Active power b. Reactive power c. Apparent power d. AC Frequency

9. Electronic Interference due to capacitance can be reduced by using
   a. Copper cables b. Industrial cables c. Twisted cables d. Shielded cables

10. Which kind of controller will you choose for a noisy, high humidity, temperature i.e for the industrial environment?
    a. Arduino Uno
    b. Programmable logic controller
    c. Rasperry PI
    d. Arduino Mega

11. Fuzzy logic control is based on
    a. Degree of uncertainty
    b. Precise control
    c. Low power control
    d. All of the above

12. The control system used in industry to control industrial process is termed as:
    a. Computer control
    b. Process control
    c. Human control
    d. None of the above

13. Successive ADC has
    a. Fastest conversion time
    b. High resolution
    c. (a) and (b)
    d. Good accuracy

14. A digital voltmeter displays 9.02V. Its resolution is
    a. 0.2V b. 0.02V c. 0.002V d. 0.0002V

15. The different stages in fuzzy logic control are
    a. Fuzzification, and Defuzzification
    b. Fuzzification, Rule making and Defuzzification
    c. Fuzzification and Decision making
    d. Fuzzification, Rule making, Decision making, and Defuzzification

16. The gain of non-inverting amplifier is:
    a. $(1+R_f)/ R_1$ b. R_f+R_1 c. $R_f - R_1$ d. $-R_f/ R_1$
    Where R_f: Feedback resistor, R_1: Input resistor

17. The common secondary rating of a current transformer is:
    a. 1.5A b. 3A c. 4A d. 1A

18. The common secondary rating of a potential transformer is:
    a. 220V b. 110V c. 400V d. 600V

19. Which is the best industrial amplifier?
    a. Summing amplifier
    b. Inverting amplifier
    c. Logarithmic amplifier
    d. Instrumentation amplifier

20. The sampling frequency for industrial application should be
    a. Equal to the signal frequency
    b. Less than the signal frequency
    c. At-least ten times the signal frequency
    d. All of the above

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SECTION "B"

[5 Q. × 8 = 40 marks]

Attempt ANY FIVE questions. Each question carries 8 marks. Symbols have their usual meanings. Urgent appropriate assumptions are permissible. Marks are indicated inside brackets.

1.
   a. Explain the parts of a Programmable Logic Controller. [4]
   b. Describe the components of a Fuzzy Logic Controller. [4]

2.
   a. Develop a 5-bit Binary Weighted Digital to Analog converter and explain its advantages and disadvantages. [5]
   b. Explain the sources of error in ADC and DAC. [3]

3.
   a. Explain the working principle of an ammeter based on Permanent magnet moving coil. [5]
   b. Describe the working of a current transformer. [3]

4.
   a. Describe the components of a data acquisition systems. [4]
   b. Describe the working of a 4-bit successive Analog to Digital Converter. [4]

5.
   a. What are the sources of error in measurement systems? Describe them in detail. [4]
   b. Describe the measuring principle using Schering bridge. [4]

6.
   a. Explain the concepts of closed loop control system with a suitable example. [4]
   b. Describe the working of a Linear Variable Differential Transformer. [4]