U.G. 3rd Semester Examination-2023

PHYSICS

[HONOURS]

Skill Enhancement Course (SEC)

Course Code : PHY-H-SEC-T-01(A,B)

Full Marks : 40 Time : 2 Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer all the questions from Selected Option.

OPTION–A

PHY-H-SEC-T-01

(Basic Instrumentation Skills)

GROUP–A

1. Answer any **five** questions: 2×5=10

a) What is multimeter?

b) Write down the unit of electric and magnetic field in S.I unit.

c) Distinguish between analog and digital instruments.

d) What are the main parts of Cathode Ray Tube?

e) Draw the basic block diagram of signal generator.

f) What is "loading effect"?

g) Explain what do you mean by impedance bridge?

h) Write down the full form of DAC and ADC.

[Turn over]

GROUP-B

2. Answer any **two** questions: 5×2=10

a) Write down the colour code for measuring resistance of a resistor. Explain briefly with a suitable example for measuring resistance of a resistor by colour code. 2+3=5

b) Draw a diagram of Q — meter circuit. Write down the working principle of Q–meter circuit. 2+3=5

c) Write down the basic principle of DVM. Draw the block diagram of it. 2+3=5

d) Write down the steps for measuring AC and DC voltage by using multimeter. 5

GROUP-C

3. Answer any **two** questions: 10×2=20

a) Discuss accuracy, pression and resolution of an instrument used in some measurement. What do you mean by average deviation and standard deviation? A set of independent voltage measurement takes by four observers was recorded as 117.02 V, 117.11 V, 117.08 V and 117.03 V Calculate average voltage and average deviation. 3+4+3

b) What do you mean by impedance bridge? Write down the working principle of RLC bridge. What is the specification of digital LCR meter. 2+5+3

c) Draw the block diagram of a general purpose CRO and indicates its basic components. Write short note on pulse generator. (3+2)+5

d) Write the short notes on i) Pulse Generator and ii) Signal Generator. 5+5

OPTION–B

PHY-H-SEC-T-01

(Electrical Circuit and Network Skills)

GROUP–A

1. Answer any **five** questions: 2×5=10

   a) Give two examples where Ohm's is not valid.

   b) Define current density.

   c) Draw symbol for current controlled voltage source.

   d) Write the condition to transfer Maximum Power to the load in a.c circuits.

   e) Explain what happens when a voltmeter is connected in series with the circuit?

   f) What are the materials used for wiring?

   g) Indicate the various quantities that can be measured with a multimeter.

   h) What is thc main purpose of commutators and brushes for a generator?

GROUP-B

2. Answer any **two** questions: 5×2=10

   a) Establish the relations between resistors of equivalent star and delta connections.

   b) What is house wiring? What type of wire is used in a house? What is meant by industrial wiring? 2+1+2

   c) State the maximum power transfer theorem. Explain the procedure to convert a practical Voltage source into an equivalent Current source. 2+3

d) What is the significance of back EMF? An alternating voltage is given by $V=220sin(100t)$. Calculate (i) frequency, (ii) maximum value. (iii) average value. (iv) RMS value of the above mentioned voltage. 1+4

GROUP-C

3. Answer any **two** questions: 10×2=20

a) Six identical wires each of resistance R are connected in the form of regular tetrahedron. Find the equivalent resistance between any two corners of the tetrahedron. How can you protect the household electrical appliances from sudden unusual high voltage pulse? 5+5

b) Define Real Power and Power Factor for an AC circuit. With a circuit diagram explain the principle of operation of a bridge (full wave) rectifier. 2+3+5

c) With a neat circuit diagram, explain the construction and principle of operation of AC Motor. Write short notes on DC generators. 5+5

d) What are the various types of drawing used for electrical wiring? Explain in detail. An alternating voltage of 240 V. 60 Hz is applied to a coil which takes 10Amp of current. The power absorbed by the circuit is 0.5 KW. Calculate the resistance and reactance of the coil. 5+5