

R&PUBL IC OF SOMALILAND

FORM FOUR EXAMS, 2017

# PHYSICS



NATIONAL EXAMINATION BOARD



Total Score



Name .....

School .....

Roll No .....

**Republic of Somaliland**

**Somaliland National Examination Board**

**Form Four**

**PHYSICS  
EXAMINATION**

**July 2017**

**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.

<b>PART 1:</b>	<b>20 Multiple Choice Questions</b>	<b>20 Marks</b>
<b>PART 2:</b>	<b>8 Structured Questions</b>	<b>80 Marks</b>

**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.**

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**PART 1: ANSWER ALL QUESTIONS IN THIS SECTION.  
CIRCLE THE CORRECT ANSWER.**

( 20 Marks)

1. Velocity is defined as :
  - A. Distance moved in unit time
  - B. Displacement in unit time
  - C. Acceleration in particular direction
  - D. Energy transferred per unit time.
2. The quantity that tells how hard a force acts is known as :
  - A. Momentum
  - B. Impulse
  - C. Moment
  - D. Torque
3. In launching a rocket , hot gases of high pressure is ejected downwards and as a result the rocket moves upwards. This is an example of Newton's \_\_\_\_\_ law of motion.
  - A. First
  - B. Second
  - C. Third
  - D. Fourth.
4. You are sitting in a car. It stops suddenly and you fall forwards. This is an example of your:
  - A. Momentum
  - B. Inertia
  - C. Impulse
  - D. Torque
5. When the forces acting on a moving body are balanced the net force becomes zero. As a result the body will :
  - A. Move with an increasing velocity
  - B. Move with decreasing velocity
  - C. Move with constant (Uniform) velocity
  - D. Stop moving

6. A bullet is fired with an initial velocity of 50 m/s at an angle of  $30^{\circ}$  to the horizontal. What is the horizontal component of bullet's initial velocity?

- A. 15 m/s
- B. 25 m/s
- C. 44.3 m/s
- D. 50 m/s

7. Ahmed whisks a stone along a horizontal circle with a string. If the string breaks, the stone will :

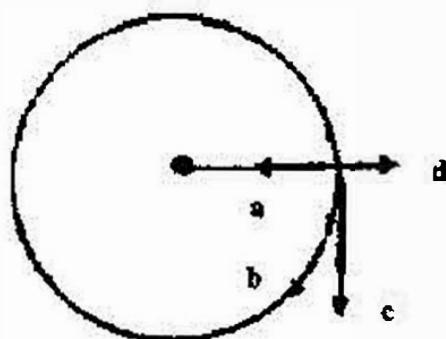
- A. Move inwards along the radius
  - B. Continue to move along the curve
  - C. Move along the tangent
  - D. Move outwards along the radius
8. SI unit of angular velocity is:
- A. Newton per radian
  - B. Radians per second
  - C. Radians per meter
  - D. Radians per second squared

9. A girl climbs to the top of high mountain in 15 minutes. If she does 180000 J of energy against gravity, what average power is developed?

- A. 50 watts
- B. 100 watts
- C. 120 watts
- D. 200 watts

10.  $F = -Kx$  is mathematical expression for :

- A. Newton's second law of motion
- B. Hooke's law
- C. Snell's law
- D. Lenz's law



11. Sky waves are used to carry information over long distances with the absence of satellites. This is because sky waves :

- A. Can pass through vacuum
- B. Are reflected by ionospheres
- C. Can be absorbed by air particles
- D. Are electromagnetic waves

12. R.F current is produced by an oscillatory circuit. This contains:

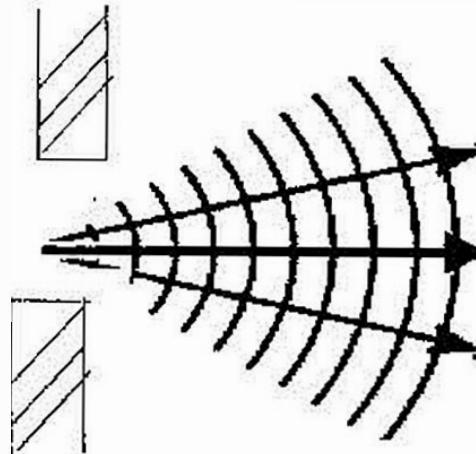
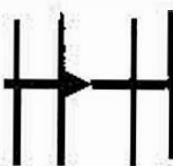
- A. Amplifier and capacitor
- B. Transistor and capacitor
- C. Capacitor and coil
- D. Capacitor and diode

13. Process of converting electronic data or information radio systems into a form that people can understand easily is known as:

- A. Encoding
- B. Decoding
- C. Translating
- D. Data organization

14. Which property of waves is illustrated by the diagram :

- A. Reflection
- B. Refraction
- C. Diffraction
- D. Interference



15. A nuclide of mass number A emits an alpha particle . What is the mass number of the resulted nucleus in terms of A:

- A. A - 2
- B. A - 4
- C. A - 8
- D. A + 1

16. Which of the following is NOT nuclear radiation :

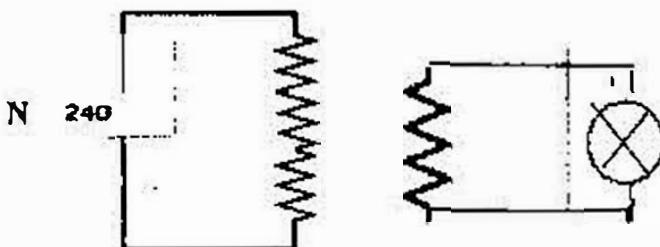
- A. Alpha rays
- B. Beta rays
- C. X-rays
- D. Gamma rays

17. A radioactive sample has half life of 3 months. what fraction of the sample remains undecayed after one year:

- A.  $\frac{1}{8}$
- B.  $\frac{1}{16}$
- C.  $\frac{1}{32}$
- D.  $\frac{1}{64}$

18. The figure shows a transformer that steps down mains supply ( 240V ) – what is the voltage across the lamp? The transformer has turns ratio of 30:1

- A. 1 V
- B. 8 V
- C. 80 V
- D. 240 v



19. Which of the following is an example of electric generator :

- A. Loudspeaker
- B. Circuit breaker
- C. Microphone
- D. Galvanometer

20. Electric power transmission is always done using a.c rather than d.c .This is because

a.c :

- A. Can be generated easily
- B. Can be changed easily
- C. Is safer than d.c
- D. Is cheaper than d.c

**PART TWO. STRUCTURED QUESTIONS. ANSWER ALL QUESTIONS**

1. a) Define acceleration and give its unit. ( 2Marks)

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b) A car increases its velocity from 10 m/s to 30 m/s in 5 s. Calculate?

i) The acceleration of the car: ( 3 Marks)

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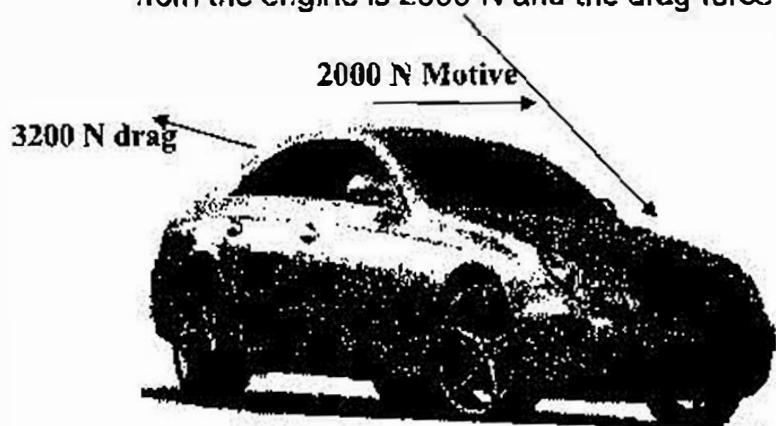
ii) Distance travelled: (3 Marks)

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iii) Average velocity: ( 2 Marks)

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2. The figure shows the forces acting on a car of mass 800 kg. The motive force from the engine is 2000 N and the drag force at this instant is 3200 N.



- a) Explain why the car is decelerating. (2 Marks)

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- b) Work out the net force acting on the car ? (2 Marks)

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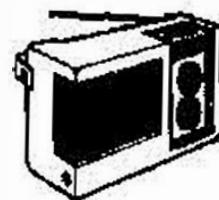
- c) Work out the deceleration of the car ? (3 Marks)

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- d) What would happen to the motion of the car if the force from the engine balances the total drag force? (2 Marks)

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3. Ahmed is listening to a radio. Complete the passage below using words from the following list :

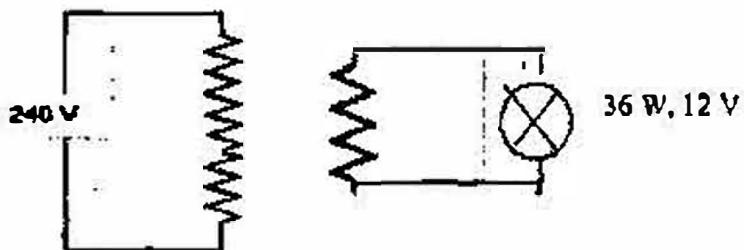


RF carrier	Resonance	Tuner	Sound	
Aerial	Amplifier	Energy	Electrical	Frequency

- A. The ..... of radio receiver detect signals from many different radio stations and converts into electrical signals.
- B. The ..... Selects ( picks up) one particular frequency from a given station by .....
- C. The demodulator decodes the incoming signals by removing the ..... leaving only AF signals.
- D. The ..... increases the amplitude of these electrical signals.
- E. The ..... required to do this is supplied by the battery.
- F. The loudspeaker converts ..... energy into ..... energy.

( 8x1.5 = 12 Marks)

4. The figure shows a transformer to step down mains supply to light up the 36 W, 12 V lamp.



A. What is meant by step down transform? (2 Marks)

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B. What is the turn's ratio of the transformer windings? (2 Marks)

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C. What current flows through the lamp? (3 Marks)

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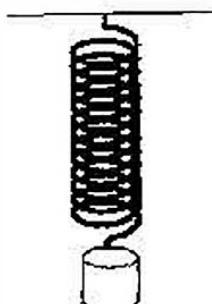
D. What current flows through the primary coil? Assume no power loss in the transformer? (3 marks)

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5. Match the terms in column A with their descriptions in column B. (10x1 = 10 Marks)

	<b>A</b>		<b>B</b>
1	Transverse _____	A	Maximum displacement from undisturbed position
2	Longitudinal _____	B	The highest point of oscillating particles
3	Crest _____	C	Particle oscillation is perpendicular to the wave propagation
4	Amplitude _____	D	Number of waves per second
5	Trough E.g G	E	Distance from crest to next crest
6	Frequency _____	F	Particle oscillation is parallel to the wave propagation
7	Period _____	G	Lowest position of oscillating particles
8	Wave length _____	H	Time for one wave
9	Speed _____	I	$V = \lambda F$
10	Wave equation _____	J	Distance per unit time

6. A load of 20 N is hung from a spring that obeys hook's law.



**20 Ton**

A. Write down hook's law .

( 2 Marks)

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B. If the spring stretches by 0.04m , calculate the spring constant? ( 3 Marks)

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C. The property of a spring to return its original position after deforming forces are removed is known as ( Elasticity, ductility ). ( 2 Marks)

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D. Calculate the extension if a force of 50 N was applied ? ( 3 Marks)

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7. A. Define the term : " half life" of radioactive sample

(2 Marks)

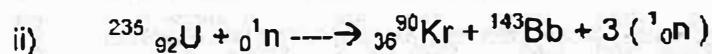
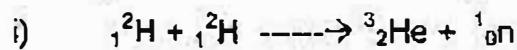
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B. In an experiment to find the half life of radioactive sample , the count rate falls from 400 Bq to 50 Bq in 15 days. Work out the half life of the sample.

(3 marks)

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C. Distinguish between the following nuclear reactions :



( 2marks)

Ans: Reaction 1 stands for .....

Reactions 2 stands for .....

D. State any three positive uses of radioactivity? ( 3 Marks)

1. ....
2. ....
3. ....

8. A) Define Momentum and give its unit

( 2 Marks)

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B. The equation  $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$  is mathematical expression for the law of conservation of linear momentum. Describe the law in words. (2 Marks)

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C. A body of mass 10 Kg is moving at 4 m/s . Calculate its momentum ? (3Marks)

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D.What will happen to the momentum if the body becomes at rest. Tick one box:

Increases

Decreases

Becomes Zero

Does not change

( 2 Marks)

END