

**BACHELOR OF PHYSIOTHERAPY
FIRST SEMESTER
MECA & BASIC ELECTROTHERAPY
BPT-103**

**SET
B**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

(Objective)

Time: 30 mins.

Marks: 20

Choose the correct answer from the following:

1×20=20

- In case of conductor, the forbidden energy band is
 - Large
 - Very large
 - Small
 - Negligible
- Transistor is a
 - Current controlled device
 - Voltage controlled device
 - Both
 - None of these
- Collector of a transistor is
 - Lightly doped
 - Highly doped
 - Moderately doped
 - All the above
- 2's compliment of the binary number 11011001 is
 - 00100110
 - 00100101
 - 1011110
 - 00100111
- If 20 numbers of 20 Ohm resistors are connected in parallel, then equivalent resistance will be
 - 10 Ohm
 - 5 Ohm
 - 1 Ohm
 - 20 Ohm
- Which of the following wavelengths have highest energy?
 - Red
 - Blue
 - Green
 - UV
- What is the technique of the flow of heat energy in a fluid?
 - Conduction
 - Convection
 - Radiation
 - None of the above
- What is the wavelength of a sound of 50 Hz. Assume standard velocity of sound waves in air.
 - 6.2 m
 - 64 m
 - 0.62 m
 - 6.4 m
- The Raman Effect is related to which of the following of molecules
 - Vibrational Energy states
 - Linear motion
 - Rotational Energy states
 - Vibrational motion
- The Doppler Effect is related with which of the following?
 - Sound
 - Light
 - Heat
 - None of the Options

11. Which of the following is a heat insulator?
a. Iron
b. Glass
c. Gold
d. Silver
12. Which property of a material is used to separate the different colors of light
a. Reflection
b. Refraction
c. Dispersion
d. Absorption
13. What is the speed of sound in Air?
a. 230 m/s
b. 100 m/s
c. 320 m/s
d. 1000 m/s
14. Binary equivalent of the number $(25)_{10}$ is
a. 10101
b. 11001
c. 11001
d. 01111
15. Two resistors are said to be connected in series when
a. Both carry the same amount of current
b. Total current equals the sum of branch currents
c. Both resistors have the same amount of voltages
d. None of the above
16. In parallel circuits, all components must have
a. The same potential difference across them
b. Carry the same current
c. Both (a) & (b)
d. None of the above
17. CPU consists of
a. ALU & Memory
b. ALU & Control Unit
c. Control Unit & Memory
d. All the above
18. Which of the following is responsible for arithmetic and logic operations?
a. ALU
b. Memory
c. Control Unit
d. All the above
19. The device that converts AC to DC is called
a. Amplifier
b. Transformer
c. Rectifier
d. Converter
20. In a MUX, the selection of a particular input line is controlled by
a. Data controller
b. Logic gates
c. Select lines
d. All the above

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(Descriptive)

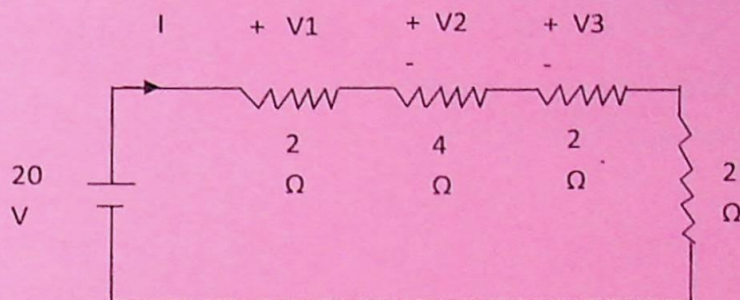
Time : 2 hrs. 30 mins.

Marks : 50

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

1. (a) Differentiate between Semiconductor, Conductor and Insulator. 5+5=10
(b) Design a 4:1 MUX.

2. a. Using Voltage division rule, find the voltage across $4\ \Omega$ register. Also find the value of current 3+3+4=10



b. In a circuit, if series opposing voltages are 12 V and 6 V and two resistors of values $4\ \Omega$ & $8\ \Omega$ are connected in series, then find

- (i) Circuit current
- (ii) Power supplied by the two batteries
- (iii) Power dissipated in two resistors

c. Explain with the help of diagram the working principle of half wave rectifier.

3. a. Design a Full-Adder circuit with the help of truth table. 7+3=10
b. What are the various terminals of BJT? Briefly Explain.

4. a. Explain with the help of diagram the working principle of PNP transistors. 4+3+3=10
b. Subtract $(15)_{10}$ from $(10)_{10}$ in 2's complement method.
c. Realize a OR gate using NAND gates only.

11. ✓

5. Write short notes on the followings: 5+5=10
(a) Generation of computer.
(b) Application of current in treatment.
6. a. Describe the Raman Effect with the necessary diagrams 5+5=10
b. Explain the Electromagnetic spectrum and denote which waves are used for which medical purposes.
7. a. Differentiate between Light and Sound waves with an appropriate diagram. 5+5=10
b. What is the Newton's Formula for the velocity of sound and the correction needed. Also explain the effect of Pressure, Temperature and Humidity on the Velocity of Sound
8. a. Differentiate between the three known methods of heat transfer. 5+5=10
b. Explain why the top of the lake freezes but not the bottom.

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