

Total Score

Name

School

Roll No

Republic of Somaliland

Somaliland National Examination Board

Form Four

PHYSICS
EXAMINATION

JUNE 2019

TIME 2 HOURS

Plus 10 minutes for reading through the paper

INSTRUCTIONS TO CANDIDATES

This paper consists of 13 printed pages.

Count them now. Inform the invigilator if there are any pages missing.

PART 1; 20 Multiple Choice Questions 40 Marks

PART 2: 7 Structured Questions 60 Marks

TOTAL 100 Marks

- **Answer ALL questions in Part 1 and 2.**
- **No extra papers are allowed.**

Use **this** page for rough work. It will NOT be marked.

Blank lined area for rough work.

PART ONE:

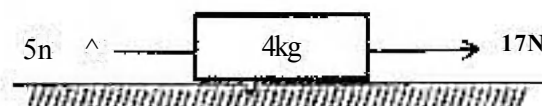
20 x 2 = 40 marks

Multiple choices (for each question in this section circle the letter or the correct answer)

1. A force of 17 N acts on a block of mass 4 kg.

The force of friction opposing the motion is 5 N. The acceleration of the block is

- 2 m/s^2
- 3 m/s^2
- 4 m/s^2
- 12 m/s^2



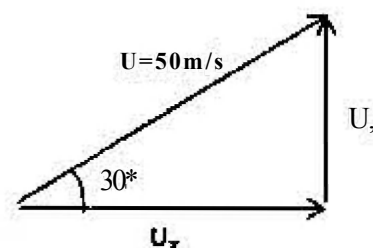
2. The gradient of velocity -time graph represents

- acceleration of the motion
- displacement made
- total distance travelled
- direction of the motion.

3. A projectile is thrown at an angle of 30° to the horizontal with an initial velocity of 50 m/s.

The vertical component of initial velocity is

- 20 m/s
- 25 m/s
- 43.3 m/s
- 50 m/s



4. Asha runs up a flight of stairs as in the figure.

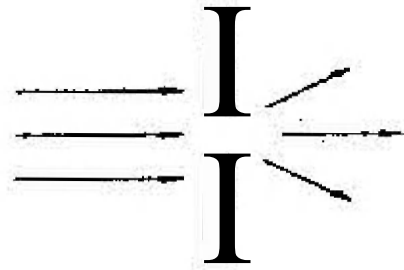
What will happen to his gravitational potential energy (GPE)

- Increases
- Decrease
- Increases first and then decreases
- Remains unchanged



5. What property of waves is illustrated by the diagram?

- a. reflection
- b. refraction
- c. diffraction
- d. interference



6. Which of the following properties belongs to sound waves? Sound waves

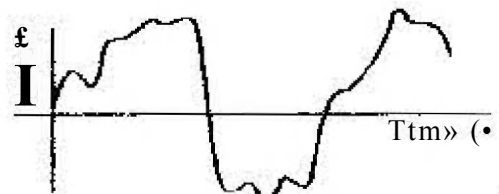
- a. are transverse waves
- b. can travel through vacuum
- c. need medium for travel
- d. are electromagnetic waves.

7. In radio reception system, the process of removing radio frequency (r.f) carrier from audio frequency (a.f) signals is known

- a. Modulation
- b. Demodulation
- c. Encoding
- d. Transmission

8. The graphs in the figure stands for

- a. digital signal
- b. analogue signal
- c. sine wave
- d. modulated signal



9. In the nuclear reaction ${}^1_0\text{H} + {}^6_3\text{Li} \longrightarrow \text{X} + {}^4_2\text{He}$

The value of X is:

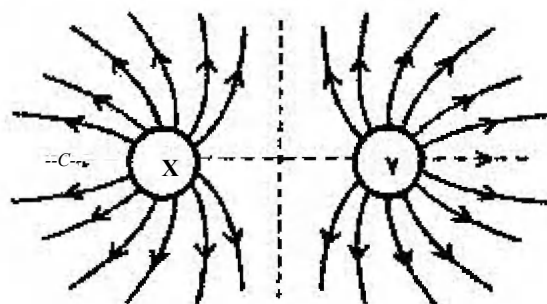
- a. 2
- b. 4
- c. 7
- d. 8

10. A radioactive nuclide has a half-life of 4 days, What fraction of the original number of atoms will remain after 12 days?

- a. $\frac{1}{2}$
- b. $\frac{1}{4}$
- c. $\frac{1}{8}$
- d. $\frac{1}{16}$

11. In the figure, two point charges X and Y are brought close together. Which row A to D correctly shows the sign of the charges?

- a. X is positive and Y is negative
- b. X is negative and Y is positive
- c. X and Y are both positive
- d. X and Y are both negative.



12. In vacuum flask which process of heat transfer is reduced by the vacuum layer between the double glasses?

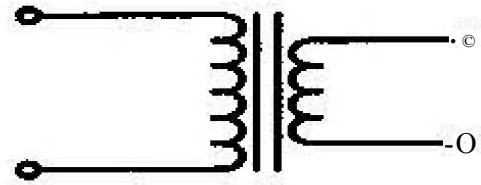
- a. Conduction
- b. Convection
- c. Radiation
- d. Evaporation

13. Water is used to cool machines. This is because water:

- a. is easily available
- b. is a liquid
- c. has high specific heat capacity
- d. has unusual expansion.

14. The circuit shown below stands for :-

- a. transformer
- b. rectifier
- c. transformer
- d. **amplifier**



15. A microphone converts sound (mechanical) energy to electrical signal. This is an example of:

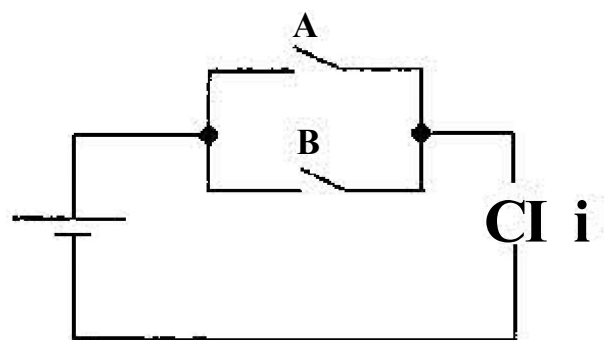
- a. motor
- b. generator
- c. rectifier
- d. **galvanometer**

16. A bulb is labeled with "100 watts", which information does the label give about the bulb?

- a. energy it dissipates in 1 second
- b. current it lets through
- c. resistance it offers to current
- d. voltage across the lamp

17. The logic gate whose switching circuit is shown in the figure stands for-

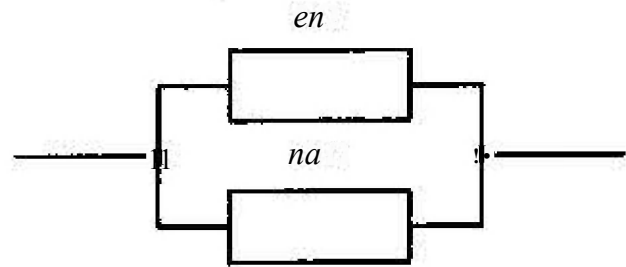
- a. AND gate
- b. OR gate
- c. NOT gate
- d. **NAND gate**



18. Two resistors are connected in parallel as shown in the figure.

Total (equivalent) resistance
of the circuit is

- a. 4 Ω
- b. 6 Ω
- c. 12 Ω
- d. 18 Ω



19. How does resistivity of semiconductor depend on temperature changes? Resistivity:-

- a. decreases as temperature rises
- b. Increases as temperature rises
- c. increases first and then decrease
- d. does not change with temperature

20. Speed of light in vacuum is 3×10^8 m/s and speed of light in water is 2.25×10^8 m/s, calculate the index of refraction of water

- a. 0.75
- b. 1.24
- c. 1.33
- d. 1.5

PART TWO: Structured Questions

1. a. the law of conservation of linear momentum can be written mathematically as follows

$$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$$

Describe the law in words

.....

(2 marks)

- b. Two cars of masses 1200kg and 800kg moving towards each other at 20 m/s and 30 m/s respectively collide. If the two cars stick together and move in the same direction calculate their common velocity

.....

 (3 marks)

- c. the quantity that tells how hard a force acts is given by Ft . This quantity is known as

moment

☐

momentum

☐

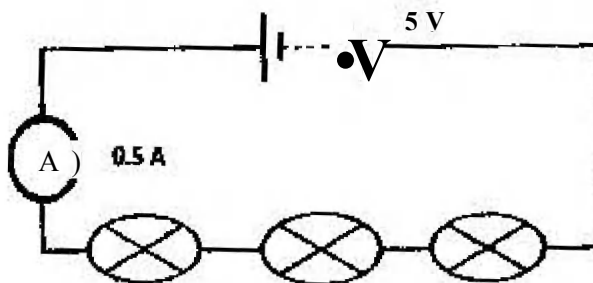
impulse

☐

tick one box (j)

(2 marks)

- 2- Three lamps are arranged in series, as in the figure, across 6V power supply and a current of 0.5A flows through the lamps



- a. Describe two disadvantages of series arrangement of lamps

.....

 (2 marks)

- b. Voltage across a circuit is proportional to the current ($V \propto R$).
 This rule is known as

.....
 (2 marks)

- c. Use the rule to calculate total resistance of the lamps

.....

 (2 marks)

- d. Given that all the three lamps are identical, calculate the resistance of each lamp

.....

 (2 marks)

3. a. The quantity of heat supplied by a heater of power P in a period of time is given by

$$Q = Pt$$

- i. Use the equation to calculate the quantity of heat supplied by a heater of power 500 watts in 5 minutes

.....

.....

.....

.....

.....

(3marks)

- ii. Unit of power is watt. Express watt in an equivalent unit

.....

.....

(2 marks)

- b. Explain in brief, how a human body cools down itself by sweating

.....

.....

.....

(2 marks)

4. a) Most of the mass of an atom is contained in the nucleus. What particles are available in the nucleus?

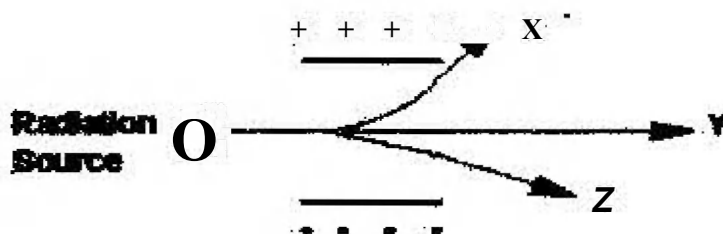
(2 marks)

- b) the figure illustrates the effect of electric field on nuclear radiations. Write down the name of radiation represented by;

X _____

Y _____

Z _____



(3 marks)

c) Why radiation Y is not deflected (passes straight)?

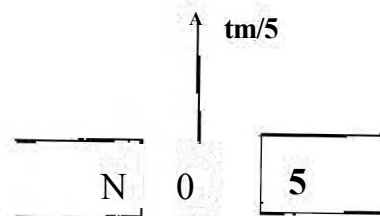
.....

 (2 marks)

d) Give any two positive applications of radioactivity

1 _____
 2 _____ (2 marks)

5. A wire 20cm long is moved upwards at a speed of 8m/s at right angles to a magnetic field of strength 2.5 T . The field goes from North - to South.



a) Calculate the size of the Emf induced in the wire

.....

 (3 marks)

b) On the diagram illustrate the direction of the induced current.

Use $\odot$ for into the page

$\otimes$ for out of the page

(2 marks)

c) Suggest two ways of increasing the size of the induced Emf.

.....

 (2 marks)

d) The arrangement produces electricity from motion. This is an example of

Motor ☐
 Generator ☐
 Transformer ☐

(2 marks)

6. Sound is a form of energy produced by vibrating body

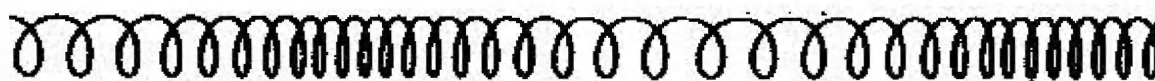
a) Sound consists of compressions and rarefactions. Because of this property sound is longitudinal wave

Transvers wave (2 marks)

b) Sound needs material medium for propagation. This shows that sound is electromagnetic wave

mechanical wave (3 marks)

c) Label C for compression and R for rarefaction



(3 marks)

d) Ships use echo to detect the depth of water underneath. A ship sends sound pulses and receives an echo after 1.2 seconds. Calculate the depth of the sea, if speed of sound in water is 1500m/s,



(2 marks)

7. The figure shows a system of radio transmitter. Study it and then answer the following questions



Which of these parts of the transmitter

(5 x 2 = 10 marks)

- a) Produces audio frequency (a.f) signals ?
- b) Produces carrier frequency (r.f) signals?
- c) Sends out radio waves?
- d) Mixes a.f signals in to r.f carrier ?
- e) Increases the energy of modulated wave?

END