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DCPH603

Reg. No. | | | | | | | | |

VI Semester B.Sc. Degree Examination July/August-2024

PHYSICS

Electronic Instrumentation and Sensors

(NEP Scheme Freshers 2021-22 onwards)

Paper : 8 (PHY.DSCT8)

Time : 2½ Hours **Maximum Marks : 60**

Instructions to Candidates : **1. Answer the number of questions as cited in each part.**

2. Use of non-programmable scientific calculator is allowed.

PART - A

Answer any FOUR questions. Each question carries two marks. **(4×2=8)**

1. Mention any two advantages of a three phase AC power.
2. Mention any two characteristics of DC power supply.
3. What is a Wien bridge oscillator? Write the expression for its frequency of oscillation.
4. What is the principle of a π - section filter?
5. Mention any two types of digital display systems.
6. What is the principle of a capacitive transducer?

PART - B

Answer any FOUR questions. Each question carries Five marks. **(4×5=20)**

7. Calculate the ripple factor of a half wave rectifier, if the rms value of current is 0.17mA and the Peak value of current is 0.34A.
8. A meter with full scale deflection current of 10 mA and internal resistance of 500 Ω is to be converted into a multirange DC voltmeter of ranges 0-20 V and 0-50V. Determine the values of resistances required for each range.
9. A Phase shift oscillator uses 0.01 μF capacitors. Find the value of resistance to produce a frequency of 3.25 kHz.

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10. An active high pass filter has a cutoff frequency of 1kHz with a pass band gain of 3. Calculate the value of capacitance and the feedback resistance.

Given $R_1 = 10k\Omega$, $R = 15.9k\Omega$.

11. A 4 bit digital to analog converter has a reference voltage of 5V. Determine the output voltage for the digital input of 1111.

12. A resistance strain gauge with a gauge factor of 4 is cemented to a steel base, which is subjected to a strain of 1×10^{-6}. If the original resistance value of the gauge is 150 Ω, calculate the change in resistance.

PART - C

Answer any FOUR questions. Each question carries eight marks. **(4×8=32)**

13. a) What is half wave and full wave rectifier?

    b) What is a cathode ray oscilloscope? Draw its block diagram and explain briefly the different parts of CRO. **(5+3)**

14. a) What is the difference between passive and active filters?

    b) State and prove the fundamental theorem of filters using symmetrical T- network. **(2+6)**

15. a) Explain with a circuit diagram the digital to analog converter by using Ladder type (R-2R) network.

    b) What is the principle of phase sensitive detection? **(6+2)**

16. a) Explain the construction and working of an LED.

    b) What is pulse width modulation? Mention the principle of operation of it. **(6+2)**

17. a) Explain in brief the basic characteristics of an electrical transducer.

    b) What is a thermistor? Explain the construction and working principle of a platinum resistance thermometer. **(4+4)**

18. a) Distinguish between bonded and unbounded resistance wire gauges.

    b) Explain the construction and working principle of a Linear Variable Differential Transducer. **(2+6)**
