MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2018

PHYSICS

20
18

P/LAND NATIONAL EXAMINATION BOARD

MINISTRY OF EDUCATION AND HIGHER EDUCATION
PUNTLAND NATIONAL EXAMINATIONS BOARD

Code Number

Form four EXAMINATION 2018
Time 2 hours AND 10 minutes for reading

PHYSICS

Instructions to candidates

- Answer all the questions
- This paper consists of 11 pages, count it and if any is missing inform your invigilator
- Do not write your **name and roll number** on the exam paper
- Make sure that **student's profile** is attached to the exam paper, if not, inform you invigilator.
- No extra paper is allowed.
- If you make a mistake, **cross out the incorrect** answer and **write your correct answer.**

This exam paper consists of following parts

Parts	Marks
Part one: Multiple choice questions	10 marks
Part two: Structured questions	90 marks
	Total: 100 Marks

For the markers only

PARTS	MARKS
Part one	
Part two	
TOTAL	%

SOM EXAMS

Use this page for rough work, it will not be marked.

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PART ONE: MULTIPLE CHOICE QUESTIONS   (10 MARKS)

Circle the correct answer in each of the following questions

1. Which is a scalar quantity?
   A. Weight
   B. Pressure
   C. Acceleration
   D. Momentum

2. LDR stands for
   A. Light dependent resistor
   B. Light emitting diode
   C. Light dependent radio
   D. Light dependent record

3. Which of the following is a symbol of a cell?

   A.   **B.**   **C.**   **D.**
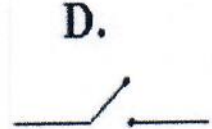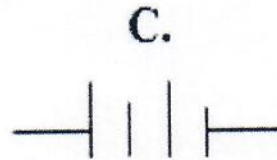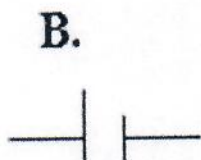
4. Which diagram represents the action of refraction of light through convex lens?

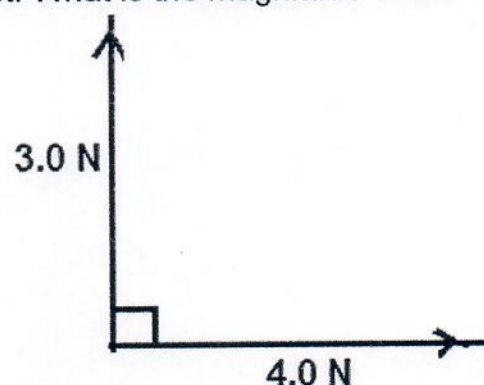   A   B   C   D
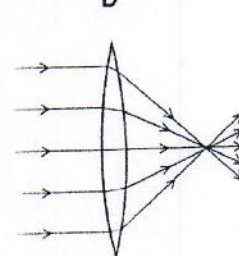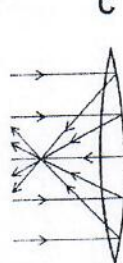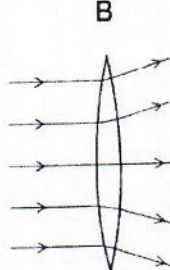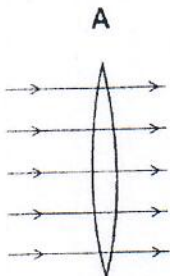
5. The diagram below shows a boy in four positions on a flat floor. At what position the boy is exerting the least pressure on the floor?

   A   B.   C.   D.

SOM EXAMS
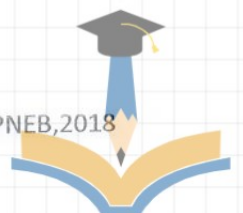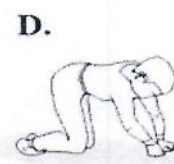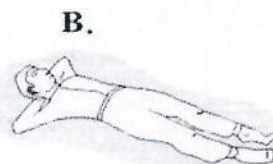
6. Two perpendicular forces are used to pull an object. What is the magnitude of the resultant force acting on the object?

    A. 1.0 N
    B. 3.5 N
    C. 7.0 N
    D. 5.0 N

3.0 N

4.0 N

7. What will happen to the brightness of the circuit if third bulb is connected at position X?

    A. The brightness of the circuit decreases.

    B. The brightness of the circuit increases.

    C. The brightness of the circuit stays the same.

    D. The brightness of the circuit triples.

+ 3V −

X

Bulb 1   Bulb 2   Bulb 3
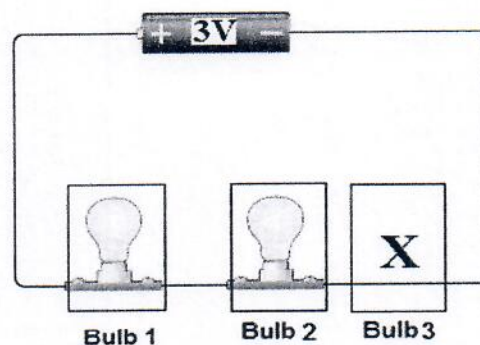
8. The loudness of a sound wave depends on
    A. The frequency of the wave
    B. The period of the wave
    C. The amplitude of the wave
    D. The speed of the wave

9. What is the approximate value indicated by the arrow?
    A. 0.05
    B. 0.025
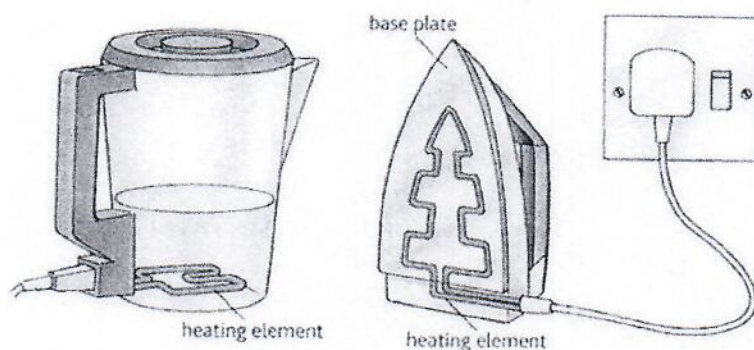   C. 0.1
    D. 0.075

0.1   0.2

10. An object floats in water if it has
    A. A relative density greater than 1
    B. A relative density less than 1
    C. The same density of water
    D. A weight less than that of water

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PART TWO: STRUCTURED QUESTIONS   (90 MARKS)
Question One: (Electricity 12 marks)

A. The figure below shows some electrical devices connected to the mains supply.

i.   What factor causes the heating effect of the electrical devices?
.... (1mark)

ii.   The three pin plug has three wires. Name the wires
   1. ....(1 mark)
   2. .... (1 mark)
   3. .... (1 mark)

iii.   What is the function of the heating element?
....
.... (1mark)

B. The heating element of the electric kettle has a power rating of 2400 Watt when used
   on 240V supply. Calculate the
i.   Current flowing through the heating element?
....

.... (3marks)

ii.   Resistance of the heating element?
....

....(3marks)

iii.   A student uses a modern plastic electric kettle to put in to the socket right. He could
     not find an earth wire. Why was this NOT fitted with earth wire?
....

.... (1mark)

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Question Two: (Electronics 9 marks)

A. The diagram right shows a circuit.

i. By using circuit symbols, connect with an Ammeter and voltmeter to measure current and voltage of the lamp respectively? (2marks)

Q

Ac source

lamp

(2 marks)
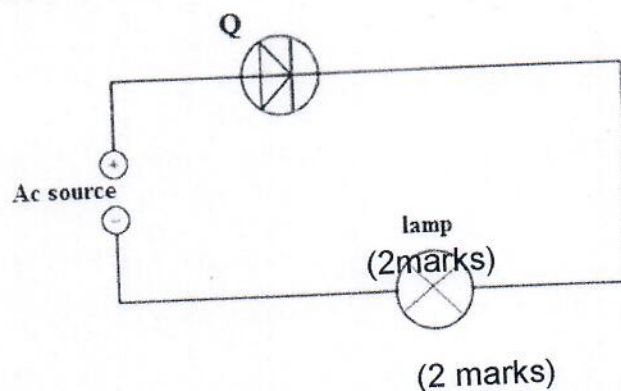
ii. Name the component labeled letter **Q** on the diagram? .... (1mark)

..,...

B. Sound cannot be recorded unless both play button and the record button of a radio are pressed simultaneously. A circuit diagram for this and its truth table are shown.
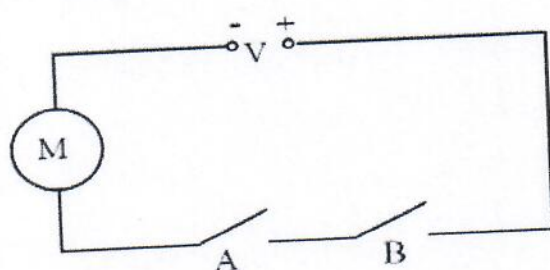
Switch A	Switch B	Output Q
0	0	
0	1	
1	0	
1	1	

(2 marks)

i. Complete the truth table to show how recording works?

ii. Which logic gate does your table show? .... (1 mark)

....

C. Fill the spaces using the words in the box.

Transistor	resistor	LED	LDR	Capacitor	OR-gate

i. Its resistance decreases when light falls on it 1mark

ii. Stores electrical charges .... 1 mark

iii. Is used as indicator lamps on computers and radios ....1 mark

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Question Three: (Electromagnetism 12 marks)

The diagram below shows a magnet moved towards a coil.

A. What will happen to the coil as the magnet moves towards the coil?

……………………………………………
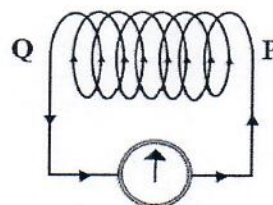
…………………………………………… (1 mark)

B. What will happen to the needle of the Galvanometer if
   i. The magnet is moved faster

………………………………………………………………………………………… (1 mark)

   ii. The magnet is moved away from the coil

………………………………………………………………………………………… (1 mark)

   iii. The magnet is held stationary inside the coil

………………………………………………………………………………………… (1 mark)

   iv. Name the poles indicated by P and Q?
       P ………………………………………………………………..………… (1 mark)
       Q …………………………………………………………………..…… (1 mark)

C. A transformer has 100 turns in its primary coil and connected an input voltage of 30 V. The turnings of its secondary coil are 300 turns.

i.   Is it step-up or step-down transformer?
……………………………………………………………………………………… (1 mark)

ii.   Calculate the output voltage of the transformer?
………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………(3 marks)
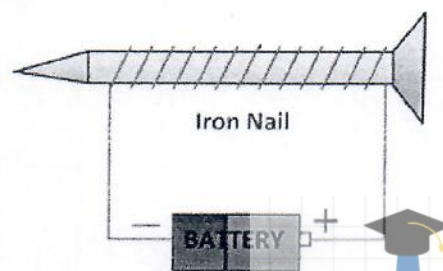
D. The diagram below shows an iron nail magnetized by electrical method (electromagnet).

i.   Name another method of magnetization rather than electrical method.
…………………………………………………………… (1 mark)

ii.   Why iron is preferred than steel in electromagnet?
…………………………………………………… (1 mark)

Iron Nail

BATTERY
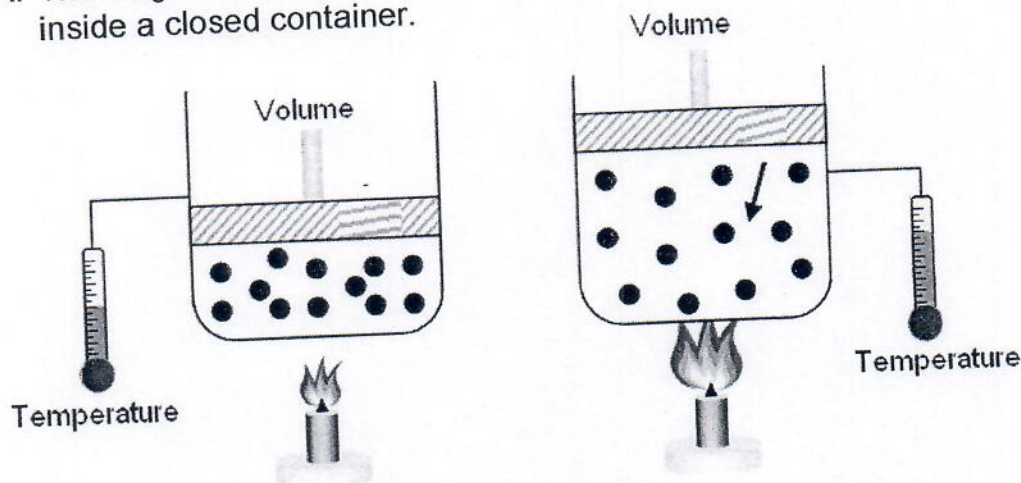
Question Four: (Heat and temperature 9 marks)

A. The diagram below shows the relation between volume and temperature of gas inside a closed container.

i. State the Charles's law of gases?
....
.... (1 mark)

ii. What will happen to kinetic energy of the molecules of gas particles as temperature increases?
....
.... (1 mark)

iii. The S.I unit of energy is .... and S.I unit of temperature is
.... (2 marks)

B. The volume of a certain mass of a gas collected is 60 cm³ at a temperature of 27⁰C. The temperature is raised to 127⁰C?

   i. Convert the temperatures into Kelvin
   .... (1 mark)
   27⁰C .... (1 mark)
   127⁰C ....

   ii. Calculate the new volume of the gas when heated?
   ....
   ....
   ....
   ....
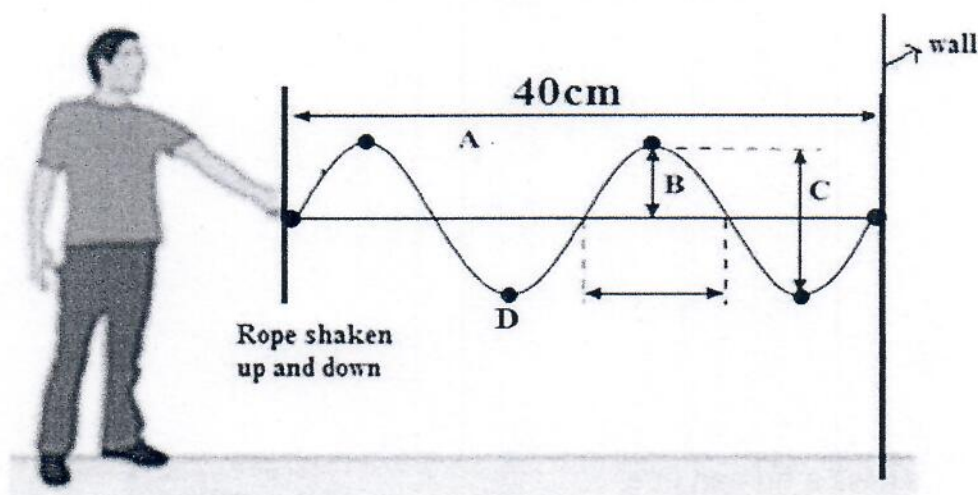   .... (3marks)

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Question Five: (waves 10 marks)

A. The diagram below shows waves being produced on a rope.

i.   Which letter shows

The amplitude ………………………………………………………. (1 mark)

The Trough   …………………………………………………........ (1 mark)

ii.   What is the wavelength of the wave………………………….……… (1 mark)

B. The waves travel across the rope at 10 m/s. Calculate the frequency of the wave?

………………………………………………………………………………………………

………………………………………………………………………………………………

…………………………………………………………………………………(3marks)

C. Suggest a reason why two astronauts in space can NOT hear their sound each other unless they use radio waves?

………………………………………………………………………………………………

……………………………………………………………………………… (1 mark)

D. If the time between hearing the HORN of the ship and the echo from the cliff is 4 seconds, how far away is the ship from the cliff? (speed of sound air 330m/s)

………………………………………………………………………………………………

………………………………………………………………………………………………

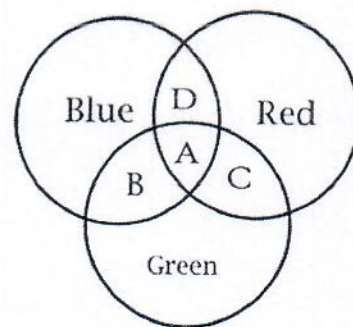…………………………………………………………………………………(3 marks)

Question Six: (Light 9 marks)

The diagram shows three primary colours combined together.
   A. Identify the colours represented by the letters B, C, and D?
      i.   B: ……………………………………… (1mark)
      ii.   C: …………………………………….(1 mark)
      iii. D: …………………………………….(1 mark)

   B. What is the general name given to the colors obtained by
      mixing two primary colours?
      ……………………………………………………………………. (1 mark)
   C. Name the colour produced as a result of mixing three primary colors?
      ………………………………………………………………..……. (1 mark)

   D. The diagram shows a human eye

      i. Name the labeled parts
      R :…………………………………….(1 mark)
      S: ………………………………….. (1 mark)
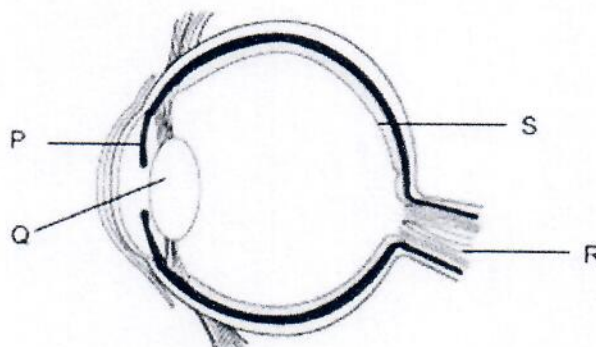
      ii. What is the function of the structures P and Q?
          P: ……………………………………………………………...………….. (1 mark)
          Q:………………………………………………………………………………….(1 mark)

Question Seven: (Radioactivity 10 marks)

A. Fill in the spaces using the words in the box. Words may used once, more than once
   or not at all.

Half life   Mass   Nuclear fission   Protons   Electrons
Neutrons   Nuclear fusion   Negatively   and   Positively

   i.   Isotopes have the same number of …………………………….. but a different
           number of ……………………………………...   (2 marks)

   ii.   An alpha particle is……………………….. Charged particle.   (1mark)

iii.   When a heavy nucleus breaks up to form two lighter ones it's said be
.... (1 mark)

iv.   A beta particle is ....charged particle.   (1 mark)

v.   The number of .... are equal to the number of protons in neutral
atom.   (1 mark)

B. If the half-life of 200 grams of a radioactive isotope is 8 years, how many grams will
remain in 32 years?
....
....
....
....(4 marks)

Question Eight: (Motion 9 marks)

A. Match the quantities in Column A with their corresponding descriptions in Column B.

| Column A	Answer	Column B
1. Angular velocity		A. Is directed towards the centre of curved path.
2. Angular acceleration		B. Has S.I unit of rad/sec
3. Centripetal force		C. Is directed away from the centre of curved path
4. Centrifugal force		D. The rate of change of angular velocity.

(4 marks)

B. Calculate the centripetal force acting on a stone of mass 0.5 kg attached with the end

of a string of length 2 m if it is whirled at 10 m/s.

....
....
....
.... (3marks)

C. State the difference between distance and displacement?

....
.... (2 marks)
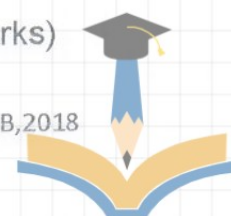
Question Nine: (Forces 10 marks)

A. The diagram shows the forces acting a book on a table.

Name the forces labeled **A**, **B** and **D**

    A .... (1 mark)
    B... (1 mark)
    D... (1 mark)
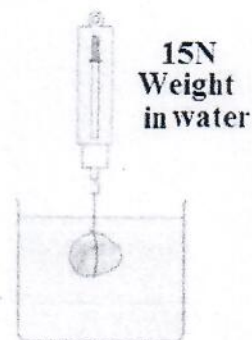
A

Book slides this way

B ←   → C

D
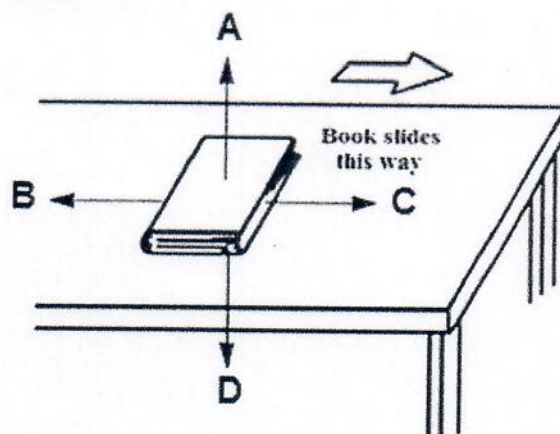
B. An object weighs 20 N in air. When it is fully submerged in water it weighs 15N.

I.   Calculate the upthrust force on the object in the water.
....
.... (1 mark)

II.   What is the weight of the water displaced by the object?

.... (1 mark)

20N
Weight
in air

15N
Weight
in water

III.   Calculate the mass of the object (*take g = 10 N/kg*).

....
....
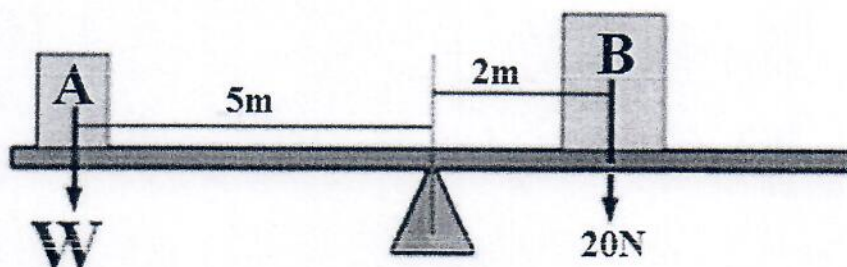... (2 marks)

C. Find the weight (**W**) of object A if the see-saw below is balanced about the pivot.

....
....
....
.... (3 marks)

A   5m   2m   **B**

W   20N

END