



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)
MAIN CAMPUS
UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR
MAIN EXAM
FIRST YEAR SECOND SEMESTER EXAMINATIONS
FOR
DIPLOMA OF MEDICAL BIOTECHNOLOGY**

COURSE CODE **BBD 121**

COURSE TITLE: **GENERAL PHYSICS FOR BIOMEDICAL SCIENCE**

DATE: 19/04/2022

TIME: 12.00 PM – 2.00 PM

INSTRUCTIONS TO CANDIDATES

- This paper is divided into three sections, A B and C, carrying respectively: Multiple Choice Questions (MCQs), Short Answer Questions (SAQs) and Long Answer Questions (LAQs).
- Answer all questions.
- Write your answers on the provided university examination booklet.

TIME: 2 Hours

SECTION A (MCQs) 20MARKS

1. Identify the primary quantity from the following.
 - a) Mass
 - b) Density
 - c) Speed
 - d) Volume
2. Which of the following is a use of dimensional analysis?
 - a) To check the dimensional correctness of an equation
 - b) To solve the equation dimensionally
 - c) To get the number of dimensional constants
 - d) To understand the dimensional equation
3. The dimension whose unit does not depend on any other dimension's unit is known as _____
 - a) Fundamental dimension
 - b) Dependent dimension
 - c) Independent dimension
 - d) Absolute dimension
4. Which one of the following is a dimensionless quantity?
 - a) Mass
 - b) Weight
 - c) Specific weight
 - d) Reynold's number
5. First law of thermodynamics is based on?
 - a) Conservation of energy
 - b) Conservation of mass
 - c) Conservation of momentum
 - d) Conservation of work
6. If 315cal of heat is given to the system, and the system does 20cal of work, find the change in internal energy.
 - a) 295cal
 - b) 335cal
 - c) 0 cal
 - d) 335J
7. Which photon is more energetic: A red one or a violet one?
 - a) Both
 - b) Red
 - c) Violet
 - d) Neither
8. If the wavelength of electromagnetic radiation is doubled; what will happen to the energy of photons?
 - a) Remains the same
 - b) Doubled
 - c) Halved
 - d) Infinite
9. What happens to the wavelength of a photon after it collides with an electron?
 - a) Increases
 - b) Decreases
 - c) Remains the same
 - d) Infinite
10. Why are alkali metals most suited as photo-sensitive metals?
 - a) High frequency
 - b) Zero rest mass
 - c) High work function
 - d) Low work function
11. Which radiations will be most effective for the emission of electrons from a metallic surface?
 - a) Microwaves

- b) X rays
 - c) Ultraviolet
 - d) Infrared
12. Electric current may be expressed in which one of the following units?
- a) coulombs/volt
 - b) joules/coulomb
 - c) coulombs/second
 - d) ohms/second
13. A Newton is equal to which of the following
- a) kilogram-meter per second
 - b) meter per second squared
 - c) kilogram-meter per second squared
 - d) kilogram per meter-second
14. The electrons would go to lower energy levels first and then to higher energy levels according to which of the following
- (a) Aufbau principle
 - (b) Pauli's exclusion principle
 - (c) Hund's rule of maximum multiplicity
 - (d) Heisenberg's uncertainty principle
15. The number of electrons which can be accommodated in an orbital is
- (a) One
 - (b) Two
 - (c) Three
 - (d) Four
16. The maximum number of electrons that can be accommodated in 'f' sub shell is
- (a) 2
 - (b) 8
 - (c) 32
 - (d) 14
17. What is the rate of flow of electric charges called?
- (a) Electric potential
 - (b) electric conductance
 - (c) Electric current
 - (d) none of these
18. Which instrument is used for measuring electric potential?
- (a) Ammeter
 - (b) galvanometer
 - (c) voltmeter
 - (d) potentiometer
19. When one unit electric charge moves from one point to another point in an electric circuit, then the amount of work done in joules is known as?
- (a) Electric current
 - (b) electric resistance
 - (c) electric conductance
 - (d) potential difference
20. The hindrance presented by material of conductor to the smooth passing of electric current is known as:
- (a) Resistance
 - (b) Conductance
 - (c) Inductance
 - (d) None of these

SECTION B

1. a. Describe the first law of thermodynamics(3mks)
b. 5000 J of heat are added to two moles of an ideal monatomic gas, initially at a temperature of 500 K, while the gas performs 7500 J of work. What is the final temperature of the gas? (5mks)
2. Define the following terms(8mks)
 - a. Specific heat capacity
 - b. Latent heat
 - c. Enthalpy
 - d. Quantity of heat
3. a. State the Pauli Exclusion Principle(3mks)
b. Explain the applications of Pauli Exclusion Principle (5mks)
4. Explain the magnetic properties of matter (8mks)
5. a. What is wave equation?
b. Explain the principle of superposition of waves

SECTION C

1. a. State and explain the amperes law (4mks)
b. Explain the applications of amperes law (8mks)
c. Two long straight wires parallel to each other, each carrying a 20A current separated with 2m distance. Calculate the intensity of magnetic field between them (8mks)
2. a. state and explain the newton's 2nd law of motion (4mks)
b. A cuboid box with a length of 5m and a mass of 100kg is being pulled by a cart with an acceleration of 5m/s determine;
 - i. pressure exerted on the flow by the box (8mks)
 - ii. The force applied on the box' (8mks)