(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

(MMUST)

DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCE

UNIVERSITY SUPPLEMENTARY/SPECIAL EXAMINATIONS
2018/2019 ACADEMIC YEAR

(MAIN)

UNDERGRADUATE COURSE

COURSE CODE: BML 124

COURSE TITLE: PHYSICS FOR MEDICAL LABORATORY SCIENCE

DATE: **TIME:**

INSTRUCTIONS TO CANDIDATES

Answer **ALL Questions**

QUESTION ONE (20 MARKS)

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) Device that is used to store charge, is named as

A) capacitor
B) resistor
C) transistor
D) diode

3 Heat is measured in

A. Joules
B. Calories
C. Both a and b
D Juole/second

4) Which gas law is described by the expression $\frac{V}{T}$ = Constant provided pressure is kept constant.

(A) Charles' Law (B) Grahams' Law (C) Boyles' Law (D) Pressure Law.

5) What is the S.I. unit of Energy.

(A) Joulse (B) Joules (C) Joulese (D) Jouls

6) Three capacitors of capacitance $0.5F, 0.33F$ and $0.25F$ are connected in series. Find the total capacitance. Express your answer to four decimal places.

(A) 1.0800F (B) 1.0833F (C) 1.0830F (D) 1.0803F

7) In the Fleming's Left-hand rule which finger always point the direction current.

(A) First finger. (B) Second finger. (C) Thumb. (D) Third Finger.

8) A potential difference across a lump is 12 volts. How many joules of electrical energy are changed to heat when a charge of 5 coulombs passes through it?

(A) 60J (B) 06J (C) 0.6J (D) 6.6J

9) The circuit in which current has a complete path to flow is called _____ circuit.

A) short

B) open
C) closed
D) open loop

10) 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.

11) What do you understand by the term “echo”.

(A) Refraction of sound (B) Reflection of Sound (C) A sharp sound falling on an obstacle (D) Broadcasting of sound.

12) Electromagnetic waves are classified by range of frequencies and wave length. Which wave is not among the last four in terms of wavelengths?

(A) Ultraviolet Light (B) X-Rays (C) Microwaves (D) Infrared Light.

13) Features of best hydraulic liquid are given below.

(A) Be incompressible.
(B) Low Freezing point and high boiling point.
(C) Should not corrode the parts of the hydraulic system.
(D) High freezing point and low boiling point.

14) Eliminate a statement which is not true about weight.

(A) It is a pull of gravity on a body
(B) Is a vector quantity
(C) Measured using spring balance
(D) It is the same everywhere.

15) What is the S. I. Unit symbol for temperature?

(A) ^{0}C (B) C^0 (C) K (D) k

16) The following are features describing mass, which one is not.

(A) It is a pull of gravity in a body (B) It is same everywhere (C) Measured using beam balance
(B) It is a scalar quantity

17) Gases have

A) low density and mass

B) high density and mass

C)high density but low mass

D)low density but high mass

18) Provided below are the quality of liquid used in a thermometer. Which one is not.

(A) Should easily be seen
(B) Should expand or contract uniformly by a large amount over a small range of temperature.
(C) Should expand or contract uniformly by a large amount over a large range of temperature.
(D) Should have a wide range of temperatures.

19)Convert $0.00197gm^{-3}$ into Kgm^{-3}

(A) $0.0197\ Kgm^{-3}$ (B) $0.197\ Kgm^{-3}$ (C) $1.97\ Kgm^{-3}$ (D) $19.7\ Kgm^{-3}$

20).Laminated insulations coated with varnish are norm ally used in the transformer

(A) To reduce reluctance of magnetic path
(B) To reduce the effect of eddy current
(C) To increase the reluctance of magnetic path
(D) To reduce the hysteresis effect

SECTION B

1) What is the equivalent resistance of three resistors (1.0Ω, 2.0Ω and 3.0Ω) when they are connected in series. (3 Marks)
2) State three factors that affects pressure in liquid. (3 Marks)
3) Briefly describe the principles behind the following:
   a) Pauli exclusion principle (3mks)
   b) Ohms law (3mks)
4) An X-ray machine produces radiation of wavelength of $2.0x10^{12\cdot}$ Calculate:

i) The frequency of the wavelength. (2 Marks)

ii) Its energy content. (2 Marks)

5) A student designed a transformer to supply a current of 10A at a potential difference of 60V to a motor from an a.c. mains supply of 240V. If the efficiency of the transformer is 80%, calculate:

i) The power supplied to the transformer. (5 Marks)

ii) The current in the primary coil. (3 Marks)

6) State three applications of photoelectric effects. (3 Marks)

7) A wire 480cm long has a uniform diameter of 0.56mm. if the resistance of the wire is 10Ω , determine the resistivity of the material of the wire. (4 Marks)

8) State two eye defects and how to correct it them. (4 Marks)

9) Highlight three applications of electromagnetic induction. (3 Marks)

10) Name any three electromagnetic waves and explain their applications (6 Marks)

SECTION C (40 MARKS)

1) i) Describe any four causes of energy losses in a transformer and how they can be minimized.
(15 Marks)

(ii) Explain why water wets clean surface of glass but not waxed surface of the glass. (5 Marks)

2) (i) State four applications of capacitors . (4 Marks)

(ii) By use of diagrams describe magnetic field patterns between

a) like charged point charges (3mks)

b) Two plates carring positive charges separated by a distance (3mks)

3) i)A block of a soap stone of dimension 4m by 2m by3m is 48kg and is made to rest on a smooth horizontal surface. Calculate the pressure it exerts on the surface with small area. (3mks)

ii) A box is dragged across a floor by a 100N force directed 60^o above the horizontal. How much work does the force do in pulling the object 8m? (4mks)

iii) A net force of 7.5 kN, west acts on a 1208 kg race car. At what rate will the car accelerate? ($a = 6.2\ m/s^2$, west) (3mks)