

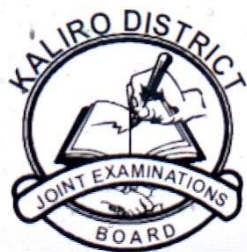
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535/1  
PHYSICS  
Paper 1  
Jul./Aug. 2019  
2 ¼ hours



**KALIRO DISTRICT JOINT EXAMINATIONS BOARD**  
*Uganda Certificate of Education*  
**PHYSICS**  
**PAPER 1**  
**2 hours 15 minutes**

**Instructions to candidates:**

- Write your name, centre and Index Number clearly in the space above.
- Section A contains 40 objective questions.
- You are required to write the correct answers A, B, C or D against each question in the box on the right hand side of each page.
- Section B contains 10 structured questions.
- Answers are to be written in the spaces provided on the question paper.
- Mathematical tables and non-programmable calculators may be used.
  - ❖ Acceleration due to gravity  $g$   $= 10\text{ms}^{-1}$ .
  - ❖ Specific heat capacity of water  $= 4200\text{Jkg}^{-1}\text{K}^{-1}$
  - ❖ Density of pure water  $= 1000\text{kgm}^{-3}$
  - ❖ Specific heat capacity of copper  $= 400\text{J Kg}^{-1}\text{K}^{-1}$ .

**FOR EXAMINER'S USE ONLY**

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | MCQ | Total |
|----|----|----|----|----|----|----|----|----|----|-----|-------|
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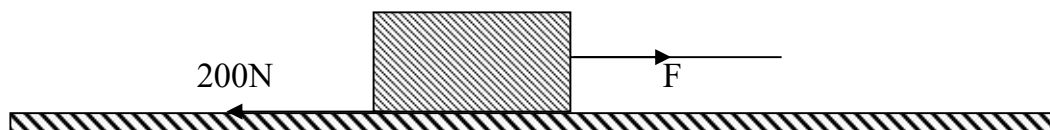
**Turn Over**

### SECTION A: (40 MARKS)

1. A newton is defined as
- A. The SI unit of force
  - B. That which changes a body's state of rest.
  - C. That which changes a body's state of uniform motion in a straight line.
  - D. The force required to produce an acceleration of  $1\text{ms}^{-2}$  of a mass of 1kg.

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2. The figure below shows a body of mass 2kg which is acted on by a constant force, F under a constant resistance of 200N producing an acceleration of  $5\text{ms}^{-2}$ . What is the value of F?



- A. 200 N
  - B. 210 N
  - C. 400 N
  - D. 1000 N
3. A cylindrical rod of volume  $0.005\text{m}^3$  and length 50cm floats on water of density  $1000\text{kgm}^{-3}$  with 15cm of its length submerged. What is the mass of the rod?
- A. 0.5 kg
  - B. 1.5 kg
  - C. 15.0 kg
  - D. 50.0 kg
4. The following are a set of vector quantities only **except**.
- A. density, volume, velocity
  - B. impulse, torque, velocity.
  - C. displacement, speed, impulse
  - D. weight, mass, momentum
5. A body is acted on by two forces of magnitudes 12N and 5N acting at right angles to each other. What is the magnitude of the force required to restore equilibrium of the body?
- A. 17N
  - B. 7N
  - C. 13N
  - D. 60N

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6. A ball bearing falling in viscous fluid experiences its weight ( $W$ ), up thrust ( $u$ ) and the viscous drag( $v$ ). Under what circumstance will it attain a terminal velocity?
- A.  $u + v = w$   
 B.  $w + v = u$   
 C.  $u + w = v$   
 D.  $v - w = u$



7. The figure below shows a uniform metre rule AB pivoted at 25cm from end A with a mass of 2 kg hung from point A and another of 0.5kg at B.

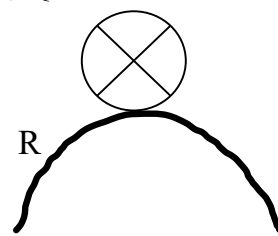
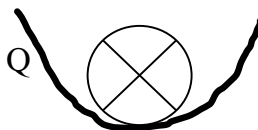
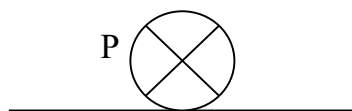


The mass of the metre rule is

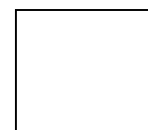
- A. 2kg  
 B. 1kg  
 C. 0.5kg  
 D. 2.5kg



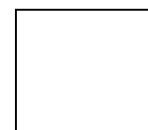
8. The figures below show a ball resting at different points P, Q and R. In which state of equilibrium the ball P, Q and R respectively?



- A. Neutral, stable, unstable  
 B. Neutral, unstable, stable  
 C. stable, unstable, neutral  
 D. unstable, neutral, stable.



9. A metal wire of original length 2 m stretches to a length of 2.05 m under the action of a tension force of 50 N. What tension is required to stretch it to 2.10 m?
- A. 200 N  
 B. 51.2 N  
 C. 100 N  
 D. 48.8 N



10. The following occur when a metal block is heated

|   | Volume           | Mass             | Density   |
|---|------------------|------------------|-----------|
| A | increases        | remain same      | decreases |
| B | Increases        | Increases        | Increases |
| C | Remains the same | Remains the same | decreases |
| D | Increases        | Remains the same | Increases |

11. 22000 J of heat increased the temperature of 2.0 kg of paraffin from 20°C to 30°C. The specific heat capacity of paraffin is thus

- A. 1100 Jkg<sup>-1</sup>K<sup>-1</sup>  
 B. 2200 Jkg<sup>-1</sup>K<sup>-1</sup>  
 C. 1200 Jkg<sup>-1</sup>K<sup>-1</sup>  
 D. 2100 Jkg<sup>-1</sup>K<sup>-1</sup>

12. Which of the following produces a cooling effect?

- (i) compression of a gas  
 (ii) expansion of a gas  
 (iii) evaporation of a liquid  
 A. (i), (ii), (iii)  
 B. (i) and (iii) only  
 C. (ii) and (iii) only  
 D. (iii) only

13. In which process below are electrons emitted from a hot filament?

- A. radioactivity  
 B. thermionic emission  
 C. thermo electric effect  
 D. photo electric effect

14. Which of the following statements are true?

- (i) protons and neutrons are found in the nucleus  
 (ii) electrons and β-particles are the same  
 (iii) protons and electrons occur in equal numbers in all neutral atoms  
 (iv) α- particles and β-particles are both freely charged  
 A. (i), (ii) and (iii)  
 B. (i) and (iii) only  
 C. (ii) and (iv)  
 D. (iv) only

15. A vibrator produces waves which travel a distance of 12m in 45. The frequency of the vibration is 12Hz, what is the wavelength of the waves?

- A. 1.5 m  
 B. 6.0 m  
 C. 3.0 m  
 D. 24.0 m

16. In a pin hole camera, sharper and tall images are obtained when the

- A. hole is wide and object is farther.
- B. hole is narrow and object is nearer
- C. camera is long and hole is wide
- D. camera is short and hole is narrow

17. A girl stands between two tall cliffs and claps her hands. She hears the 1<sup>st</sup> echo after 1s and the 2<sup>nd</sup> echo after 2s. If the speed of sound is  $30\text{ms}^{-1}$  between the cliffs, the distance between the cliffs is

- A. 300 m
- B. 450 m
- C. 900 m
- D. 1200 m

18. An electric appliance connected to the 240V mains draws 15 A for 40 minutes. If a unit of electricity costs Shs. 2.50, what is the cost of using this appliance for that time?

- A. shs 1.44
- B. shs 21.60
- C. shs. 960
- D. shs 1296

19. Which one of the following is not affected when a water wave propagates from a deep to a shallow region of water?

- A. frequency
- B. amplitude
- C. velocity
- D. wave length

20. The half-life of a radioactive element is 4 hours. What mass of the element decays after 24 hours if the initial mass is 9.6 g?

- A. 0.15 g
- B. 1.6 g
- C. 9.45 g
- D. 4.8 g

21. The figure below shows a section of ticker timer tape cut out, with points made from A towards end B.



The body connected to the ticker-timer is

**Turn Over**

- A. moving steadily
- B. decelerating
- C. accelerating
- D. experiencing none of the above



22. Which of the following are transverse waves only?

- A. radio, sound, ultraviolet
- B. ultraviolet, x-rays, water waves
- C. infrared, gamma rays, sound
- D. sound, ultraviolet, x-rays



23. Which of the following diagram shows the display on a CRO screen when A.C is fed into Y-input and the time base is on

- A. 
- B. 
- C. 
- D. 

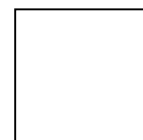
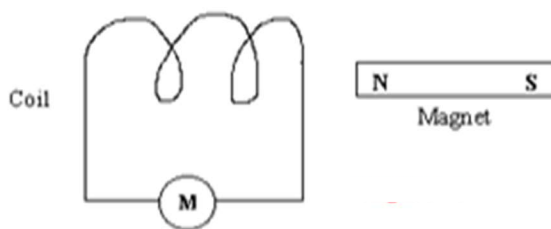


24. In a wire supporting a load, tensile stress is given by

- A.  $\frac{\text{Strain}}{\text{Area}}$
- B.  $\frac{\text{Young's modulus}}{\text{Strain}}$
- C.  $\text{Force} \times \text{Area}$
- D.  $\frac{\text{Force}}{\text{Area}}$



25. The figure below shows an arrangement used to produce an e.m.f. What causes the e.m.f?



- A. attraction between the coil and magnet
- B. magnetic field outside the coil
- C. magnet placed close to the coil
- D. the variation of magnetic lines linking the coil

26. In a green house, plants emit radiations which cannot pass through the green houses glass because the radiation are

- A. of short wave length
- B. of long wave length



- C of high frequency
- D absorbed by flask

27. Which of the following can't work with direct current?

- A. radio set
- B. TV set
- C. transformer
- D. electric bulb

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28. A ticker-timer is connected to the main supply of frequency 40Hz. The time taken to print three consecutive dots is

- A. 0.08s
- B. 0.25s
- C. 0.05s
- D. 0.75.

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29. Which of the following can cause a negatively charged electroscope to fall?

- (i) bringing a positively charged rod near the cap
- (ii) bringing a negatively charged rod near the cap
- (iii) connecting the can to the earth

- A. (i) and (ii) only
- B. (i) and (iii) only
- C. (ii) and (iii) only
- D. (i), (ii) and (iii)

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30. A body of mass 25kg falls freely from a height of 10m to the ground. Its velocity at the ground is

- A.  $4.47\text{ms}^{-1}$
- B.  $10.0\text{ms}^{-1}$
- C.  $14.14\text{ms}^{-1}$
- D.  $2500\text{ms}^{-1}$

☐

31. A mouse of mass 0.03 kg climbs through a distance of 2 m up a wall in 4 s. The power extended in watts is

- A.  $0.03 \times 2 \times 4 \times 10$

- B.  $\frac{0.03 \times 4 \times 2}{10}$

- C.  $\frac{0.03 \times 4 \times 10}{2}$

- D.  $\frac{0.03 \times 2 \times 10}{4}$

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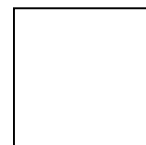
32. Metals are good conductors of heat because  
A. they are ductile  
B. they contain free protons  
C. they contain free electrons  
D. their atoms can easily be displaced
33. A yellow dress with blue dots shone with pure red light appears  
A. red with black dots  
B. yellow with blue dots  
C. green with red dots  
D. black with yellow dots
34. Which of the following devices converts electric energy to useful sound energy?  
A. microphone  
B. moving coil loud speaker  
C. electric motor  
D. D.C dynamo
35. Air has a density of  $1.26\text{kgm}^{-3}$ . The mass of air in a room of dimensions  $15\text{m} \times 14\text{m} \times 6\text{m}$  is  
A. 10kg  
B. 1000kg  
C. 1587.6kg  
D. 3175.2kg
36. A sound of regular frequency is known as a  
A. beat  
B. noise  
C. node  
D. tone
37. An inclined plane 3m long is used to raise a load of 1200N through a vertical height of 60cm. If the friction between the load and the plane is 40N, the effort needed is  
A. 280N  
B. 2000N  
C. 429N  
D. 1200N
38. Total internal reflection occurs when  
(i) Angle of incidence is greater than the critical angle.  
(ii) Angle of incidence is less than the critical angle  
(iii) The ray is moving from a denser to a less dense medium

- A. (i) and (iii)
- B. (ii) and (iii) only
- C. (i) only
- D. (i), (ii) and (iii)



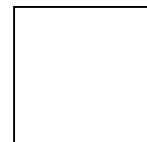
39. The light sensitive part in the human eye is known as the

- A. film
- B. cornea
- C. retina
- D. lens



40. The earth's magnetic field is such that

- A. the north magnetic pole points in the northern hemisphere
- B. the north magnetic pole points in the southern hemisphere
- C. the magnetic equator and geographic equator coincide
- D. the earth's axis coincides with the magnetic polar axis



### SECTION B:

41. An object of mass 4kg moving with a velocity of  $2\text{ms}^{-1}$  is then acted on by a constant force of 10N in the direction of motion through a distance of 20 m. Calculate the

(a) final velocity of the body.

(2 ½ marks)

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(b) work done by the force.

(1 ½ marks)

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42. A solid of volume  $10^{-4} \text{ m}^3$  floats in water with  $\frac{3}{5}$  of its volume submerged.

(a) Find the mass of the solid.

(02 marks)

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(b) If the solid floats in another liquid of density  $750 \text{ kgm}^{-3}$ , what fraction of the solid is submerged? (02 marks)

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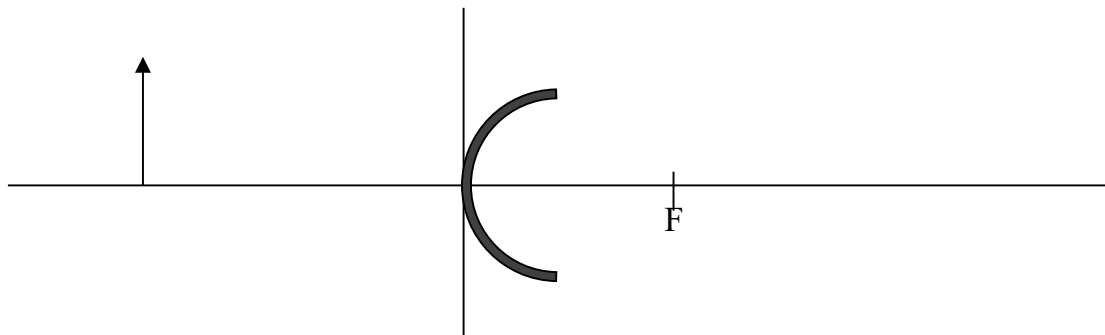
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43. (a) The diagram below shows an erect object placed in front of a convex mirror. Complete to show the formation of its image. (02 marks)



(b) State any **two** applications of convex mirror in the day to day life.

(01 mark)

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44. (a) State the **principle of moments**.

(01 mark)

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(b) (i) The figure below shows a uniform metre rule AB of mass 500g pivoted at the 25cm mark. Masses of 2 kg and 5 kg are suspended from its ends.



What mass should be attached to point A so as to make the system to be in equilibrium? (02 marks)

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(ii) State **two** applications of the principle of moments. (01 mark)

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45. (a) Define the term **electrification** as applied to electrostatics. (01 mark)

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(b) Explain why two objects rubbed together may become charged and explain the nature of charge attained. (03 marks)

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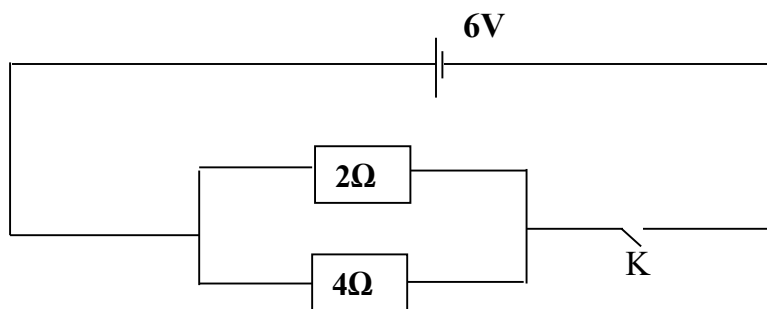
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46. (a) Define a **volt**. (01 mark)

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(b) The figure below is of an electric circuit in which two resistors of  $2\Omega$  and  $4\Omega$  are connected to a battery of 6V e.m.f and negligible internal resistance.



Calculate the current which flows when

(i) switch K is open.

(1 ½ marks)

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(ii) switch K is closed.

(1 ½ marks)

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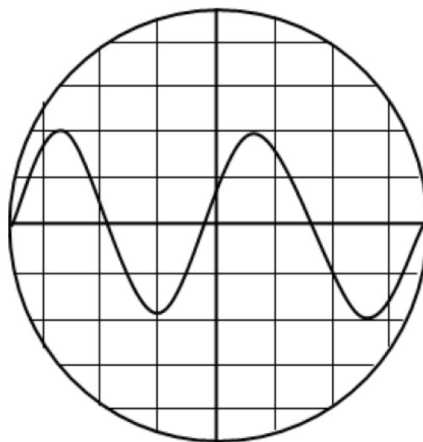
47. (a) Define **cathode rays**.

(01 mark)

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(b) The diagram below shows the display of a CRO with its time base switch on when connected to a power supply. The wave form obtained is such that the distance between each line is 1cm.



(i) Identify the type of voltage. (01 mark)

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(ii) Find the maximum value of voltage generated if voltage gain is  $10 \text{ vcm}^{-1}$ . (02 marks)

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48 (a) Define a **transformer**. (01 mark)

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(b) A transformer wastes 20% of the power when input with a voltage of 240V. If its output is 12W, calculate the input current.

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(c) State **two** causes of power wastage in a transformer. (01 mark)

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49 (a) State **Charles' law**. (01 mark)

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- (b)  $200\text{cm}^3$  of a fixed mass of a gas has a temperature of  $25^\circ\text{C}$ . What will be the new volume of the gas at  $100^\circ\text{C}$  if its pressure remains unaltered? **Turn Over**  
(03 marks)
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- .....
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50. (a) Define refraction as applied to waves. (01 mark)
- .....
- .....

- (b) (i) A hospital uses x-rays of wavelength  $1 \times 10^{-11}\text{ m}$ . Calculate the frequency of the x-rays if its velocity is  $3 \times 10^8\text{ ms}^{-1}$ .
- .....
- .....
- .....
- .....

- (ii) State **one** use of x-rays in a hospital. (01 mark)
- .....
- .....

**END**