REV-01
BPT/15/20

2025/12

SET A

BACHELOR OF PHYSIOTHERAPY
FIRST SEMESTER
MECA & BASIC ELECTROTHERAPY
BPT – 103 [REPEAT]
[USE OMR SHEET FOR OBJECTIVE PART]

Duration : 3 hrs. **Full Marks : 70**

Objective

Time : 30 min. **Marks : 20**

Choose the correct answer from the following: ***1×20=20***

1. According to KCL,
   a. Σ I=1 b. Σ I=2
   c. Σ I=0 d. I=0

2. KVL can be applied to
   a. Closed path b. Open path
   c. Both (a) & (b) d. None of these

3. Transistor is a
   a. Three junction device b. Two junction device
   c. Uni-junction device d. All of these

4. In case of conductor, the forbidden energy band is
   a. Large b. Very large
   c. Small d. Negligible

5. CPU consists of
   a. ALU & Memory b. ALU & Control Unit
   c. Control Unit & Memory d. All the above

6. How many NAND gates are required to construct an AND gate?
   a. 3 b. 2
   c. 4 d. 1

7. In 4:1 MUX, the number of select line is
   a. 2 b. 3
   c. 1 d. 4

8. Voltage division rule is applicable to
   a. Series Circuit b. Parallel Circuit
   c. Both (a) & (b) d. All the above

9. DEMUX is also called
   a. Data selector b. Data distributor
   c. Data analyzer d. All the above

10. If a wire having length 2m and area $4m^2$ has a resistance of 8 Ohm. Its resistivity is
    a. 8 ohm-m
    b. 16 ohm-m
    c. 20 ohm-m
    d. 4 ohm-m

11. Binary equivalent of the number $(25)_{10}$ is
    a. 10101
    b. 11011
    c. 11001
    d. 01111

12. Diode is a
    a. Three terminal device
    b. Two terminal device
    c. One terminal device
    d. None of these

13. The 2's compliment of the number 10101101 is
    a. 01010010
    b. 11010010
    c. 01010011
    d. 11101111

14. The hexadecimal form of the binary number 11111011 is
    a. A3
    b. AF
    c. FA
    d. FB

15. Which of the following is responsible for arithmetic and logical operations?
    a. ALU
    b. Memory
    c. Control Unit
    d. All the above

16. Monitor is an example of
    a. Input Device
    b. Storage device
    c. Memory device
    d. Output device

17. If two voltages of values 18 V and 12 V are connected in series opposing circuit, the net voltage will be
    a. 18 V
    b. 12 V
    c. 30 V
    d. 6 V

18. Full Adder performs binary addition operation of
    a. 3 bits
    b. 2 bits
    c. 1 bits
    d. 7 bits

19. The electronic circuit that converts AC to DC is called
    a. Converter
    b. Amplifier
    c. Rectifier
    d. Clipper

20. The main feature of 2nd generation of computer is
    a. Transistor
    b. Vacuum tube
    c. IC
    d. AI

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Descriptive

Time : 2 hrs. 30 min. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Discuss the features, advantages and disadvantages of generation of computer. **10**

2. Define Kirchhoff's laws. Two resistors of values 14Ω and 10Ω are connected across a voltage source of 6V. Another 10Ω resistor and 5V voltage source are connected across the previous combination. Find the values of current flowing in the two mesh formed. **10**

3. a. Explain with the help of block diagram the architecture of computer.
   b. Design a half-subtractor with the help of truth table. **5+5=10**

4. a. Design a Full Adder circuit with the help of truth table.
   b. Subtract $(15)_{10}$ from $(10)_{10}$ in 2's compliment method. **7+3=10**

5. What do you mean by Multiplexer? Design a 4:1 MUX with the help of truth table. **10**

6. a. Explain with the help of diagram 1×2 DEMUX.
   b. Differentiate between Semiconductor, Conductor and Insulator. **5+5=10**

7. a. What is a transistor? What are the various configurations of transistors? Explain with the help of diagram. **6+4=10**
   b. In a circuit, if series opposing voltages are 12 V and 6 V and two resistors of values 4Ω & 8Ω are connected in series, then compute
      (i) Circuit current
      (ii) Power supplied by the two batteries
      (iii) Power dissipated in two resistors

8. **a.** Find the binary equivalent of the decimal number $(13.25)_{10}$. **2.5+2.5 +5=10**
   b. Convert $(11011.1011)_2$ into decimal.
   c. Write short notes on half wave rectifier.

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