



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
(MMUST)**

DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCE

**UNIVERSITY MAIN EXAMINATIONS
2017/2018 ACADEMIC YEAR**

(MAIN & KISUMU CAMPUS)

**BSC MEDICAL LABORATORY SCIENCES/BSC MEDICAL
BIOTECHNOLOGY**

COURSE CODE: BMLS 124

**COURSE TITLE: PHYSICS FOR MEDICAL LABORATORY SCIENCE
MAIN EXAMINATION**

DATE:

TIME:

INSTRUCTIONS TO CANDIDATES

Answer ALL Questions

This Paper Consists of 5 Printed Pages. Please Turn Over.

SECTION A (20marks)

1 The unit of physical quantity which does not depend on the unit of any other physical quantity is called as

- a. Independent dimension
- b. Fundamental dimension
- c. Core dimension
- d. None of the above

2. Energy has different forms which include

- a. Heat
- b. Work
- c. All of the mentioned
- d. None of the mentioned

3. Eliminate a statement which is not true about effect of force.

- a. It makes a stationary object to move
- b. Can make moving objects change direction,
- c. It can change the shape of an object
- d. It is the same everywhere.

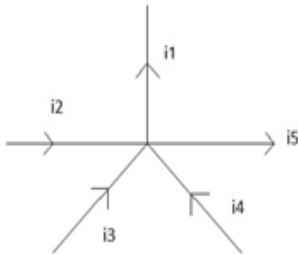
4. Potential difference in electrical terminology is known as?

- a. Voltage
- b. Current
- c. Resistance
- d. Conductance

5. Which of the following term define by the statement “a natural tendency of an object to maintain a state of rest or maintain a uniform motion in straight line”.

- a. Inertia
- b. Inertia
- c. Enertia
- d. Enertia

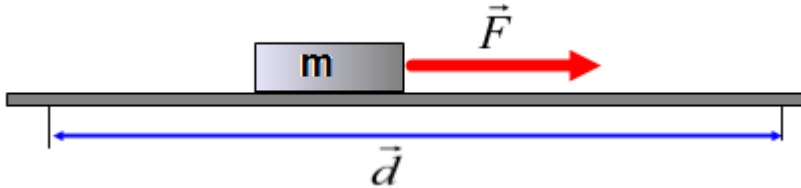
6. Identify the relation between currents according to KirichoffsCurrent Law from the set up below



- a. $i_1=i_2=i_3=i_4=i_5$
- b. $i_1+i_4+i_3=i_5+i_2$
- c. $i_1-i_5=i_2-i_3-i_4$
- d. $i_1+i_5=i_2+i_3+i_4$

7. In symbols, pressure is equal to
- A/F , where A is area and F is force
 - F/A , where F is force and A is area
 - d/F , where d is distance and F is force
 - F/d , where F is force and d is distance

8.



A block of mass m is pulled over a distance d by an applied force F which is directed in parallel to the displacement. How much work is done on the block by the force F ?

- $F\cos\theta d$
 - zero
 - Fd
 - $-Fd$
9. State Pauli Exclusion Principle
- No single electron can be in the same quantum state at the same time.
 - No two electrons can be in the same quantum state at the same time.
 - No two quantum states can accommodate each of any given two electrons
 - None of any two quantum states can accommodate all electrons at the same time
10. Device that is used to store charge, is named as
- Capacitor
 - Resistor
 - Transistor
 - Diode
11. Calculate the frequency of visible light having a wavelength of 464.1 m ($C=2.98 \times 10^8 \text{ m/s}$)
- $1.383 \times 10^{11} \text{ s}^{-1}$
 - $1.548 \times 10^{-6} \text{ s}^{-1}$
 - $1.548 \times 10^{-15} \text{ s}^{-1}$
 - $6.460 \times 10^{14} \text{ s}^{-1}$
12. Identify an odd one out description of inelastic collision among the following statement.
- The momentum is conserved while Kinetic Energy is not conserved
 - The total mass is the sum of the masses of the individual bodies.
 - The momentum is not conserved while the kinetic energy is conserved.
 - The bodies end up moving with a common velocity.
13. Heat is measured in
- Joules
 - Calories

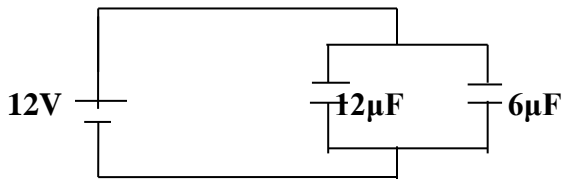
- c. Both A and B
 - d. Juole/second
14. Which one of the following types of radiation has the lowest frequency?
- a. FM radio waves
 - b. Infrared radiation
 - c. Microwave radiation
 - d. X-rays
15. Law stating that "force is directly proportional to product of charges and inversely proportional to square of separation between them" is called
- a. Newton's law
 - b. Coulombs law
 - d. Gauss's law
 - d. Charles law
16. Convert 0.00197gm^{-3} into Kgm^{-3}
- a. 0.0197 Kgm^{-3}
 - b. 0.197 Kgm^{-3}
 - c. 1.97 Kgm^{-3}
 - d. 19.7 Kgm^{-3}
17. When do we say that a magnetic material is in a saturated state of magnetism.
- a. When all the dipoles are aligned toward one direction
 - b. When all the domains are aligned toward one direction.
 - c. When all the dypoles are aligned toward one direction.
 - d. When the domeins are aligned toward one direction.
18. What is the S. I. Unit symbol for temperature?
- a. $^{\circ}\text{C}$
 - b. C^0
 - c. K
 - d. k
19. Displacement of a vibrating object is measured by
- a. A cycle
 - b. Amplitude
 - c. The period
 - d. Frequency
20. Resistance of a wire depends on
- a. Length
 - b. Material
 - c. Cross section area
 - d. None of the above.

SECTION B (40 MARKS)

1. Identify and explain the forces involved in the staining of blood specimen on a glass slide during laboratory investigation(2mks)
- 2a) A kick that lasts 0.03s sends a ball of mass 0.65kg with a velocity of 15m/s northwards. Find:

- i) The change in momentum of the ball. (2mks)
- ii) The average force exerted on the ball. (2mks)
- b) State any two limitations of Bohr theory (2mks)
- c) State three laws of thermodynamics. (3 mks)
- 3) A net force of 7.5 kN, west acts on a 1208 kg race car. At what rate will the car accelerate? (3mks)
- 4) a) Outline three factors that affect heating effect of an electric current (3 mks)
- b) State three factors that affect pressure in liquid. (3 mks)
- c) What is the equivalent resistance of three resistors (1.0Ω , 2.0Ω and 3.0Ω) when they are connected in series. (3 Marks)
- 5) a) Outline any two properties of magnetic field lines (2mks)
- b) What current will flow in the secondary coil when the primary current is 0.5A if the voltage in the primary coil is 240V and that in the secondary coil is 48V? Assume the energy loss is negligible. (3mks)
- 6) a) Arrange the following radiations in order of increasing frequency: infra red, blue light, UV light, radio waves and X-rays. (2mks)
- b) State and Explain two types of transformers (2mks)
- c) Define the following terms as used in fluid flow. (3 Marks)
 - i) Streamline flow
 - ii) Newtonian vs non-Newtonian
 - iii) Inviscid vs viscous flow

7. The figure below shows two capacitors connected to a 12V supply



- Determine: a) the effective capacitance of the circuit (2mks)
- b) Charge on each capacitor (2mks)
- 8) Convert the following temperature to kelvin (2mks)
 - i). -40°C
 - ii) Describe two factors that affect resistance in a circuit (2mks)

SECTION C (40 MARKS)

- 1i) State and Explain any five properties of electromagnetic spectrum (10 Marks)
- ii) Explain the application of the following electromagnetic waves (6mks)
 - a) Gamma rays
 - b) U.V radiation
 - c) X-rays
- (iii) Outline any three hazards of electromagnetic waves and how they can be minimized (3 mks)
- 2(i) State any two characteristics of waves by giving their S.I units (2mks)

(ii) Describe any three properties of waves (3mks)

3.i) Find the energy of x-rays whose wavelength is 10^{-10} m in vacuum ($c=3.0 \times 10^8$ m/s, and $h=6.63 \times 10^{-34}$ Js) (3mks)

ii) State three properties of x-rays (3mks)

iii) A block of glass of density 2.5 g/cm^3 has dimensions 8cm by 10cm by 15cm. It is placed on one of its faces on a horizontal surface. Calculate:-

a) The weight of the block (3mks)

4) Describe by use of a diagram the following electric field patterns

a) Field between two positively charged plates. (3mks)

b) A conductor carrying current upwards. (3mks)

c) State Ampere's law. (1mks)