# KCSE 2025 PREDICTIONS 2025-TOP SCHOOLS' SERIES PHYSICS

# (EXPECTED EXAMS 1-10)

A premium collection of expertly curated KCSE 2025 prediction questions Obtained from Kenya's top 10 national schools. This comprehensive, well-organized compilation reflects national standards, offering high-quality practice to boost student readiness, confidence, and performance in upcoming final KCSE exams.

# **CONFIDENTIAL!**

For Marking Schemes Mr Isaboke <u>0746-222-000</u> / <u>0742-999-000</u>

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### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 1**

### 232/1 PHYSICS

### PAPER 1

### **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

### **INSTRUCTIONS TO THE CANDIDATES:**

- Write your name and index number in the spaces provided above.
- Answer all the questions both in section A and B in the spaces provided below each question
- All workings **must** be clearly shown; marks may be awarded for correct steps even if the answers are wrong.
- Mathematical tables and silent electronic calculators may be used.

SECTION	QUESTION	MAX SCORE	CANDIDATE'S SCORE
SECTION A	1-13	25	
SECTION B	14	11	
	15	15	
	16	08	
	17	07	
	18	14	
	TOTAL	80	

#### FOR EXAMINERS' USE ONLY

#### **SECTION A (25 MARKS)**

#### Answer All Questions In This Section In The Spaces Provided

Figure 1 shows an object held between two straight edges. Determine the radius of the object using the meter rule shown in figure 1 below. (2 marks)



- Apart from the size of an object state the other factor to be considered when choosing an instrument for measuring length of a given object (1 mark)
- **3.** The figure shows the level of mercury in a barometer. Study the diagram and answer the questions that follow



State and explain the effect on the height h when the atmospheric pressure increases (2 marks)

- 4. Give a reason why it easier to use a hammer with a long handle to remove a nail from wood than to use another one with a short handle to remove the same nail (1 mark)
- 5. When a steel ball is allowed to fall freely in a viscous fluid, it is observed to attain terminal velocity after some time. State the reason why the ball attains terminal velocity (1 mark)

The tape in the figure (not to scale) was obtained from an experiment using a timer of frequency 50Hz



State whether the body is decelerating or not the acceleration of the body whose motion is represented in the tape. (1mark)

**7.** The figure shows two identical measuring cylinder containing different liquids X and Y placed on a weightless simple balance. The system is equilibrium.



Compare the density of liquid X and that of Y

(2 marks)

8. The figures below show an arrangement of two pulleys used to lift same load of 100N



State with a reason the system that is more efficient

(2 mrks)

9. The figure shows a water tank that is used to heat water and supply through taps.



State with a reason whether the appropriate position for a heater is X or Y (2 marks)
10. The figure shows a uniform metre of mass 200g balance by a spring balance placed 70cm form one. The pivot is placed 30cm away from the same end. Study the diagram and answer the

questions that follow



Determine tension T on the spring

11. State the cause of random motion of smoke particles as observed in Brownian motion

experiment using a smoke cell.

(1 mark)

(2 marks)

12. The figure shows the level of mercury and water in identical glass beakers



Explain the difference in the shapes of the meniscus

13. A wooden block of mass 2kgs is placed on a horizontal surface. A horizontal force of 12N is exerted on it makes it to accelerate at 5ms<sup>-2</sup>. Determine the frictional force acting between the surfaces.
 (2 marks)

### **SECTION B (55 MARKS)**

Answer All Questions in This Section in the Spaces Provided

### 14.

a) State the two conditions necessary for a system of forces acting on a body to be in equilibrium

### (2 marks)

b) The figure shows a loaded wheelbarrow held in equilibrium by a gardener. The wheel of the wheelbarrow is in contact with the ground at point C



There are three vertical forces acting on the wheelbarrow P is the upward force applied by the gardener. Q is the upward force of the ground on the wheel at point C.W is the weight of the wheelbarrow and its contents. Explain why the force P is less than the force W

i. By considering the forces P, Q and W,

(2 marks)

ii. By considering the moments of the forces P and W about point C. (2 marks)

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#### (2 marks)

c) The figure shows a tanker lorry full of liquid. Study the diagram and answer the questions that follow



- The tanker delivers the liquid and drives away empty. Compare the acceleration of the empty tanker with the acceleration of the full tanker for the same resultant force (2 marks)
- ii. Given that empty tanker has a weight of 50 000 N. The forward force is 6000 N and the total resistive force is 2000N. Determine the acceleration of the tanker (3 marks)

15.

- a) A warm bottle of soda placed in ice at 0°C cools faster than when the same soda is placed in water at the same temperature. Explain this observation (2 marks)
- b) The figure shows an incomplete circuit set up that can be sued in an experiment to determine the specific heat capacity of a solid block by electric method. Study the diagram and answer the questions that follow



i. State the purpose of the rheostat in the experiment

(1 mark)

ii. Complete the diagram by inserting the missing components for the experiment to work(2 mks)

- (3 marks) iii. Other than temperature, state three measurements that should be taken
  - c) The figure shows a set-up of apparatus used in an experiment to determine the specific latent heat of fusion of ice. Study the diagram and answer the questions that follow



The following readings were noted after the heater was switched on for 10 minutes

- ➤ Mass of the beaker=260g
- Mass of the beaker +melted ice =280g

Determine

- i. The energy supplied by the 120W heater in the 10 minutes (3 marks)
- ii. The specific latent heat of fusion of the ice
- iii. The experiment value for the specific latent heat of fusion of ice obtained is less than the theoretical value. Give one reason for this observation (1 mark)
  - 16. The figure shows a conveyor belt transporting a package to a raised platform. The belt is driven by a motor.



The mass of the package is 36 kg.

Determine

- a) The increase in the gravitational potential energy (G.P.E.) of the package when it is raised through a vertical height of 2.4 m. (2 marks)
- **b**) The power needed to raise the package through the vertical height of 2.4 m in 4 s (2 marks)

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(3 marks)

- c) The electrical power supplied to the motor is much greater than the answer to (b). Explain how the principle of conservation of energy applies to this system. (2 marks)
- d) Assume that the power available to raise packages is constant. A package of mass greater than 36 kg is raised through the same height. Suggest and explain the effect of this increase in mass on the operation of the conveyer belt. (2 marks)
- **17.** An athlete of mass 64 kg is bouncing up and down on a trampoline. At one moment, the athlete is stationary on the stretched surface of the trampoline as shown in

the figure below.



- a) State the form of energy stored due to the stretching of the surface of the trampoline. (1 mark)
- (a) The stretched surface of the trampoline begins to contract. The athlete is pushed vertically upwards and she accelerates. At time t, when her upwards velocity is 6.0 m / s, she loses contact with the surface. Determine Her kinetic energy at time t. (2 marks)
- (2 marks) (b) The height at which the kinetic energy will be zero
- **b**) In practice, she travels upwards through a slightly smaller distance than the distance calculated in (ii).Suggest why this is so.
- c) The trampoline springs are tested. An extension-load graph is plotted for one spring. Fig. 3.2 is the graph.



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(1 mark)

On the same axes sketch a graph of another spring whose spring constant is higher than the trampoline springs
 (1 mark)

18.

a) The diagram below shows a set-up used to investigate a particular gas law. Study the diagram and answer the questions that follow



- (a) State with a reason which gas law is being experimented by the set-up (2 marks)
- (b) Name the two factors that are held constant in the experimented (2 marks)
- (c) Give the reason why heating is done through a water bath (1 mark)
- b) Figure (a) shows 52cm of air trapped by a mercury column of 10cm while figure (b) shows the column of air when the glass tube is inverted



Determine the atmospheric pressure in mmHg

(3 marks)

d)

c) The graph below shows the relationship between the pressure and temperature of a gas of volume V<sub>1</sub>



On the same axis sketch another graph for a gas of a larger volume.

(1 mark)

(a) The figure below shows a ball spinning in anticlockwise direction through still air

#### Direction of spinning



The horizontal distance covered by the ball is observed to be longer than when the ball is not spinned. Explain how the spinning increases the range of the ball (3marks)

(b) The figure below shows gas flowing along a pipe of non-uniform cross-sectional area. Two pipes A and B are dipped into liquids as shown below.



Indicate the levels of the liquids in A and B giving a reason for your answer (2marks)

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 1**

## 232/2

### PHYSICS

### PAPER 2

### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

### Kenya Certificate of Secondary Education.

### Instructions to candidates

- (a) Write your name, index number in the spaces provided above.
- (b) Sign and write the date of the examination in the spaces provided
- (c) This paper consists of **TWO** Sections: **A** and **B**.
- (d) Answer ALL the questions in section A and B in the spaces provided.
- (f) KNEC mathematical tables and silent non-programmable electronic calculators may be used.

Section	Question	Maximum score	Candidates score
Α	1-13	25	
	14	13	
	15	11	
В	16	11	
	17	10	
	18	10	
	TOTAL SCORE	80	

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### **SECTION A: 25marks**

### Answer <u>ALL</u> the questions in this section

**1.**The figure below shows region of the complete electromagnetic spectrum.

	Rec	1	Vio	let		
А		Visible lig	ght		В	С

i) Name the region marked A and B.

ii) State one use of electromagnetic radiation marked C.

2. The figure shows circular waves approaching a place barrier in uniform medium.

Barrier



On the diagram draw the reflected waves.

(1 mark)

- 3. A student standing between two cliffs and 500m from the nearest cliff clapped his hand and heard the first echo after 3 seconds and the second echo 2 sesconds later. Calculate the distance between the cliffs.
   (3 marks)
- **4.** The figure below shows a hollow negatively charged sphere with a metallic disc attached to an insulator placed inside.



State and explain what would happen to the leaf of uncharged electroscope if the metallic disc was brought near the cap of the electroscope. (2 marks)

**5**.Explain how local action is reduced in a simple cell.

(1 mark)

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(1 mark)

(2 marks)

(2 marks)

6. Figure shows the graph of image distance v against the object distance u for a curved mirror.



a) Explain why the coordinate P is for a magnified image.

- **b**) Identify the type of mirror used.
- 7. Radio waves travel with a speed of  $3.0 \times 10^8$  m/s in air. If a broad casting station broad casts at a wavelength of 225m, calculate the period of the radio waves. (2 marks)
- **8.**Two parallel current carrying conductors are placed close to each other as shown in figure below.



On the same diagram, draw the magnetic field pattern and indicate the directions of the forces experienced by each conductor. (2 marks)

9. Figure shows a stationary wave.



- a) Identify an antinode in the diagram.
- **b**) What is the wavelength of the stationary wave?
- 10. Figure shows a needle fixed on a cap of a leaf electroscope. The electroscope is highly charged and then left for some time.

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Explain why the leaf collapses.

(2 marks)

(1 mark)

(1 mark)

(1 mark) (1 mark)

11. The diagram below shows two mirrors inclined at 60° to each other. (Not drawn to scale)



Sketch on the diagram the path of the ray after striking mirror AB (2 marks)

12.A soft iron ring is placed between two poles of permanent magnets as shown below. Draw the magnetic field pattern set up between the two poles. (1mark)



13.Explain how hammering in the E-W direction demagnetizes a magnet

(1 mark)

### SECTION B: 55marks

#### Answer <u>ALL</u> the questions in this section in the spaces provided

- **14.a**) A lens forms a clear image on a screen when the distance between the screen and the object is 100. If the image is 4 times the height of the object. Determine;
- i) The distance of the image from the lens.
- ii) The focal length of the lens.
- **b**) The graph below shows the variation of 1/v and 1/u in an experiment to determine the focal length of a lens.



(3 marks)

(2 marks)

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(2 marks)

(1mark)

- (i) Use the graph to determine the focal length
- (ii) What is the power of the lens used?

c) The diagram below shows an upright object O placed in front of a concave lens.



By use of rays, locate the position of the image formed. (2 marks)

(e) The figure below shows a human eye with a defect.



(iii) Name an appropriate lens that can be used to correct this defect. (1mark)

**15.** (a)The figure below shows part of the lighting circuit of a house.



i)Explain why a fuse is included in the circuit.

(1 mark)

(1mark)

ii) Explain why the fuse is placed in the live wire rather than in the neutral wire. (1 mark)

- **b**)A house has five rooms each with 240V, 60W bulbs. If the bulbs are switched on from 7:00pm to 11:00pm,
- i) Calculate the power consumed per day in kilowatt-hour. (3 marks)
- ii) Find the cost of power per week for lighting these rooms at Ksh. 6.70 Per unit. (2 marks)
- iii) Each lamp has a power of 60W. Calculate the current through one lamp when it is switched on.

#### (2 marks)

- c) Explain why long distance power transmission in done at a very high voltage (2 marks)
- **16** (a) State Farady's law of electromagnetic induction.
  - (b) Figure below shows an experiment to illustrate electromagnetic induction using a coil and a magnet.



State the observation on the galvanometer when:

i) The magnet is stationary	(1 mark)
i) The magnet is plunged into the coil at constant velocity	(1 mark)
iii) Explain how the current is produced.	(2 marks )

- iv) Show on the diagram the direction of the current in the coil when the magnet is moved towards the coil (1 mark)
- (c) A transformer is designed to supply a current of 12A at a P.d. of 80V. The inlet cable is to be connected to an a.c. mains of 240V. The efficiency of this transformer is 80%.

#### Calculate:

- (i) Current in the primary coil of the transformer (2marks) (2marks)
- (ii) The power supplied to the transformer
- (iii) Explain how energy losses in a transformer are reduced by having a soft iron core.(1mark)
- 17. (a) The figure below shows a simple electric motor running on battery.



(i) Label parts; A and B ( **2marks**)

(ii) Indicate the poles of the magnet on the diagram so that the coil rotates in the direction indicated. (1 mark)

(ii) Suggest two improvements that could be made on the motor to improve its efficiency.

(2 marks)

- **b**) **i**) State one condition for Ohm's law to hold
- ii) The graph below shows a voltage-current graph for a cell.



Determine;

i) The e.m.f of the cell.

(1 mark)

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)

(1mark)

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ii) The internal resistance of the cell given that E = V + Ir

(3 marks)

**18.a)** Figure shows how light is dispersed to produce a rainbow when it passes through a raindrop.



State with reasons, what is happening to the ray of light at points.

- i) Q (2 marks) ii) R (2 marks)
- **b**) Three capacitors are connected as shown in figure 9 below with a battery of e.m.f 6V and zero internal resistance.



Calculate the;

i) Ef	fective capacitance.	(2 marks)
ii)	Charge on the 12µF capacitor.	(2 marks)
iii)	State <b>two</b> factors that increases capacitance of parallel plate capacitor.	(2 marks)

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 2**

### 232/1 PHYSICS

### PAPER 1

### **TIME: 2 HOURS**

NAME	
SCHOOL	SIGN
INDEX NO	ADM NO

### Kenya Certificate of Secondary Education.

#### **Instructions to candidates**

- 1. Write your name, index number and school in the spaces provided above.
- 2. Sign and write the date of examination in the spaces provided above.
- 3. This paper consist of TWO sections; A and B.
- 4. Answer ALL the questions in section A and B in the spaces provided.
- 5. ALL working MUST be clearly shown.

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MAXIMUM SCORE	80 MARKS
CANDIDATE'S SCORE	

#### **SECTION A: 25marks**

**1.** A stopwatch is used to time a runner in a race. Figure below show the stopwatch at the start and at the end of a lap of the race.



State how long( in SI unit) did the runner took to finish the lap of the race(1mark)2. The front views of two cars are shown in figure below, drawn to the same scale.



Suggest which car has the greater stability, and give a reason. (2marks)

**3.** Figure below shows a micrometer screw gauge. State the reading indicated (2marks)



4. Figure 4 shows two identical springs of spring constant 3N/cm supporting a load of 30N.



Determine the extension of each spring.

**5..**Figure below shows a system for raising a heavy piece of metal into a vertical position.



A man pulls on the rope with a horizontal force T. The piece of metal has a weight of

- 2000 N and is freely pivoted at A. The system is in equilibrium. By taking moments about A, calculate T. (3marks)
- 6. Explain why an aeroplane is likely to take off much earlier than expected when the speed of the wind blowing in the opposite direction to its motion on the runway suddenly increases2 mks)
- **7.**An aircraft 300m from the ground traveling horizontally at 400m/s releases a parcel. Calculate the horizontal distance covered by the parcel from the point of release. (Ignore air resistance)

### (3 marks).

**8.**A body of mass 4.0kg held at a vertical height of 500cm is released to travel a long a frictionless curved path as shown below.



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#### (2 marks)

- The 4.0kg mass strikes another body of mass 6.0kg at rest immediately it reaches the horizontal the bodies stick together and move in the same direction. Determine the velocity of the bodies immediately after collision. (3marks)
- 9.A tin with a hole is filled with water to a certain height. Water jets out as shown in figure 9(a) below. A second identical tin is filled with water to the same height and a block of wood floated as shown in figure 9(b).



State the reason why the maximum distance of jet  $d_2$  is greater than  $d_1$ . (1 mark)



i) State the observation made in the smoke cell.

#### (1 mark)

ii) Explain the observation made when the temperature in the smoke cell is increased. (1 mark)

- 11. When a mercury in a glass thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain. (2 marks)
- 12. Figure 3 shows an arrangement of apparatus to study properties of different surfaces.



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The heater is placed equidistance from the two plates. State what happens when the heater is switched on for some time. (1 mark)

**13.** Expain your answer in question 12 above

#### **SECTION B: 55marks**

**14.** a) The figure below shows the features of a refrigerator.



Freezing compartment

i) What is the function of the pump?	(1 mark)
ii) What is the function of the copper fins at the back of the refrigerator?	(1 mark)
iii) Explain briefly how cooling takes place in the refrigerator.	(3 marks)
iv)What is the purpose of the double wall in a refrigerator?	(1 mark)
<b>b</b> ) <b>i</b> ) Define the term latent heat of fusion of a substance.	(1 mark)

ii) The figure below shows an apparatus that could be used to determine the specific latent heat of fusion of ice.



In order to obtain results that are as accurate as possible, state why it is important to:

I. wait until water is dripping into the beaker at constant rate before taking readings. (1 mark)

**II.** Use finely crushed ice rather than larger ones.

### (1 mark)

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(1mark)

**15.** (a)State the law of flotation.

#### (1 mark)

(b) Figure below shows a uniform rod of height 8cm floating vertically in a beaker containing two immiscible liquids P and Q. The densities of the liquids are 800kg/m<sup>3</sup> and 1200kg/m<sup>3</sup> respectively the cross-sectional area of the rod is 2cm<sup>2</sup>.



Determine

(i).the weight of liquid P displaced by the rod.	(3 marks)
(ii) The weight of liquid Q displaced by the rod.	(2 marks)
(iii) The mass of the rod.	(1 mark)
(iv)The density of the rod.	(2 marks)

(c). Figure below shows a block of volume 50 cm<sup>3</sup> and density 2 000 kg/m<sup>3</sup> submerged in a liquid and suspended from a uniform horizontal beam by means of a thread. The beam is balanced by a spherical mass of 40 g, which is suspended from it on the other side of the pivot as shown



Determine the upthrust force acting on the block.

(3 marks)

16. a) State two condition necessary for a driver to negotiate a bend on a banked bend at a (2 marks)

relatively high speed

(b). The figure shows stone of mass 100g whirled in a vertical circle using a thread of length 56cm. (Take g 10N/Kg)



- i) The centripetal force experienced by the stone.
- ii) Tension force on the string:
- I) T<sub>A</sub> (2 marks) II) T<sub>B</sub> (2 marks) (1mark) iii) calculate the angular velocity of the stone.
- (d)Figure shows a centrifuge that is used to separate particles suspended in a liquid.



(i).Explain why the particles of different masses will acquire different radii as the system is rotated.

(1 mark)

- (ii). If  $M_3$ ,  $>M_2>M_1$ , arrange the particle in increasing radii when the centrifuge is rotated for some time. (1 mark)
- 17.a) State the one condition necessary for pressure law to hold. (1 mark)

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(3 marks)

- b) A bubble at the bottom of a pond expands as it rises to the top of the liquid. Explain. (1 mark)
- c) The graph below represents a graph of pressure against temperature, °C.



From the graph, determine;

i)The absolute temperature.	(1 mark)
<b>Ii</b> )The pressure at 373K	(1 mark)
Explain why temperature in (i) above can not be achieved	(2 marks)
d) A column of air 26cm long is trapped by mercury thread 5cm long. When th	e tube is inverted,

the air column becomes 30cm long. What is the value of atmospheric pressure?



Explain using kinetic theory of gases why pressure of gases increases as temperature of the gas is increased. (3 marks)

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(3 marks)

**18.***a*) Differentiate between work and energy.

**b**) Describe the energy transformation that takes place when a car battery is used to light a bulb.

c) The figure shows a machine.

Gear wheel A with 30 teeth is driven by gear wheel B with 15 teeth.

i) Determine the velocity ratio of the machine.

ii) If the machine has a mechanical advantage of 0.375, determine the efficiency of the machine.

d) A cart of mass 30kg is pushed along horizontal path by a horizontal force of 8N and moves with a constant velocity. The force is then increased to 14N.

Determine:;

- i) The resistance to the motion of the cart.
- ii) The acceleration of the cart.

Driver 15 teeth 30 teeth

(2 marks)

(2 marks)

(2 marks)

(1 mark)

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(1 mark)

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 2**

### 232/2

### PHYSICS

### PAPER 2

### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

### **INSTRUCTIONS TO CANDIDATES**

(a) Write your name and index number in the spaces provided.

(b) Mathematical tables and non-programmable calculators may be used.

(c) This paper consists of section A and section B.

(d) Attempt all the questions in the spaces provided.

(e) ALL working MUST be clearly shown.

SECTION	QUESTIONS	MAX SCORE	CANDIDATE'S SCORE
А	1 - 12	25	
В	13	13	
	14	15	
	15	15	
	16	12	
	TOTAL	80	

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(2 marks)

- 1. An object pin is placed in front of a plane mirror. The image of the pin is viewed from position
  - A. Draw array diagram to show this image.



- 2. You are provided with two rods, a conductor and an insulator. Describe how you would use a charged gold-leaf electroscope to distinguish between the insulator and a conductor. (2 marks)
- 3. A pin-hole camera of length 10 cm is placed 0.5
- m away from a goalpost. A sharp image of the goalpost 15 cm high is formed on the screen.Determine the height of the goalpost. (2 marks)
- 4. The figure 2 below shows a displacement- time graph of a particular progressive wave.



Draw on the same diagram, a wave which passes through the points with double frequency and half

amplitude of the first wave.

(2 marks)

- 5. Explain how temperature affects the speed of sound is gases (1 mark)
- 6. A polythene charged strip is brought near two spheres A and B that are in contact as shown in



(i) indicate the charge distribution the spheres when negatively charged polythene is brought near

A.

(1 mark)

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volts

Deep water

(i) State which lamp is brightest when circuit is closed?

- (ii) Explain your answer in part (i) above.
- 8. Figure 5 shows an iron rod on which a wire is to be wound to make an electromagnet.



- 9. The force on a conductor carrying current in a magnetic field can be varied by changing, among others, the magnitude of the current and magnetic field strength. State two other factors that can be changed to vary the force. (2marks)
- 10. Using domain theory explain the differences between a magnetic material and a magnet (2mks)
- 11. Figure 6 shows water waves traveling from deep into shallow water.

shallow water



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(1 mark)

(2marks)

(1 mark)

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12. Figure 7. Shows two rays incident on a converging lens



(i) Draw the ray after refraction to show positions of the image. (2marks/)
(ii) State the application of this arrangement in (i) above (1 mk).

#### **SECTION B(55 MARKS)**

13. (a) Define refractive index of a material in terms of velocity of light. (1mark/)
(b) state the conditions necessary for a total internal refraction to occur (2marks)
(c)Figure 8 shows light ray traveling from air to glass and from glass to air. Ray of Light AO is incident normally or the semicircular class



- (i) Determine the refractive index of glass with respect to air. (3 marks)
- (ii) In addition to the circular glass, you are provided with; a ray box (source of light ray), four office pins, soft board, white paper and a protractor, describe how this apparatus may be used to determine the critical angle of the glass.
   (4marks)
- (iii) Determine the critical angle of this semicircular glass. (3 marks)

**14.(a)** You are provided with three resistors 1  $\Omega$ , 3  $\Omega$  and 6  $\Omega$ .

i) Draw a circuit diagram to show $6\Omega$ and $3\Omega$ resistors in parallel and this combination in series		
with $2\Omega$ resistor and the 6 V battery.	(2marks).	
(ii) Determine the total effective resistance in the circuit drawn in (i) above	(2 marks)	
(iii) Calculate the p.d across a 2 $\Omega$ resistor	(2 marks)	
(iv) Determine the value of current through the 6 $\Omega$ resistor	(3marks)	

(b) Figure 9, shows a graph of potential difference (V) against current (I A) through a filament lamp (bulb)



difference p.d (v) was plotted as shown graph 1

(i) Draw a well labeled working circuit diagram showing the apparatus that can be used to obtain a set of readings used to draw the graph in (figure9). (2marks)
(ii) Explain why the filament lamp does not obey ohm's law (2 marks)
(iii) Explain how resistance of the filament lamp varies as current increases. (1 mark).
(iv) State the characteristics of material wire used in the filament lamp. (1 mark).
15. (a)Define capacitance of a capacitor. (1 mark)
(b) (i) Describe the essential features in the construction of a parallel plate capacitor. (3 marks)
(iii) Explain how charge is distributed in such parallel capacitor in b(i) above. (2marks)
(c) In an experiment to charge a capacitor, the charge stored was measured for different values of charging potential difference. A graph of charge stored Q (μc) (y-axis) against potential





- (i) List down the apparatus used to perform this experiment (1 mark)
- (ii) Draw a circuit diagram showing all connections of the listed apparatus in (i) above to perform the experiment of charging a capacitor. (2 marks)

From the graph

(ii) Determine the capacitance of the capacitor used in this experiment.

(iii)Calculate the energy stored in this capacitor.

(d) Three capacitors are connected a shown in figure 10.



- (3 marks)
- (2 marks)

(2 marks)

(2 marks)

Calculate:

- (i) Total effective capacitance in the circuit.
  - (ii) The charge on a  $4.0 \,\mu\text{F}$  capacitor.
- 16. (a) Complete figure 11 by drawing two rays to show the final image formed by convex lens of the object O, shown (2 marks)



- (b) Describe the characteristics of the image formed in 16 (a) above (3 marks)
- (c) State the optical device that uses the arrangement in (a) above. (1 mark)
- (d) A person viewing a near object switches attention to look at an aero-plane far away.
- (i) State the change that occurs in his eye in order to see the aero-plane clearly. (2 marks)
- (ii) If this person fails to see the aero-plane clearly, what defect is he suffering from? (1 mark)
- (iii) Explain with a diagram how the defect can be corrected. (3 marks)

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 3**

### 232/1 PHYSICS

### PAPER 1

### **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

### **INSTRUCTIONS TO CANDIDATES**

- This paper consists of two sections A and B.
- Answer **all** the questions in the two sections in the spaces provided after each question
- All working **must** be clearly shown.
- Electronic calculators and Mathematical tables may be used.
- All numerical answers should be expressed in the decimal notations.

QUESTION	MAX MARKS	SCORE
1 – 14	25	
15	12	
16	10	
17	09	
18	14	
19	10	
	80	
	QUESTION 1-14 15 16 17 18 19	QUESTIONMAX MARKS1-14251512161017091814191080

For Examiner use only
### **SECTION A (25 MARKS)**

Answer all the questions in this section in the spaces provided.

1. Figure 1. shows a micrometer screw gauge being used to measure the diameter of a ball bearing.



#### Fig.1

Fig. 2

If the instrument has a negative zero error of 0.01mm, record the actual diameter of the ball bearing.

(1 mark)

2. Figure 2. shows drops of mercury and water on a glass surface,



Explain the difference in the shapes of the drops.

3. State why diffusion is faster in gases than in liquids.

**4.** When a Bunsen burner is lit above a wire gauze, it is observed that the flame initially burns above the gauze shown in figure 3 (i). After sometime, the flame burns below as well as above the gauze as shown in figure 3(ii).



Explain the observation.

(2 marks)

5. In an experiment to demonstrate Brownian motion, smoke was placed in a smoke cell and observed using a microscope. The smoke particles were seen moving randomly in the cell. Explain the observation. (1 mark)

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## (2 marks)

(1 mark)

6. A paper vane in a horizontal axis was placed above a Bunsen burner as shown in figure 4. When the burner was lit, the paper vane begun to rotate. Explain the observation. (2 marks)



- 7. An electric kettle with shiny outer surface is more efficient than one with a dull outer surface, give a reason for this. (1 mark)
- 8. What is the reason why trailers carrying heavy loads have many wheels.
- 9. Two flasks A and B were placed on a horizontal surface as shown in figure 5.



State and explain which flask is more stable.

10. Figure. 6 below shows a metre rule balancing when a mass of 200g is hung at one end. Determine the tension, T in the string. (3 marks)

<u>1111</u> т Fig. 6 10cm 200g

- **11.** State Newton's second law of motion.
- 12. A pipe of diameter 12mm is connected to another of diameter18mm. if water flows in the wider pipe at the speed of 2m/s, determine the speed of water in the narrow pipe. (3 marks)

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(1 mark)

(1mark)

(2 marks)

13. On the axes provided in the figure 7, sketch the graph showing variation in pressure with volume of a fixed mass of gas that obeys Boyle's law. (1 mark)

Pressure (pa)

#### Volume (cm<sup>3</sup>)

- 14. An oil drop has a volume of 0.01mm<sup>3</sup>. When it is placed on the surface of water, it spreads out to form a circular patch of area 500cm<sup>2</sup>.
- (i) Calculate the size of the molecule of the oil. (3 marks) (ii) State one assumption made in (i) above. (1 mark)

#### **SECTION B (55 marks)**

**15.** (a)Define angular velocity

(b) the figure below shows an object of mass 0.2kg whirled in a vertical circle of radius 0.3m at uniform speed of 4m/s



(I) Position A	(2 marks)
(ii) Position B	(2 marks)
(iii) Suggest the point where the string is likely to snap.	(1 mark)

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(1 mark)

(d) The figure below shows the motion of a trolley on a ticker tape timer whose frequency is

100HZ



Determine:

- (i) Initial velocity at points AB.
  (2 marks)
  (ii) Velocity at points CD
  (2 marks)
  (iii) Acceleration of the trolley during the motion.
  (2 marks)
  (2 marks)
  (2 marks)
  (2 marks)
  (1 mark)
- (b) State two precautions taken when using a density bottle. (2 marks)
- (c) A form one student wanted to determine the density of copper. She wrote the following procedure: Study it and answer the questions that follow.
- Measure the mass  $x_1$  (g) of a clean dry empty density bottle
- Fill the bottle partly with copper turnings and measure the mass  $x_2(g)$
- Fill the bottle with water up to the neck and measure its mass  $x_3(g)$
- Empty the bottle and rinse it.
- Fill it with water and replace the stopper. Measure the mass  $x_4(g)$  of the bottle filled with water.

### Write an expression for:

(i) Volume of the bottle	(2 marks)
(ii) Mass of copper turnings	(1 mark)
(iii) Volume of copper turnings.	(2 marks)
(iv) Density of copper.	(2 marks)

<b>17.</b> (a) State the law of floatation	(1 mark)
(b) A metal block weighs 0.8N is suspended by a string in water. If the block is co	mpletely
immersed in water the tension in the string is 0.5N. Find	
(i) The upthrust on the block	(1 mark)

- (ii) The density of the block. (3 marks)
- (c) The figure below shows a cork of mass 25g floating in water.



Determine the minimum volume of copper that must be attached so that the two will just submerge.( Relative density of copper = 9.0, Relative density of cork= 0.25) (3marks)

- (d) Explain how a submarine can be made to.
- (i) Float on water
- **18.** (a) You are provided with the following apparatus:

A filter funnel, a thermometer, a stop watch, ice at 0°C, an immersion heater rated P watts, a beaker, a stand, boss and clamp and a weighing machine.

Describe an experiment to determine the specific latent heat of fusion of ice. Clearly state the measurements to be made. (3 marks)

(b)200 g of ice at 0°C is added to 400g water in a well lagged calorimeter of mass 40g. The initial temperature of the water was 40°C. If the final temperature of the mixture is X°C,(Specific latent of fusion of ice L =  $3.36 \times 10^5$  Jkg<sup>-1</sup>, specific heat capacity of water, c = 4200Jkg<sup>-1</sup>K<sup>-1</sup>, specific heat capacity of copper = 400 Jkg<sup>-1</sup>K<sup>-1</sup>.)

(i) Derive an expression for the amount of heat gained by ice to melt it and raise its temperature to X°C (2 marks)

- (ii) Derive an expression for the amount of heat lost by the calorimeter and its content when their temperature falls to X°C.
   (2 marks)
- (iii) Determine the value of X.

(c) A hydrogen balloon of volume 1.2 m<sup>3</sup> is released at the ground level where the pressure is680 mmHg and a temperature of 20 °C. Determine the volume of the balloon at a height of2500m above the ground where the pressure drops to 500 mmHg and the temperature is 4°C.

#### (4 marks)

(3 marks)

**19.** A balloon seller has a cylinder of helium gas which he uses to blow up his balloons. The volume of the cylinder is  $0.10m^3$ . It contains helium gas at a pressure of  $1.0 \times 10^7 Nm^{-2}$ . The balloon seller fills each balloon to a volume of  $1.0 \times 10^{-2}m^3$  and a pressure of  $2.0 \times 10^5 N/m^2$  (a)Explain in terms of particles how the helium in the cylinder produces a pressure(1 mark)

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#### (1 mark)

(b) Calculate the total volume that the helium gases occupy at a pressure of  $1.2 \times 10^5 \text{ N/m}^2$ . Assume the temperature of the helium does not change (3 marks)

(c) Calculate the number of balloons of volume  $1.0 \ge 10^{-2} \text{m}^3$  that the balloon seller can fill using the gas (2 marks)

(d) The graph below shows how the pressure of a gas trapped inside a sealed container changes with temperature. The pressure is caused by the gas particles continually hitting the sides of the container.



- (i) Write down the name of the temperature at which the gas particles stop hitting the sides of the container
   (1 mark)
- (ii)What is the momentum of the gas particles at this temperature? Give reason for the Answer

(2 marks)

(1 mark)

(iii) Give the value of the temperature in Kelvin

END

# **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

# **EXPECTED EXAM 3**

# 232/2

# PHYSICS

# PAPER 2

## **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

## **INSTRUCTIONS TO CANDIDATES**

- (a) Write your name, index number in the spaces provided above.
- (b) Sign and write the date of the examination in the spaces provided
- (c) This paper consists of **TWO** Sections: A and B.
- (d) Answer ALL the questions in section A and B in the spaces provided.
- (e) All working MUST be clearly shown.
- (f) KNEC mathematical tables and silent non-programmable electronic calculators may be used.

Section	Question	Maximum score	Candidates score
Α	1-13	25	
	14	11	
	15	11	
В	16	13	
	17	10	
	18	10	
	TOTAL SCORE	80	

#### FOR EXAMINERS USE ONLY

## SECTION A: 25marks

1. The chart below shows an arrangement of different parts of the electromagnetic spectrum.

Radio wave	А	Infrared rays	В	Ultra-violet χ-Rays	
------------	---	---------------	---	---------------------	--

Name the radiation represented by

State one use of radiation represented by B

A .....

2. An object O is placed in front of convex mirror as shown in the diagram below. Complete the diagram to locate the position of the image, 1. (3 marks)



**3.** The figure below shows a wire carrying current whose direction is out of the paper. The wire is placed in a magnetic field.

(a)Indicate on the figure the direction of the force F, acting on the wire. (1 mark)

(b)State what would be observed on the wire if the direction of the current is reversed. (1 mark)

**4.** The figure below shows part of the lighting circuit of a house.



i) Give a reason why a fuse is included in the circuit.

- (1 mark)
- ii) If each lamp has a power of 60W at voltage of 240V. Calculate the current through one lamp when it is switched on. (2 marks)

(1mark)

(1mark)

5. Figure 5 below shows a simple transformer connected to a 12v a.c source and an a.c voltmeter.



Determine the reading on the voltmeter.

6. The diagram shows a patient having her eyes tested. A chart with letters on it is placed behind her and she sees the chart reflected in a plane mirror.



Determine how far away from the patient, the image of the chart is seen.

- 7. State Snell's law.
- 8. The figure below shows an electric circuit.



State and explain how the potential difference across X varies as the light shining on it becomes brighter. (2marks)

9. Waves pass from deep water to shallow water and refraction occurs.



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#### (2 marks)

(2 marks)

(1 mark)

Calculate the speed of the waves in the shallow water

(2 marks)

(1 mark)

(1 mark)

**10.** The diagram below shows a ray of light striking the plane at 35° as shown below.

State the angle of reflection.



11. The figure below shows an iron bar being magnetized by stroking it with a magnet.



Indicate on the iron bar the polarity of resulting magnet.

- **12.** An echo sounder of a ship transmits sound waves to the depth of the sea and receives the echo after 2.4 seconds. If the speed of sound in water is 1600ms<sup>-1</sup>, determine the depth of the sea.
- (3 marks)
- 13. It is observed that when a charged body is brought near the cup of a positively charged electroscope, the divergence of the leaf increases. State the type of charge on the body.(1mark)

## **SECTION B (55 marks)**

**14.** (a) The figure below shows a diagram of a Geiger Muller tube connected to a power supply and a pulse counter.



(i)Why should the argon gas be at low pressure?

(ii)State the purpose of the bromine gas in the tube.

(iii)Suggest one way of increasing the sensitivity of the tube

(1mark)

(1mark)

(1mark)

(2marks)

(iv) Find the value of a and b in the following equation.

$${}^{234}_{92}U \rightarrow {}^a_b X + 2\alpha$$

**b**) The figure below shows a PN junction diode used in a rectifier.





**15.** The figure below shows a cathode ray tube



**a**) State the function of the

i) Heater

(1mark)

ii) Extra High Tension (E.H.T.)	(1 mark)
<b>b</b> ) State how the intensity of the fluorescence on the screen can be increased.	(1 mark)
<b>b</b> ) State how the intensity of the fluorescence on the screen can be increased.	(1 mark)
c) State the effect of having air in the tube instead of a vacuum	(1 mark)
d) State one properties of cathode rays	(1 mark)
e) Distinguish cathode rays and X-rays	(1 mark)

f) Give one advantages of using a C.R.O instead of a voltmeter in measuring voltages (1 mark)

g) The figure below shows an a.c. voltage. If the Y-gain control reads 10V/cm and the time base reads 5 milliseconds/cm



Calculate:

i) The frequency of the alternating voltage

ii) Peak to peak voltage of the alternating voltage

**16** (a)(i)It is observed that when ultra- violet radiation is directed onto a clean zinc plate connected to the cap of a negatively charged leaf electroscope, the leaf falls .Explain this observation

(2 marks) (ii)State why this observation does not occur if the electroscope is positively charged (1 mark)

- (iii) ,Explain why the leaf of the electroscope does not fall when infra- red radiation is directed onto the zinc plate (1 mark)
- **b**) State the effect on the electrons emitted by the photoelectric effect when:
  - (i) The intensity of incident radiation is increased (1 mark)
  - (ii) The frequency of the incident radiation is increased (1 mark)
- c) Light of wavelength  $4.3 \ge 10^{-7}$ m is incident on two different metal surfaces, nickel and potassium. (Take speed of light as  $3.0 \ge 10^{8}$  ms<sup>-1</sup> and planks constant h as

6.63 x 10<sup>-34</sup>Js).

(i) Determine the energy of the incident radiation.

# (2 marks)

(2 marks)

(3 marks)

**TOP SCHOOLS' PREDICTIONS - 2025** 

(ii) If the work function of nickel is  $8.0 \ge 10^{-19}$ J and that of potassium is  $3.68 \ge 10^{-19}$ J, state with a reason from which of the two metals the given light will eject electrons. (2 marks)

(iii) Determine the velocity of the emitted electrons from the metal surface in b(ii).

(Take the mass of an electron as  $9.1 \times 10^{-31} \text{ kg}$ ). (2 marks)

17(a) The figure below shows three resistors as shown.



If the voltmeter reads 4V, find the

(i) Effective resistance

(ii) Current through the  $3\Omega$  resistor

(iii) Potential difference across the  $8\Omega$  resistor if the voltage total voltage in the circuit is 10V

### (1 mark)

- (c) (i) What is meant by the term "terminal voltage" as used in current elecricity? (1mark)
- (ii) A cell supplies a current of 2.0A when connected to a  $0.6\Omega$  resistor and 1.5A when the same cell is connected to a  $0.9\Omega$  resistor.Find the e.m.f and the internal resistance of the cell.

## (3marks)

18((a) Give a reason why a candle flame is blown when a highly charged conductor is brought close to it as shown below. (1mark)



(2 marks)

(3marks)

**b**) State two factors that affect capacitance of a capacitor

c)The figure below shows 1µF, 2µF, 4µF and 5µF capacitors connected to a battery.



## Determine:

i) The total capacitance.	(3marks)
ii)The total energy stored by the capacitors.	(2marks)
iii) Voltage across the 4µF capacitor.	(2marks)

(2 marks)

# **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

# **EXPECTED EXAM 4**

# 232/1 PHYSICS

# PAPER 1

### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

# Kenya Certificate of Secondary Education.

### **Instructions to candidates**

- Write your name and class in the space provided.
- This paper consists of two sections; SECTION A and B
- Answer all the questions in the spaces provided
- ALL working MUST be clearly shown.
- Mathematical tables and electronic calculators may be used
- Take: Acceleration due to gravity:  $g = 10m/s^2$

Section	Question	Maximum Score	<b>Candidate's Score</b>
Α	1 – 12	25	
	13	10	
	14	11	
	15	12	
В	16	10	
	17	12	
	Total Score	80	

#### For Examiner's Use Only

### **SECTION A (25 MARKS)**

- 1. With a reason identify in which state is diffusion faster between gas and liquid. (2marks)
- 2. The length of the spring is 20.0cm. It becomes 24.0cm when a weight of 8.0N hangs on it.Calculate the length of the spring when supporting a weight of 200N. (2marks)
- 3. The figure below shows the instrument used to measure pressure



- **a.** Name the instrument
- b. What would be observed if the test tube is tilted assuming the instrument is functioning normally (1mark)
- 4. The rate of heat flow in thermal conductivity increases with increase in cross-section area.Explain this observation (1n)
- 5. Explain why a small car travelling at a very high speed is likely to be dragged into a long track travelling in the opposite direction (2marks)
- 6. A uniform meter rule is balanced by two masses as shown in the figure below.



By displacement method, the immersed object is found to occupy 13.5cm<sup>3</sup>. Determine the density of the liquid in SI units. (3 marks)

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### (1mark)

#### (1mark)

7. The springs shown in the arrangement in figure 4 below are identical.



Given that the 180N weight causes a total extension of 30cm, determine the spring constant of each spring. (The weight of each spring is negligible) (3 marks)
8. i) Distinguish between elastic collision and inelastic collision. (1 mark)

- ii) State the energy transformation during inelastic collision. (2 marks)
- 9. State the branch of physics that deal with kinetic energy of matter. (1 mark)
- 10. The water in a burette is 30.6cm<sup>3</sup>, 50 drops of water each of volume V are added to the water in the burette. The final reading of the burette was 20.6cm<sup>3</sup>. Calculate the radius of the drop of water
   .(3 marks)
- 11. State two factors that affect the stability of an object (2 marks)
- 12. State a reason why a burn from steam at 100°cis more severe than a burn from boiling water at the same temperature (1 mark)

#### **SECTION B: (55 MARKS)**

13. a) An astronaut in orbit round the earth may feel weightless even whe	en the earth's gravitational
field still acts on him. Explain	(2 marks)
<b>b)</b> Distinguish between angular velocity and linear velocity	(1 mark)
c) a stone is whirled with uniform speed in a horizontal circle of radius	15 cm. it takes the stone 10
seconds to describe an arc of length 4cm. calculate	
i) Angular velocity	(3 marks)
ii) Linear velocity of the stone	(2 marks)
iii) Periodic time	(2 marks)

14. a) State the Bernoulli's principle of fluids

#### (2 marks)

- **b**) In derivation of equation of continuity in fluids, state two assumptions to be made. (2marks)
- b) The figure below shows cross-section of two submerged bodies P and Q in an ocean. The bodies were then pulled by a ship in the direction shown.



State with a reason, which body is easier to pull if they have equal volume and density(2 marks)

- i) On the same diagram, show the path followed by each body and their streamlines (2 marks)
- c) Water flows steadily a pipe as shown in the figure below. The diameter of A and B are 3cm and 5cm. if the volume flux at A is 45cm<sup>3</sup>/s. find the speed of water at B.(3 marks)



15. a) State the law of floatation

b) The diagram below shows a hot air balloon tethered to the ground on a calm day. The balloon contains 1300cm<sup>3</sup> of hot air of density 0.82 kg/m<sup>3</sup>. The mass of the material making the balloon without hot air is 420kg. The density of the surrounding air is 1.35 kg/m<sup>3</sup>. Determine



- i) The total weight of hot air balloon
- ii) The weight of air displaced by the balloon

(3 marks) (2 marks)

(1 mark)

iii) Upthrust force on the balloon	(1 mark)
iv) the tension in the rope holding the balloon in the ground.	(2 marks)
<b>v</b> ) the acceleration with which the balloon begins to raise when <b>released</b> .	(3marks)
<b>16.</b> a) the graph below represents a body moving with variable speed	



on the same graph sketch the results of the same body moving at a lower velocity.(1 marks)

b) A paper tape was attached at a moving trolley and allowed to run throw a ticker timer. If the frequency of the tape is 100Hz. Determine



ii)Velocity AB and CD

ii)The average acceleration

17. a)Figure 9 shows a set up to investigate one of the gas laws. All equipment are standardized.



i) Name the gas law being investigated.

(1 mark)

(3 marks)

	ii) Give two reasons for using the concentrated sulphuric acid index.	(2 marks)
	iii) What is the purpose of the water bath?	(1 mark)
	iv) State two measurements that should be taken in this experiment.	(2 marks)
	<b>v</b> ) Explain how the measurements taken in (iv) above may be used to verify the law	. (3 marks)
b)	A gas has a volume of 30cm <sup>3</sup> at 18°C and normal atmospheric pressure. Calculate the	e new
	volume of the gas if it is heated to 54°C at the same pressure.	(3 marks)

# **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

# **EXPECTED EXAM 4**

# 232/2

# PHYSICS

# PAPER 2

## **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

### **INSTRUCTIONS TO THE CANDIDATES:**

- Write your **name** and **index number** in the spaces provided above
- This paper consists of two sections A and B.
- Answer all questions in section A and B in the spaces provided.
- All working **must** be clearly shown in the spaces provided.
- Mathematical tables and electronic calculators may be used.
- *Take'g'* 10m/s 2

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 - 14	25	
В	15	15	
	16	14	
	17	14	
	18	12	
TOTAL		80	

## FOR EXAMINERS' USE ONLY

## **SECTION A**

- **1**. What property of light is suggested by the formation of shadows?
- 2. You are provided with the following; A cell and holder, a switch, a rheostat, an Ammeter, a voltmeter and connecting wires. Draw a diagram for a circuit that could be used to investigate the variation of the potential difference across the cell with the current drawn from the cell.

#### (2mks)

(2mks)

(1 mks)

- **3.** An un-magnetized steel rod is clamped facing North-South direction and then hammered repeatedly for some time. When tested, it is found to be magnetized. Explain this observation.
- 4. A lady holds a large concave mirror of focal length 1 m, 80 cm from her face, state two characteristics of her image in the mirror. (2 mks)
- 5. A girl brought a positively charged rod close to the cap of a gold leaf electroscope; she observed that the gold leaf diverged further. Explain this observation. (2mks)
- **6.** In an experiment using a ripple tank the frequency, f, of the electric pulse generator was reduced to one third of its value. How does the new wavelength compare with the initial wavelength?

(3 marks

7. Figure 1 shows a ray of light incident on the face of a water prism



FIG.1

Sketch the path of the ray as it passes though the prism. Critical angle for water is  $49^0$  (1mk)

- 8. A heating coil is rated 100W, 240V. At what rate would it dissipate energy if it is connected to a 220V supply? (3mk)
- 9. Figure 2 shows an object 0 placed in front of a concave lens with principal foci F and F
   Construct a ray diagram to locate the position of the image (1mk)
   For Marking Schemes Contact 0746 222 000 / 0742 999 000



10. State the difference between X-rays and Gamma rays in the way in which they are produced.

(1mk)

- 11. A 60W bulb is used continuously for 36 hours. Determine the energy consumed. Give your answer in kilowatt hour (kwh). (2mks)
- 12 A narrow beam of electrons in a cathode ray oscilloscope (CR0) strike the screen producing a spot. State what is observed on the screen if a low frequency a.c source is connected across the y- input of the CRO (1mk)

In an experiment on photo- electricity using metal X, the graph shown in figure 3 was obtained Use the graph to answer questions 13.



13. Determine the minimum frequency Fo below which no photoelectric emission occurs.(1mk)
14. You are provided with 12V a. c source, four diodes and resistor. Draw a circuit diagram for a full wave rectifier and show the points at which the output is taken. (2mk)

**15.** (a) Given a bar magnet, an iron bar and a string

- (i) Describe a simple experiment to distinguish between the magnet and the iron bar
- (ii) State with reasons the observation that would be made in the experiment. (2mks)
- (b) In an experiment to magnetize two substances P and Q using electric current, two curves

(graphs) were obtained as shown in figure 4



Using the information in fig. 4 explain the differences between substances P and Q with references to the domain theory (6mks)

(c) In the set up in figure 5, the suspended metre rule is in equilibrium balanced by the magnet and the weight shown. The iron core is fixed to the bench.



(i) State the effect on metre rule when the switch S is closed. (1mk)

(ii) What would be the effect of reversing the battery terminals? (1mk)

**16.** (a) (i) What is the difference between longitudinal and transverse waves? (1mk)

<sup>(</sup>iii) Suggest how the set up in figure 5 can be adapted to measure the current flowing in the current circuit. (3mk)

- (ii) State two distinctions between the way sound waves and electromagnetic waves are transmitted
- (b) A mineworker stands between two vertical cliffs 400m from the nearest cliff. The cliffs are X distance apart. Every time he strikes the rock once, he hears two echoes, the first one after 2.55, while the second follows 2s later. From this information; calculation:
- (i) The speed of the sound in air
- (ii) The value of X
- (c) In an experiment to observe interference of light waves a double slit is placed close to the source. See figure 5



- (ii) Describe what is observed on the screen
- (iii) State what is observed on the screen when
- i). The slit separation S1S2 is reduced
- ii) White light source is used in place of monochromatic source
- 17.a)The diagram in figure 6 below shows a narrow beam of white light onto a glass Prism.



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(2mk)

(3mk)

(1mk)

- (2 mks)

(1mks)

(1mk)

(1mk)

(2mk)

(2mk)

(1mk)

(1mk)

- (iii) Give a reason for your answer in part (ii) above.
- (iv)What is the purpose of the slit?
- b) Figure 7 below shows the path of ray of yellow light through a glass prism. The speed of yellow light in the prism is 1.8 x 10<sup>8</sup> m/s.



- i) Determine the refractive index of the prism material (Speed of light in vacuum,  $C = 3.0 \times 10^8$  m/s) (3mks)
- (ii) Show on the same diagram, the critical angle c and hence determine its value. (3mks)
- (iii) Given that  $r = 31.2^{\circ}$ , determine the angle 0.
- 18. (a) X- rays are used for detecting cracks inside meta' beams (i)State the type of the X- rays used.
- (ii) Give a reason for your answer in (i) above.
  - (b) Figure 1 shows the features of an X- ray tube



i) Name the parts labelled A and B.

(2mks)

(3mks)

(ii) Explain how a change in the potential across P changes the intensity of the X-		
rays produced in the tube.	(2 mks)	
(iii)During the operation of the tube, the target becomes very hot. Explain how this heat is	s caused.	
	(2 mks)	
(iv)What property of lead makes it suitable for use as shielding material?	(1mk)	
(c)In a certain X- ray tube, the electrons are accelerated by a Pd of 12000V. Assuming all the		
energy goes to produce X- rays, determine the frequency of the X- rays produced. (Pla	nk's	
constant h= $6.62 \times 10^{-34}$ is and charge on an electron, e = $1.6 \times 10^{-19}$ C).	(3mks)	

# **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

# **EXPECTED EXAM 5**

# 232/1 PHYSICS

# PAPER 1

### **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

# Kenya Certificate of Secondary Education.

## **INSTRUCTIONS TO CANDIDATES**

- ✓ The paper consists of TWO sections A and B.
- $\checkmark$  Answer all the questions in section A and B in the spaces provided
- ✓ All working MUST be clearly shown
- ✓ Non-programmable silent calculators and KNEC mathematical tables may be used.

#### FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX SCORE	SCORE
Α	11-11	25	
	12	11	
	13	10	
	14	10	
В	15	13	
	16	11	
TOTAL SCORE		80	

## **SECTION A (25 MARKS)**

 The figure below shows a micrometer screw gauge being used to measure the diameter of a rod. The thimble scale has 50 divisions.



State the reading shown above.

2. The figure below shows water placed in a measuring cylinder calibrated in cm<sup>3</sup>



An object of mass 50.1g and density 16.7 g/cm<sup>3</sup> is lowered gently in the water. Indicate on the diagram the new level. (1 mark)

- 3. An object is attached to a spring balance and its weight determined in air. It is then gently lowered into a liquid in a beaker. State what will happen to the reading. (1 mark)
- **4.** The figure below shows a uniform meter rule pivoted at the 23cm mark with a mass of 3.6kg hanging at 0cm mark the system is in equilibrium.



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#### (2 marks)

(2 marks)

(1 mark)

Determine,

i) The weight of the rule

- ii) The normal reaction force R at the rule
- 5. When a mercury in a glass thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain (2 marks)
- 6. A trolley of mass 0.5kg moving with a velocity of 1.2m/s collides with a second trolley of mass 1.5kg moving in the direction with a velocity of 0.2m/s. If the Collins is inelastic, determine the velocity of the trolleys after collision.
  (3 marks)
- **7.** A block of copper of mass 2kg and specific heat capacity 400 J/kg K initially at 81°C is immersed in water at 20°C. If the final temperature is 21°C, determine the mass of water.

#### (3 marks)

- 8. When a body of mass 0.25kg is acted on by a force, its velocity changes from 5m/s to 7.5m/s, determine the work done by the force. (3 marks)
- **9.** The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.



Heat

The side made of metal is now heated with a Bunsen flame. State with a reason, the side to which the rod is likely to tilt. (2 marks)

 The figure shows the velocity time graph of two identical spheres released from the surfaces of two liquids A and B.



Time (s) For Marking Schemes Contact 0746 222 000 / 0742 999 000

Give a reason why the terminal velocity of the sphere In B is higher than in A.(1 mark)

**11.** A u-tube vertically holds two liquids  $L_1$  and  $L_2$  as shown in the figure below.



- (a) Mark accurately the point in liquid L<sub>2</sub> that is at the same pressure as point P (1 mark)
- (b) If the atmospheric pressure is 103000 M/m<sup>2</sup> and the density of liquid L<sub>2</sub> is 103 kg/m<sup>3</sup> determine the pressure acting at point A. (3 marks)

#### **SECTION B (55 MARKS)**

#### Answer all questions in this section

**12.** (a) The velocity-time graph in the figure below illustrates the motion of a ball which has been projected vertically upwards from the surface of the moon. The weight of the object on earth's surface is 20N, when the acceleration due to gravity is 10ms<sup>-2</sup>.



sketch on the same axis.

(1 mark)

(b) The figure below represents part of a tape pulled through the ticker-timer of frequency 50Hz moving down an inclined plane.



If the trolley was allowed to move down the inclined plane for 4 seconds. Calculate the distance it covers. (3 marks)

13. a) State two differences between boiling and evaporation. (2 marks)(b) 200g of a solid was uniformly heated by a 0.2kw heater for sometime. The graph in the

figure below shows how the temperature of the solid changed with time.



- (i) Explain what is happening between OA and AB. (2 marks)
  (ii) Calculate the specific heat capacity of the solid. (3 marks)
  (iii) Calculate the specific latent heat of fusion k of the solid. (3 marks)
- 14. (a) (i) Define the term velocity ratio (V.R) (1 mark)
  (ii) Name one machine that has a velocity ratio of less than one (V.R < 1)(1 mark)</li>
  (b) The figure below shows a set-up used to find the mechanical advantage of a pulley system\



On the axes provided sketch a graph of mechanical advantage (M.A) against load (L) (2 marks)



(c) A hydraulic machine is used to raise a load of 100kg at a constant velocity through a light of 2.5m. The radius of the effort piston is 1.4cm while that of the load piston is 7.0cm. given that the machine is 80% efficient, calculate: -

(i)	The effort needed (2	3 marks)
( <b>ii</b> )	The energy wasted when using the machine	(3 marks)
<b>15.</b> a)	Define pressure and state its S.I Units.	(2 marks)
<b>b</b> ) S	State Pascal's principal.	(1 mark)
c)	In construction of a mercury barometer care is taken to make su	re it has no gas in the space
abo	ove mercury.	
i) I	How would you test whether there is gas above?	(1 mark)
ii) S	tate the problem caused by the presence of gas in the barometer.	(1 mark)

d) Find the total pressure experienced by a diver 8 meters below the sea surface.

Take; Atmospheric pressure =  $103 \ 360 \text{N/m}^2$ . Density of sea water  $1030 \text{kg/m}^3$ (3 marks)

e) i)The air pressure at the base of a mountain is 75.0cm of mercury while at the top it is 60.0cm of mercury. Given that the average density of air is 1.25kgm<sup>-3</sup> and the density of mercury is 13600 km<sup>-3</sup>, calculate the height of the mountain.

ii) State factors that affect pressure due to liquid column. (2 marks)

**16.** a) The figure below shows a circuit diagram for a device for controlling the temperature in a room.



i)Explain the purpose of the bimetallic strip. (2 marks)

ii) Describe how the circuit controls the temperature when the switch is closed.(2 marks)
 b)(i) Explain why bodies in circular motion undergo acceleration even when their speed is constant. (1 mark)

(ii) A particle moving along a circular path of radius 5cm describes an arc of length 2cm every second. Determine:

a.	Its angular velocity	(2 marks)
b.	Its periodic time.	(2 marks)
(iii)	A stone of mass 40g is tied to the end of a string 50cm long and whirled in a	a vertical circle
at 2	rev/s. Calculate the maximum tension in the string.	(3 marks)

# **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

# **EXPECTED EXAM 5**

# 232/2

# PHYSICS

# PAPER 2

### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

## **INSTRUCTIONS TO CANDIDATES**

- Write your name and index number in the spaces provided above.
- Sign and write the DATE of examination in the spaces provided above.
- This paper consists of **TWO** sections: **A** and **B**.
- Answer ALL the questions in sections A and B in the spaces provided.
- ALL working MUST be clearly shown.
- Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

Section	Question	Maximum Score	<b>Candidates Score</b>
А	1 - 12	25	
	13	9	
В	14	8	
	15	11	
	16	10	
	17	8	
	18	9	
	<b>Total Score</b>	80	
#### SECTION A (25 MARKS)

Answer ALL the questions

**1.** Figure 1 show a ray of light incident on a plane mirror.



6. Figure 2 shows a steel bar to be magnetized.



Complete the circuit such that both poles **P** and **Q** acquire opposite polarity (North- south respectively). (1mark)

7. Figure 3 shows a set up of a simple cell.



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8. The chart below shows part of the electromagnetic spectrum.

	Α	В	Visible light	UV light	С
( <b>a</b> ) Iden	tify the radiation 1	narked A and C.		(1m	ark)
( <b>b</b> ) Give	e one application of	of the radiation ma	rked <b>B</b> .	(1m	ark)
9. The	range of audible f	requencies varies f	from 20 Hz to 20 k	Hz. If the speed of	sound is 340 m/s
wha	t is the correspond	ling range of wave	length?	(3m	arks)
<b>10.</b> Dist	inguish between ti	ransverse waves an	nd longitudinal way	/es.	(1mark)
11.Figu	ire 4 shows a wav	e form			
Fig	ure 4 <u>Distance</u> <u>O</u>	0.2	0.4 0.6	0.8	Time (ms)

Determine the wavelength given that the speed of the wave is 400 m/s. (2marks)

**12.** An electric kettle is rated at 1.8 kW, 240 V. Explain the choice of the safest fuse for the kettle.

(the available fuses are 5 A, 10 A, and 20 A)

-3.0

#### **SECTION B (55 MARKS)**

#### Answer ALL the questions in the spaces provided.

13.(a) A bar magnet is pushed into a coil as shown in Figure 5 below



Figure 5

- (a) Name the electrode A and electrolyte B.
- (b) State two reasons why the bulb goes off a short time.
- (c) Give one method of minimizing the defect that occurs in plate A.
- (2marks)

(2marks)

(1mark)

(3marks)

(3marks)

(2marks)

(1mark)

Explain what happens to the pointer of the galvanometer when the magnet is:

(i) Moved into the coil rapidly?	(1mark)
(ii) Remains stationary inside the coil?	(1mark)
(b) State <b>two</b> ways of increasing the magnitude of induced current in a generator.	(2marks)

(c) A transformer has 200 turns in the primary coil and 1000 turns in the secondary coil. The primary coil is connected to an a.c source producing 100 V and rated 500 W. The current delivered by the secondary circuit was found to be 0.95 A.

- (i) Determine the efficiency of this transformer.
- (ii) Explain why the efficiency is less than 100%.
- 14. (a) A coin is placed at the bottom of a tall jar. The jar is filled with paraffin to a depth of 32.4 cm and the coin is apparently seen displaced 9.9 cm from the bottom. Determine the refractive index of air with respect to paraffin. (3marks)
- (b) Define the term **critical angle**.
- (c) **Figure 6** shows a ray of light passing through a glass prism.



If the speed of light in prism is  $2.0 \times 10^8 \text{m/s}$ 

- (i) Determine the refractive index of the prism material given that the speed of light in air is 3.0 x 10<sup>8</sup>m/s.
   (2marks)
- (ii) Determine the value of the critical angle c and show it on Figure 6. (2marks)
- (a) Differentiate between an Ohmic and non-ohmic conductor giving one example in each case

(2marks)

(b) Figure 7 shows a circuit with resistors and voltmeter connected to a battery.



- (i) If each cell has an internal resistance of  $0.7\Omega$ , determine the total resistance in the circuit. (3marks)
- (ii) What amount of current flows through the  $3\Omega$  resistor when the switch is closed? (3marks)
- (iii) What is the reading of the voltmeter when the switch S is

(I) Open	(1mark)
(II) Closed	(1mark)
(iv) Account for the difference between the answers in (I) and (II) above.	(1mark)

**15.Figure 8** shows an electromagnetic relay being used to switch an electric motor on and off. The electromagnet consists of a coil of wire wrapped around a core. The motor in figure is switched off.



(a) Suggest suitable material for the core. (1mark)
(b) What happens to the core when switch S is closed? (2marks)
(c) Why do the contacts A and B close when the switch S is closed. (2marks)

(d) When the switch S is opened, what will happen to;

(i) The core	(1mark)
(ii) Soft iron armature.	(1mark)
(e) Give one other application of an electromagnet.	(1mark)
(f) State two ways in which an electromagnet could be made more powerful.	(2marks)

16. (a) Give a reason why a candle flame is blown when a highly charged conductor is brought close to it as shown in Figure 9. (2marks)



(b) Figure10 shows  $1\mu F$ ,  $2\mu F$ ,  $4\mu F$  and  $5\mu F$  capacitors connected to a battery.



17. (a) In an experiment to observe interference of light a double slit experiment was placed close to the monochromatic source as shown in Figure 11.



(b) Figure 12 shows an object O placed in front of a diverging lens whose principal focus is F.



(3marks)

(c) Figure 13 shows a defective eye focusing a distant object.



(ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch the rays to show the effect of the lens. (2marks)



Figure 12

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 6**

## 232/1 PHYSICS

### PAPER 1

#### **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

#### **INSTRUCTIONS TO CANDIDATES**

- Write your Name, Signature and Index Number in the spaces provided above.
- This paper consists of two sections: A and B
- Answer all the questions in the spaces provided
- All working must be clearly shown.
- Mathematical tables and electronic calculators may be used Take  $g=10ms^{-2}$
- Density of mercury =  $13600 \text{ kg/m}^3$

#### For Examiner's Use

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
Α	1-13	25	
В	14	11	
	15	11	
	16	09	
	17	12	
	18	12	
TOTAL		80	

### Section A (25 marks) Answer all the questions in the spaces provided

- **1.** A partially inflated balloon at sea level becomes fully inflated at higher altitudes. Explain this observation (2 marks)
- 2. The figure below shows a pith ball being lifted into the funnel by blowing air into the funnel Explain this observation (2 marks)

Air blown Pith ball

- **3.** State **two** reasons why gases diffuses at a higher rate than liquids. (2 marks)
- 4. A student set up an experiment as shown below using two gas jars, one with hot coloured water, the other with cold clear water separated by a smooth card. The upper jar is upside down. Explain the observation made when the card is removed. (2 marks)



5. The figure below shows the scale of a Vernier calipers which is closed fully. State the Zero error of the instrument (1 mark)





6. The figure below shows a uniform body suspended freely through a hole on an optical pin.State with reason the case where the body is more stable (2 marks)



7. The figure below shows a metal being heater at the middle. Giving the reason state the wax that will fall off first (2 marks)



8. The figure below shows a system with a liquid enclosed by two pistons. Equal force F is applied on the system as shown. Giving reason show with an arrow the direction of movement of the liquid (2 marks)



The figure below shows a bimetallic wheel whose diameter is not affected by changes in temperature. Briefly explain how the diameter of the wheel remain unchanged as the temperature increases. (2 marks)



- 9. Two identical springs have a combined spring constant of 3.5N/cm when in series Determine combined spring constant when the springs are in parallel. (2 marks)
- 10. Two coins A and B of the same mass and material are placed on a turntable as show below.The turntable is then rotated at a high speed. With reason name the coin that skids first(2 mk)



- **11.**A substance of volume Xcm<sup>3</sup> and density 800kgm<sup>-3</sup> is mixed with 100cm<sup>3</sup> of water of density 1000kgm<sup>-3</sup>. The density of the mixture is 960kgm<sup>-3</sup>. Determine the value of X. (2 marks)
- 12. A bullet of mass 10g travelling at a speed of 400ms<sup>-1</sup> hits a tree trunk. It penetrates the tree trunk and stops inside the trunk after 4 cm. Calculate the average resistance force offered by the trunk to the bullet. (2 marks)

#### Section B (55 marks)

#### Answer all the questions in the spaces provided

- 13. (a) A body accelerates from rest. Its velocity after 5 seconds is 26m/s and after 9 seconds its velocity is 42m/s. calculate
- i) Distance moved during the motion(3 marks)ii) Average speed of the journey(2 marks)
- (b) A car can be brought to rest from a speed of 20m/s in a time of 2s when brakes are applies.
  - i. Find the average deceleration

#### (1 mark)

ii. The car is stopped by a policeman when moving at a speed of 20m/s. If the driver's reaction time is 0.2s determine the shortest stopping distance. (2 marks)

(c) The figure below shows the graph of a tennis ball bouncing severally on a table



Describe the motion between

i. AB

(1 mark)

ii. BC	(1 mark)
iii. CD	(1 mark)
<b>14.</b> (a) State the Pascal principle	(1 mark)
(b) State the principal of moments	(1 mark)

(c) The figure below shows a 100cm uniform bar of weight 50N balanced horizontally on two pistons.



Correct to 2 decimal places determine

i.	Force exerted on piston A	(3 marks)
ii.	Force exerted on Piston B	(3 marks)
iii.	Cross section area of piston A	(3 marks)

15.a. The figure below shows 30cm<sup>3</sup> of gas trapped in a tube containing mercury to a height of 14.5cm. The prevailing atmospheric pressure is 760mmHg. Determine the pressure acting on the gas in Pascals
(3 marks)



i.

b. Determine the volume of the gas when the tube is held as shown below

(3 marks)



**16.**a) State the law of floatation.

(1 mark)

b) The figure below shows a block cuboid of dimensions 4cm by 4cm by 16cm floating in a liquid in an overflow can with  $\frac{3}{4}$  of its height submerged.



Given that the mass of the beaker when empty is 85g and the reading on the scale in the set up above is 245g, calculate:

(i) The density of the block. (3 marks)
(ii) The density of the liquid. (2 marks)

(c) A metal block is suspended from a spring balance and held inside a beaker without touching the beaker. Water is added gradually into the beaker. The graph below shows the variation of up thrust on the block with depth of water.



Explain the shape of the graph.

(d) The figure below shows a pulley system being used to raise a load.



(i) Indicate the direction of the strings

#### (1 mark)

(ii) If an effort of 35N raises a load of 105N, determine the efficiency of the system.

#### (3 marks)

**18. (a)** The figure below shows a car of mass (m) moving along a curved part of the road with a constant speed.



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(2 marks)

(i) Explain why the car is more likely to skid at Y than at X.	(2 marks)
(ii) If the radius of the road at V is 250m and the car has a mass of 600	kg, determine the
maximum speed at which the car can be driven while at V without	skidding. Force of
friction between the road and the tyres is 18000N.	(3 marks)
(b) A string of length 70cm is used to whirl a stone in a circle in a verti	ical plane at 5 rev/s.
Determine:	
(i) The period	(1 mark)
(ii) The angular velocity.	(2 marks)
(iii) The speed of the stone	(2 marks)
(a) A body moving in a circle with constant speed is said to have an acc	celeration. Explain.
	(1 mark)

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 6**

# 232/2

# PHYSICS

### PAPER 2

#### **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

#### **INSTRUCTION TO CANDIDATES**

- (a) Write your name, index number in the spaces provided.
- (b) This paper consists of TWO sections: A and B.
- (c) Answer ALL questions in section A and B in the spaces provided.
- (d) ALL workings **MUST** be clearly shown.
- (e) Mathematical tables and electronic calculators may be used.

Section	Question	Maximum score	Candidate's score	
А	1 - 12	25		
В	13	16		
	14	14		
	15	14		
	16	11		
	Total	80		

#### FOR EXAMINER'S USE ONLY

#### Answer ALL questions in section A and B

- **1.** The figure below shows an object O in front of a curved mirror M.
- a) On the figure, locate the image formed.



2. State two ways of decreasing the strength of an electromagnet.	(2 marks)
<b>3.</b> State <b>one</b> disadvantage of using a convex mirror as a driving mirror.	(1 mark)

- **4.** State **two** factors that affect the resistivity of an electrical conductor. (2 marks)
- **5.** A coin is placed at the bottom of a beaker containing a transparent liquid. When viewed from the top, the coin appears nearer the surface than it actually is. Explain the observation.(**2 marks**)
- 6. The figure below shows a wave in progress.



c) On the figure above, draw how the wave would appear if the period and amplitude is halved. (1 mark)

#### For Marking Schemes Contact 0746 222 000 / 0742 999 000

(3 marks)

(2 marks)

8. A ferromagnetic material is being magnetized by single stroking method. On the axes provided, sketch a graph to show how the strength of the magnet being created varies with the number of strokes
 (1 mark)



**9. Figure 4** shows a conductor carrying current placed in the magnetic field and moves in the direction shown



Identify the polarities of **X** and **Y**.

- 10. A boy standing in front of a cliff blows a while and hears echo after 0.5s. He then makes 17metres further away from the cliff and blows the whistle again. He now hears the echo after 6.0 s. determined the speed of the sound. (3 marks)
- 11. (a) What is meant by the term electric current? (1 mark)
  - (b) 0.25A of current passes through a point in a conductor in 3.5 minutes. Calculate the amount of charge passing through the point in this time. (2 marks)
- 12. An unmagnetized steel rod is clamped facing North-South direction and then hammered repeatedly for some time. When tested, it is found to be magnetized. Explain this observation (2 marks)

#### **SECTION II (55 MARKS)**

**13.** (a) State Ohm's law.

(1 mark)

**b**). The graph below shows results obtained in an experiment to determine the e.m.f.(E) and the internal resistance, r, of a cell.



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i) Find the effective resistance of the circuit.	(2 marks)
ii) Calculate the current through $5\Omega$ .	(3 marks)
(iii) What is the p.d across $2\Omega$ .	(3 marks)
iv) Calculate the current through $1\Omega$ .	(2 marks)

**14.** (a) An object is placed 30cm in front of a thin converging lens of focal length 20cm. The set up is represented in the figure.



(i) On the same figure construct a ray diagram to locate the position of the image. (3 marks)
(ii) Determine the magnification produced. (2 marks)

- (b) An object 6cm tall is placed 40cm from a convex lens of focal length 50cm. Find the position of the image. (3 marks)
- (c) State two differences between the human eye and the camera. (2 marks)
- (d) The figure below shows an eye defect.



(i) Identify the defect. (1 mark)
(ii) State the cause of the defect. (1 mark)
(iii) Using a well labeled diagram, illustrate how the defect is corrected. (2 marks)

(2 marks)

15. (a) The figure below shows a pair of parallel plates of a capacitor connected to a Battery the upper plates is displaced slightly to the left.



State with reason the effect of this movement of the capacitance (2 marks)

(b) The figure below shows an electrical circuit with three capacitors A, B and C of Capacitance

4.0  $\mu$ F, 5.0  $\mu$ F and 3.0  $\mu$ F respectively connected to a 12V battery



Determine:

(i) The combined capacitance of the three capacitors (3 marks)
(ii) The charge of the capacitor A (2 marks)
(iii) The potential difference across the capacitor B (2 marks)
(c) A positively charged sphere is suspended by an insulating thread. A negatively charged conductor is suspended near it. The conductor is first attracted, after touching the sphere it

is repelled. Explain this observation.

d) A  $2\mu$ F capacitor is charged to a potential of 200V, the supply is disconnected. The capacitor is then connected to another uncharged capacitor. The p.d across the parallel arrangement is 80V. Find the capacitance of the second capacitor. (3 marks)

**16.** (a) A single ray of light in incident on an equilateral glass position as shown in the figure below. Complete the diagram to show the path of light through and out of the position.(critical angle of glass =  $42^{0}$ ) (3 marks)



(b) State two (2) conditions necessary for total internal reflection (2 marks)
(c) (i) Figure below shows an object O at the bottom of a beaker full of a liquid. An observer above the beaker sees its image at point X inside a liquid.



Determine the refractive index of the liquid.	(3 marks)
(ii) Define the term critical angle(c) of a medium.	(1 mark)
(d) State two uses of optical fibre.	(2 marks)

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 7**

## 232/1 PHYSICS

### PAPER 1

#### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

### Kenya Certificate of Secondary Education.

#### **Instructions to candidates**

- (a) Write your name, index number in the spaces provided above.
- (b) Sign and write the date of the examination in the spaces provided
- (c) This paper consists of TWO Sections: A and B.
- (d) Answer ALL the questions in section A and B in the spaces provided.
- (e) KNEC mathematical tables and silent non-programmable electronic calculators may be used.

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
Α	1-13	25	
	14	11	
	15	09	
В	16	08	
	17	09	
	18	10	
	19	08	
	TOTAL SCORE	80	

#### FOR EXAMINERS USE ONLY

#### **SECTION A: 25MARKS**

1. The figure below shows part of micrometer screw gauge with 50 divisions on the thimble scale.Complete the diagram to show a reading of 5.73mm. (2 marks)



- 2. A bottle containing a smelling gas is opened at the front bench of a classroom. State the reason why the gas is detected throughout the room. (1 mark)
- **3**. The figure below shows beaker containing a block of ice.



State and explain the change in stability when the ice melts.

#### (2marks)

- 4. An aero plane is moving horizontally through still air at a uniform speed. It is observed that when the speed of the plane is increased, its height above the ground increases. State the reason for this observation. (2 marks)
- **5.** A steel ball of mass 0.05kg was placed on top of a spring on a level ground. The spring was then compressed through a distance of 0.2m.



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If the spring constant is 15N/m. Calculate the maximum height reached when the spring is released.

#### (3marks)

**6**. The figure below shows a uniform metre rule of weight 3N supporting two weights. The metre rule is pivoted somewhere such that it is horizontally balanced. (Pivot not shown)



The 6N weight is at 15cm mark while the 4N weight is at 70cm mark. Determine the position of the pivot from zero cm mark. (3 marks)

- 7. State one environmental hazard that may occur when oil spills over a large surface area of the sea.(1mk)
- 8. The figure shows a flat bottomed flask containing some water. It is heated directly with a very hot flame. Explain why the flask is likely to crack. (2marks)



**9**. The figure below shows a cylindrical container having hot water at 95°C. End A is shiny while end B is dull black. At equal distances from the container is placed two identical gas jars fitted with thermometers X and Y.

Gas

the rod is likely to tilt

х

- Compare the readings of the two thermometers after two minutes
- 10. Give a reason for your answer in question 9 above
- **11.** The figure below shows the change in volume of water in a measuring cylinder when an irregular solid is immersed in it.



Given that the mass of the solid is 268g, determine the density of the solid in SI units. (3 marks)12. The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.



**13.** The spiral springs shown in the figure below are identical. Each spring has a spring constant, k = 300N/m

Gas



(1 mark)

(2 marks)

(1 mark)



Determine the total extension of the system. (Take the weight of the cross bars to be negligible) (2 marks)

#### **SECTION B: 55MARKS**

**14**. (a) State the Archimedes principle.

# b) A rubber envelope of a hydrogen filled balloon having volume of 2m<sup>3</sup> is held in position by a vertical string as shown below.



The mass of the balloon is 1.3kg. Given that density of hydrogen is 0.1kg/m<sup>3</sup> density of air is

1.3kg/m <sup>3</sup> . Calculate;	
(i) the total weight of the balloon including the hydrogen gas.	(2 marks)
(ii) the up thrust.	(2 marks)
(iii) the tension in the string.	(2 marks)
(c) A solid weighs 50N in air and 44N when complete immersed in wat	er. Calculate
i) Relative density of the solid.	(2 marks)
(ii) Density of the solid.	(2 marks)

(u) A B B Time t(s)

15.a) The figure below shows a displacement-time graph of the motion of a particle.

Describe the motion of the particle in the region.

#### OA

#### AB

#### BC

(**b**) State the Newton's first law of motion.

c) The figure below shows a trolley moving towards a barrier at a constant velocity of 20m/s. Use this information to answer the questions that follows.



i) Sketch the path followed by the object after the impact	(1mark)
ii) Give a reason why the object on the trolley flies off on impact.	(1 mark)
iii) Determine the time taken by the object to reach the ground.	(2 marks)

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(3marks)



(1 mark)

- iv) Determine the horizontal distance covered by the object from the point of impact to the point where it reached the ground. (2 marks)
- **16. a**) What is meant by absolute zero temperature?
- **b**) The set up below was used by a group of form three students to verify pressure law.



Describe briefly how the set-up can be used to verify pressure law. (4 marks)
c) A 4.5cm<sup>3</sup> bubble released at the bottom of a dam measured 18cm<sup>3</sup> at the surface of the dam. Work out the depth of the dam taking atmospheric pressure to be 10<sup>5</sup> Pa and the density of water as 1g/cm<sup>3</sup>. (3marks)

17(a) One of the factors that affect the centripetal force is the mass of the body. State another factor.

#### (1mark)

(b) A mass of 400g is rotated by a string at a constant speed V in a vertical circle of radius 100cm. The tension in the string is 9.2N which is experienced at point T.



i) Determine the velocity V of the mass at point T.

(3marks)

(2marks)

(2marks)

- ii) Determine the tension in the string at the bottom of the circle.
- c) State two applications of circular motion
- 18. The figure below shows an inclined plane, a trolley of mass 30kg is pulled up a slope by a force of 100N parallel to the slope. The trolley moves so that the centre of mass C travels from points A to B.



a) What is the work done on the trolley against the gravitational force in moving from A to B?

#### (2marks)

<b>b)</b> Determine the work done by the force in moving the trolley from A to B	(2 marks)
c) Determine the efficiency of the system.	(3 marks)
d) Determine the mechanical advantage of the system.	(3 marks)

- 19. a) Explain why it is advisable to use a pressure cooker for cooking at high altitudes. (1 mark)
- b) A block of metal of mass 150g at 100°C is dropped into a lagged calorimeter of heat capacity 40J/K containing 100g of water at 25°C. The temperature of the mixture is 34°C. (specific heat capacity of water = 4200 J/kg/K).

#### **Determine:**

(i) Heat gained by the calorimeter.	(2marks)
(ii) Heat gained by water.	(2marks)
(iii) Specific heat capacity of the metal block.	(3marks)

### **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

### **EXPECTED EXAM 7**

### 232/2

# PHYSICS

### PAPER 2

#### **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

#### **INSTRUCTION TO CANDIDATES**

- (a) Write your name, index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) This paper consists of two sections: A and B.
- (d) Answer all the questions in sections A and B in the spaces provided.
- (e) All working must be clearly shown.
- (f)Silent non-programmable electronic calculators may be used.
- (g) Candidates should answer the questions in English.

Section	Question	Maximum Score	Score
Α	1 – 11	25	
	12	12	
	13	12	
B	14	12	
	15	9	
	16	10	
Total	Score	80	

#### FOR EXAMINERS USE ONLY

#### **SECTION A 25 MARKS**

#### Answer all the questions

**1.** The figure below shows a ray of light incident on a mirror at an angle of 45°. Another mirror is placed at an angle of 45° to the first one as shown. Sketch the path of the ray until it emerges.

#### (2 marks)



State any two ways of reducing the magnetic force of attraction of a magnet (2 marks)
 The figure below shows a transverse stationary wave along a string.



Name P and Q and explain how each is formed.

#### (3 marks)

**4.** The diagrams below show a positively charged acetate strip and a negatively charged polythene strip freely suspended and isolated.



Two rods X and Y are brought up in turn to these strips. X attracts the acetate strip but repels the polythene strip. Rod Y does not repel either the acetate or the polythene. State the type of charge on each rod.

X	(1 mark)
Y	(1 mark)

5. The diagram below shows waves generated from a tuning fork. If the wave takes 0.1 second to move from point A to B. determine the frequency of the wave. (4 marks)



6. Name two detectors of microwave

# 7. Other than current state two other factors that affect the magnitude of force on a current carrying conductor placed in a magnetic field. (2 marks)

- 8. Give a reason why a concave mirror is not preferred as a driving mirror. (1 mark)
- 9. A student connected the set up below in the laboratory. Explain the observation made on the bulb when the set-up below is taken to a dark room (2 marks)



- 10. A person standing 110 m from the foot of a cliff claps his hands and hears a sound 0.75 seconds later. Find the speed of sound in air. (3 marks)
- **11.** The figure below is part of electromagnetic spectrum.

	А	Visible light	UV	
--	---	---------------	----	--

Identify radiation A and state its source.

(2 marks)

(2 marks)



(ii) State the property of the material labelled B on the diagram which mak	tes it suitable for use in
the X-ray tube.	(1 marks)
(iii) Why is C inclined at an angle of 45°?	(1 mark)

(iii) Why is C inclined at an angle of 45	0?
---	----

(iv) State the adjustment that can be made to vary

#### **I.**The quality of X-rays

- **II.**The quantity of the X-rays.
- (v) An x-ray tube has an accelerating potential of 100KV. Determine the maximum frequency of the x-rays produced. (*Plank's constant* =  $6.63 \times 10^{-34}$  Js,  $e = 1.6 \times 10^{-19}$ C) (3 marks)
- (b) In a CRO, waveform given below was displayed on the screen when the sensitivity at the Y plate was10V/cm and time base set at 20 milliseconds/cm.



Determine: (i) peak voltage (ii) frequency of the signal

(2 marks) (2 marks)

(1 mark)

(1 mark)

- 13. a) 88226 *Ra* decays into 86222 *Rn* by emission of an alpha particle. Write a nuclear equation for the decay (1 marks)
- **b**) **i**) What do you understand by the term half-life of a radioactive substance? (1 mark)
- ii) A G.M tube registers 20 counts. When a radioactive source is brought close to it, it registers 3220 counts and 120 counts 30 hours later. What is the half-life of this substance? (3 marks)
- c) The figure below shows a G.M tube.



#### Scalar or ratemeter

i) What is the purpose of the mica window?	(1 mark)
ii) Explain the purpose of the bromine	(2 mark)
iii) Why should argon gas be kept at low pressure	(1 mark)
iv) What is meant by the term "dead time" as used in GM tube	(1 mark)
v) Briefly explain how GM tube works.	(2 marks)
14. (a) State the Ohm's Law	(1 mark)

(b) You are provided a rheostat, 2 cells, a voltmeter, an ammeter, a switch and a fixed resistor.

- i) Draw a circuit diagram that can be used to verify Ohm's law. (2 marks)
- ii) Describe how the above set up can be used to determine Ohms law. (4 marks)
- (b) Study the circuit diagram below and answer the questions that follow.



Calculate

(i) Determine the total resistance in the circuit.

(2 marks)

(3 marks)

(1 mark)

- (ii) The current through the  $4\Omega$  resistor
- **15.** a) State Snell's law
- **b**) A ray of light travelling from water to glass makes an angle of incident of 30°. Find the angle of refraction in the glass. Refractive index of water  $=\frac{4}{3}$ . Refractive index of glass  $=\frac{3}{2}$  (3 marks)
- c) State the necessary and sufficient conditions for total internal reflection to occur. (2 marks)
- d) The figure below shows a human eye defect.



(i) State one possible cause of this defect.(1 mark)(ii) On the diagram, show how the defect is corrected.(2 mark)16. (a) State the Lenz's law of electromagnetic induction.(1 mark)

(b) A bar magnet is moved into a coil of an insulated copper wire connected to a zero centre galvanometer as shown below



(i) Show on the figure above the direction of the induced current in the coil (1 mark)

- (ii) State and explain what is observed on the galvanometer when the south pole of the magnet is moved into and then withdrawn from the coil. (2 marks)
- (c) A transformer has 800 turns in the primary and 40 turns in the secondary winding.
- The alternating voltage connected to the primary is 240V and current of 0.5.A. If 10% of the power is dissipated as heat within the transformer, determine the current in the secondary coil. (3 marks)

(d) The diagram below shows a three-pin plug.



(i) Name the colour of conductors P and Q

(2 marks)

(ii) Why is the earth pin longer than the rest in the three-pin plug shown above? (1 mark)
## **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

## **EXPECTED EXAM 8**

## 232/1 PHYSICS

## PAPER 1

#### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

## Kenya Certificate of Secondary Education.

#### **INSTRUCTIONS TO THE CANDIDATE:**

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) This paper consists of two Sections A and B.
- (e) Answer all the questions in sections A and B in the spaces provided.
- (f) All working **must** be clearly shown in the spaces provided.
- (g) Mathematical tables and electronic calculators **may be** used.

Section	Question	Maximum Score	<b>Candidate's Score</b>
Α	1 – 12	25	
	13	08	
В	14	10	
	15	09	
	16	07	
	17	12	
	18	09	
Tota	l Score	80	

#### FOR EXAMINER'S USE ONLY:

## SECTION A: (25 MARKS)

1. A ball bearing is held between the anvil and spindle of a micrometer screw gauge as shown in the **Figure 1** below.



What is the diameter of the ball bearing?

- 2. State two properties of a liquid that is suitable for use in a thermometer. (2marks)
- **3.** A column of air 15cm is trapped by mercury thread of 10cm as shown below. Calculate the length of the trapped air when the tube is laid horizontally given that atmospheric pressure is 76cmHg.

(3 Marks)

(1 mark)



law.



- 4. Why are gases more compressible while liquids and solids are almost incompressible? (1mark)
- 5. The graph shows variation of extension and stretching force F for a spring which obeys Hooke's



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- (i) Determine the spring constant in SI units.
- (ii) The energy stored when the extension is 20cm.
- 6. The figure 2 below shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.



Heat

The side made of metal is now heated with a Bunsen flame. State with a reason, the side to which the rod is likely to tilt. (2 marks)

- 7. State one factor that would increase the surface tension of pure water in a beaker of water. (1 mk)
- 8. The figure below (figure 3) shows a uniform metal rod balanced at its Centre by different forces.



Determine the value of T.

**9.** Two rods of copper **A** and **B** of the same length but different thickness with candle wax attached to either end are heated as shown below.



State and explain the observation made.

(2 marks)

Figure 3

(3 marks)

#### **MWALIMU CONSULTANCY**

(1mark) (2marks)

**10.** Figure 4 shows a manometer attached to a gas supply. If the atmospheric pressure is 1.0336 x $10^{5}$ Pa. Calculate the pressure of the gas supply.(Density of mercury = 13600kg/m<sup>3</sup>) (2 marks)



- **11.** A block of wood measuring 0.8m by 0.5m by 2m floats in water. 1.2m of the block is submerged. (Density of water = 1000kg/m<sup>3</sup>, g=10N/kg) Determine the weight of the water displaced. (3 marks)
- 12. The figure 5 below shows two light sheets of paper arranged as shown.



Fig. 5 Fig. 5

the same time behind paper Q and in front of paper R as shown. Explain (2 marks)

#### **SECTION B (55 MARKS)**

**13.** A block and tackle is made up of three pulley wheels on top and two pulley wheels at the bottom in figure 6



(2 marks)

(a) Complete the diagram by drawing the chain which passes over the wheels and indicate where the effort is applied (2 marks)
(b) What is the velocity ratio (V.R) of the machine (1 mark)
(c) A lead of 1120N is lifted by an effort of 250N

(c) A load of 1120N is lifted by an effort of 250N

#### Determine

- (i) The mechanical advantage (M.A) of the system (2 mark)
- (ii) The efficiency, E, of the system

(e) Using the axes given below, sketch a graph of efficiency, E, against load (1 mark)





(b) Water of mass 200g at a temperature of 60°C is put in a well lagged copper calorimeter of mass 80g. A piece of ice at 0°C and mass 20g is placed in the calorimeter and the mixture stirred gently until all the ice melts. The final temperature of the mixture is then measured (Latent heat of fusion of ice = 334000Jkg<sup>-1</sup>, specific heat capacity of water = 4200Jkg<sup>-1</sup>K<sup>-1</sup>)

#### Determine:

- (i) The heat absorbed by the melting ice at 0°C
  (2 marks)
  (ii) The heat absorbed by the melted ice (water) to rise to temperature T
  (2 marks)
- (iii) The heat lost by the warm water and the calorimeter (Specific heat capacity of the calorimeter =

900Jkg <sup>-1</sup> K <sup>-1</sup> ) (3 mark	ks)
(iv) The final temperature T of the mixture	(2 marks)
15. A lead shot of mass 40g is tied to a string of length 70cm. It is swung verti	cally at 5
revolutions per second. (Take $g=10m/s^2$ )	
(a) Determine;	
(i) Periodic time,	(1 mark)
(ii) Angular velocity	(2 marks)
(iii) Linear velocity	(2 marks)
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#### (iv)Maximum tension in the string.

(b) The figure 7 below shows a container with small holes at the bottom in which wet clothes have been put. When the container is whirled in air at high speed as shown, it is observed that the clothes dry faster. Explain how the rotation of the container causes the clothes to dry faster.

Holes

(2 marks)

Fig 7

balcon



16. (a)Give a reason why the inside of a helmet is lined with sponge. (1 mark) (b) The figure below shows a balloon filled with air.

When the mouth is suddenly opened, the balloon moves in the direction shown above by the

arrow. Explain that observation. (2 marks)

(c) A rock of mass 150kg moving at 10m/s collides with a stationary rock of mass100kg. They fuse after collision. Determine the

(i) Total momentum before collision.	(2 marks)
(ii)Their common velocity after collision.	(2 marks)



(2 marks)

(1 mark)

(4 marks)

17. (a) On the axis below, sketch a graph to show how the pressure of a fixed mass of a gas varies with volume at constant temperature. (1 mark)



(b) The set-up below shows an arrangement that can be used to Verify Charles' law.



- (i) State any one use of sulphuric acid index in the above set up.
- (ii) What is the use of the stirrer? (1 mark)
- (iii) State two measurements that should be taken in this experiment. (2 marks)
- (iv) Describe how the set up can be used to verify Charles' law.
- (c) The volume of a gas enclosed with a movable piston is 300 cm<sup>3</sup> when the temperature is 290K. Determine the temperature at which the volume of the gas increases to 355 cm<sup>3</sup> (Assume pressure does not change)
   (3 marks)

(a). The section of the tape shown below was produced when a tape running down an incline plane was attached to a ticker-tape timer of frequency 50Hz.



- i) Indicate above the tape the direction in which the trolley was moving. (1 mark)
- ii) What type of current was used to operate the ticker timer? (1 mark)
- iii) Find the acceleration of the trolley in SI units. (3 marks)

(**b**). A stone is projected vertically upwards with initial velocity of 40m/s from the ground. Calculate:

i) Time taken to reach maximum height (2 marks)ii) Maximum height reached (2 marks)

#### THIS IS THE LAST PRINTED PAGE. BEST OF LUCK.

## **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

## **EXPECTED EXAM 8**

## 232/2

## PHYSICS

## PAPER 2

#### **TIME: 2 HOURS**

NAME	••••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

#### **INSTRUCTIONS TO CANDIDATES**

- 1) Write your name and your admission number in the spaces provided above.
- 2) Write the date and your signature.
- 3) This paper consists of two sections; A and B
- 4) Answer all questions in section A and B in the spaces provided.
- 5) All working must be clearly shown in the spaces provided in this booklet.
- 6) Non programmable silent electronic calculators may be used.

SECTION	QUESTIONS	MAX SCORE	SCORE
А	1 – 12	25	
В	13	13	
	14	15	
	15	15	
	16	12	
	TOTAL	80	

#### FOR EXAMINERS USE

#### Answer ALL the questions in this section in the spaces provided

- 1. Distinguish between real and virtual Image
- a) A pinhole camera forms an image of size 10cm. The object is 5m tall and 20m away from the pinhole. Find the length of the pinhole camera. (2mks)
- 2. a) The figure 1 below shows a soft iron bar that's placed in a coil near a free suspended magnet.



(2mks) State and explain the observation made when the switch is closed.

- b.) Give a reason why attraction in magnetism is not regarded as a reliable method of testing for (1mk)polarity.
- 3. The figure 2 below shows an isolated negative charge placed closer to a negatively charged plate. Draw the electric field patterns. (2mk)







Explain why they do not hang vertically downwards.

5. (a) State the effect of pressure on the speed of sound in air.

(2mks) (1mk)

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(1mk)

- (b) A boy stands 190m from a high wall and claps his hands. If he hears an echo1.3 Seconds later, calculate the speed of sound in air. (2mks)
- 6. State any two factors that determine the heating effect by an electric current. (2mks)
- 7. **Figure 4** below shows an object, O placed 10 cm in front of a concave mirror whose radius of curvature, C is 40 cm.



On the same figure, draw a ray diagram to show the position of the image formed. (3 mks)

- 8. State two advantages of an alkaline battery over lead acid battery.
- 9. An electric bulb with filament of resistance 480Ω is connected to 120 V mains supply. Determine the energy dissipated in 7 min
   (3 mks)
- 10. The figure 6 below shows a cross section of a dry cell.



(i) Name the part labeled A

(1 mark)

(2mks)

**(ii)** State the use of manganese (iv) oxide in the cell

#### **SECTION II (55 marks)**

**11.** a) i) In large currents, large resistors in parallel are preferred to low resistors in series. (1mk)Explain

- ii) State one condition under which ohm's law is obeyed in a metal conductor. (1mk)
- iii) A circuit constituting a battery, a metal wire, an ammeter and a switch connected in a series. The switch is closed and the ammeter reading noted. The metal wire is now heated. State observation on the ammeter reading and give a reason for your answer. (2mks)
- b.) In the figure 7 below, the voltmeter reads 2.4V when the switch is open. When the switch is closed, the voltmeter reads 2.1V and the ammeter reads 0.15A.



Determine the

i) E.n	n.f of the cell	(1mk)
ii) Inte	ernal resistance of the cell	(3mks)
iii)	Resistance of the bulb	(2mks)
<b>d.</b> )	Explain why a voltmeter of high resistance is more accurate in measuring potential of	difference

that one of low resistance	(1mk)
d.) Distinguish between electrical resistance and a resistor	(1mk)
<b>12.</b> a) I. Define the term wavelength of a longitudinal wave	(1mk)

**II.** The **figure 8** below shows a displacement distance for a certain wave motion.



#### Determine

i) The amplitude of the wave (1mk)ii) The wavelength of the wave (1mk)

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(1 mark)

(1mk)

(1mk)

(1mk)

iii) Given that the frequency of the wave is 40Hz, determine the:

I. Periodic time (T)	(1mk)

- II. Speed of the wave (3mks)
- b.) Figure 9 below shows light rays from two coherent sources S<sub>1</sub> and S<sub>2</sub> falling on screen. Dark and bright fringes are observed between A and B



- i) State the function of  $S_1$  and  $S_2$
- ii) State how
- I. Bright fringes are formed
- II. Dark fringes are formed
- c). **Figure10** below shows plane water waves incident on a plane reflector placed at an angle to the path of the waves.



Complete the diagram to show the reflected waves	(2mks)
13. a.) State Snell's law	(1mk)

b.) The Figure 11 below shows a ray of light travelling incident on air-kerosene interface.

- - . . 0



(i) If the speed of light in kerosene is  $2.08 \times 10^8$  m/s, find the refractive of kerosene. (speed of light

in air=3.0 x10°)	(2mks)
ii.) Determine the angle of refraction in water $(_a\mathbf{n}_w = 4/3)$	(4mks)
iii.) On the same diagram sketch the path of light as it traverses through the media showin	g the
angle of refraction in air	(3mks)
14. (a) State Ohm's law.	(1 mark)
(b)You are provided with the following apparatus:	
<ul> <li>Connecting wires</li> </ul>	
– An ammeter	
- Fixed resistor	
– A voltmeter	
– A variable resistor	
– Switch	
- 2 dry cells in a cell holder	

(i)In the spaces below, draw the circuit that can be used using the apparatus above to verify Ohm's Law. (3 marks)

(ii)Briefly explain how you can obtain the results to verify Ohm's law.

(c)Study the circuit diagram below and answer the questions that follow.



(i) Calculate the effective resistance of the circuit.

(3mrks)

(4mrk)

- (ii) Find the voltmeter reading.
- **15.** a) Describe two factors that affects the strength of an electromagnet
- **b**) State Fleming's left hand rule
- c) Show the magnetic field pattern around this set up



- **16.** a) Define the term capacitance
  - b) Determine the



- i) Charge in  $3 \mu F$
- ii) P.d across 6µF

(2 mks)

(2 mks)

(1 mks)

(2mrks)

(2 mks)

(1 mks)

(2 mks)

## **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

## **EXPECTED EXAM 9**

## 232/1 PHYSICS

## PAPER 1

#### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

## Kenya Certificate of Secondary Education.

#### **INSTRUCTIONS TO CANDIDATES**

- Write your name, school and index number in the spaces provided above.
- Write the date of examination and sign in the spaces provided above.
- This paper consists of two sections, Section A and B.
- Answer ALL the questions in section A and B in the spaces provided.
- ALL answers and working MUST be clearly shown.
- Mathematical tables and electronic calculators may be used.
- Take acceleration due to gravity,  $g = 10m/s^2$

Section	Question	Maximum score	Candidate's score
А	1–12	25	
	13	12	
	14	11	
R	15	10	
D	16	12	
	17	10	
	TOTAL	80	

#### FOR EXAMINER'S USE ONLY:

#### Answer ALL the questions in the spaces provided.

1. Figure 1 below shows a micrometer screw gauge being used to measure the diameter of a metal rod. The thimble scale has 50 divisions.



Find the diameter of the metal rod.

(1 mark)

2. Explain briefly how the temperature in a green house is kept higher than outside. (2 marks) The diagram shown in figure 2 below is an arrangement of three pulley wheels used to help in

lifting loads. Use it to answer questions 3 and 4.



- 3. Complete the diagram to show how the rope goes round the wheels, position of the load and the effort. (2 marks)
- 4. Write down the velocity ratio (VR) of the system.
- 5. State how temperature affects the speed of sound in air.
- 6. State two facts which show that heat from the sun does not reach the earth surface by convection.
- 7. The diagram in figure 3 below shows water with negligible viscosity flowing steadily in a tube of different cross-section area. If at a point A, the cross section area is 120cm<sup>2</sup> and the velocity of water is 0.40ms<sup>-1</sup>, calculate the velocity at B where cross section area is 4.0cm<sup>2</sup>?(**3 marks**)

## For Marking Schemes Contact 0746 222 000 / B 999 000

(1 mark) (1 mark)

#### (2 marks)



- 8. A motor uses an electrical energy at a rate of 200W and raises a mass of 25kg through a vertical distance of 20m in 0.5 minutes. Determine the efficiency of the motor. (3 marks)
- 9. Name three types of forces that act between bodies not in contact.
- 10. How long will it take 240V, 3000W electric immersion heater to raise the temperature of 150 litres of water in a well-lagged calorimeter made of copper of mass 20kg from 15<sup>o</sup> to 70<sup>o</sup>C?

#### (3 marks)

(3marks

11. The diagram shown in the Figure 4 below shows a system in equilibrium with the rule horizontal.AB is a uniform rule of length 1.0m and weight 1.8N. Calculate the weight of the block X. (3 marks)



**12**. State the reason why a trailer carrying heavy loads has many wheels. (1 mark)

#### **SECTION B (55 MARKS)**

#### Answer ALL the questions

13.(a) The **figure**5 below shows the displacement – time graph of the motion of particle.



- (a) State the nature of the motion of the particle between
- (i) A and B

(1mk)

(3 marks)

#### (ii) B and C (1mk)(iii) C and D (1mk)(b) A ball is thrown horizontally from top of a vertical tower and strikes the ground at a point 50 m from the bottom of the tower. Given that the height of the tower is 45m, determine the (i) Time taken by the ball to hit the ground. (2m) (ii) Initial horizontal velocity of the ball (2mks) (iii) Vertical velocity of the ball just before striking the ground. (2mks)(take acceleration due to gravity g as 10m/s) 14. a) State the pressure law; (1 mark)

**b**) Explain how a gas exerts pressure.

Stirrer

Thermometer

c) The figure below shows a set up used to verify pressure law.



- i) State the measurement that may be taken in the experiment. (2 marks)
- ii) Explain how the measurement in (i) above may be used to verify pressure law. (2 marks)
- iii) A car tyre is at pressure of  $5.0 \times 10^5$  Pa at a temperature of 37°C. While it is running the temperature rises to 75°C. What is the new tyre pressure? (Assume the tyre does not expand) (3 marks)

Glass flask

- **15.** i) Distinguish between inelastic and elastic collisions.
- **b)** The diagram in Figure 6 below shows a sphere moving in a viscous liquid in a tall measuring cylinder.

For Marking Schemes Contact 0746 222 000 / 0742 999 000



(2 marks)

Bourdon gauge

(2 marks)



ii) Sketch a graph showing the variation of velocity with time in figure 7 below. Show on the graph the terminal velocity, V<sub>T</sub>. (2 marks)



**16.** A mass of 1kg is attached to a cord of length 50cm. It is whirled in a circle in a vertical plane at 10 revolutions per second as shown in the **figure** 8 below.



a) Find the tensions in the cord when the mass is at:

i) Highest point of the circle A.

(2 marks)

(2 marks)

ii) Lowest point of the circle B.

**b**).The diagram below shows a spring tied to an object, m, and rotated in a circular path of radius, r.



(i).What provides the force that keeps the object moving in a circular path. (1 mark)

(ii). The speed of the object is constant but the body is accelerating. Explain. (1 mark) (iii). If the object is whirled faster, what would happen to spring balance reading? (1 mark)

(iv). Give a reason for your answers in b(iii) above.

- v). As the object is whirled round the string snaps and cuts off. Describe the subsequent path of the object. 1 mark)
- 17. (a) State the law of floatation.
- (b) Figure 9 shows a piece of cork held with a light thread attached to the bottom of a beaker. The beaker is filled with water.

- i) Indicate and label on the diagram the forces acting on the cork. (1 mark)
- ii) Write an expression showing the relationship between the forces above. (1 mark)

submerged in the same liquid. The density of the solid is 0.8g/cm<sup>3</sup>. Determine:-

- i)The upthrust on the solid when floating.
- ii) The density of the liquid.
- The upthrust on the solid when fully submerged.
- 18.) The following results were obtained in a experiment to verify Hooke's law when a spring was extended by hanging various loads on it.

	Load (N)	0.00	1.00	2.00	3.00	4.00	5.00	6.00
	Length of spring in cm	10.00	11.50	13.00	14.50	16.00	18.00	24.00
	Extension	0.00						
(I) Complete the table for the extension e above. (1mk						(1mk)		
(II) Plot a graph of load (y-axis) against extension (5					(5mks)			
(III) From the graph determine the spring constant.					(	(2mks)		
(IV) Calculate the energy stored when the spring is stretched to 16 cm. (2						(2mks)		

# cork water

A solid displaces 8.5cm<sup>3</sup> of liquid when floating in a certain liquid and 11.5cm<sup>3</sup> when fully

(2 marks)

ii)	The	unthrust	ont	he c	olid	when	fully	suhme



**Figure 9** thread

(1 mark)

(1 mark)

(2 marks)

(2 marks)

## **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

## **EXPECTED EXAM 9**

## 232/2

## PHYSICS

## PAPER 2

#### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

Kenya Certificate of Secondary Education.

#### 232/2

## PHYSICS PAPER 2 TIME 2 HRS

#### **INSTRUCTIONS**

- *i)* Answer All questions in the spaces provided.
- *ii)* Use the following CONSTANTS where applicable.
- iii) All working must be clearly shown for numerical questions.
- *iv)* Candidates should check to ascertain that all questions are printed as indicated in the table below.

#### **Constants**

- i) Density of water =  $1g/cm^3$  or  $1000kg/m^3$ .
- ii) Gravitational acceleration =  $10m/s^2$ .

#### **SECTION A (25 MARKS)**

**1.** A ray is incident on two mirrors inclined at  $60^{\circ}$  as shown in the diagram below. (3mks)



Determine the angle of reflection on mirror A, hence trace the path of the ray as it leaves mirror B.

2. a) The coils **P** and **S** are connected as shown below. **P** is connected to a battery, rheostat and a switch **K**. **S** is connected to a galvanometer **G**.



State the behavior of the pointer on **G** in the following cases;

i) When **K** is switched on (closed)

(1mk)

(1mk)

- **II**) When **K** is opened.
- b) A transformer has 200 turns in the primary coil and 1000 turns in the secondary coil. If the transformer is 100% efficient and the current in the secondary coil is 0.15A, determine the current in the primary coil. (3mks)
- 3. Figure below shows a simple experiment using a permanent magnet and two metal bars A and B Put close to the iron filings.



State with a reason which bar is made from a soft magnetic material.

4. The diagram below shows a ray of light xy traveling through a glass block of critical 42<sup>0</sup> to point
 A



- a) Calculate the refractive index of the glass block.
- **b**) On the same diagram, draw the path of the ray as it travels past point **A**. (1mks)
- 5. The photoelectrons liberated from an illuminated metal surface constitute a photoelectric current. What is the effect of decreasing the intensity of illumination on the magnitude of the photoelectric current? (1mk)
- 6. Figure below shows a battery of e.m.f 3.0v connected in series will two capacitors.



Determine the energy stored in the combined capacitors when the switch is closed. (3mks)

7. The figure below shows a meter rule in equilibrium with the magnet and weight W. The Soft iron core is fixed to the bench.



State and explain the effect on the meter rule when the switch S is closed (2mks)

8. State how polarization is reduced in a dry cell.

## (1mk)

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(3mks)

(2mks)

- 9. State two differences between the cathode ray tube (CRT) of a T.V and the cathode ray oscilloscope (CRO).(2mks)
- **10.** Distinguish between a P-type and a N-type extrinsic semiconductors. (2mks)

#### SECTION B (55 MARKS)

11. (a) Students set up a mass attached to a spring such that when it oscillates it taps on water surface in a wide shallow tank as in figure 11 below.



The students measured time for 20 oscillations and found that the mass takes 36 seconds. Determine:

(i) The periodic time of the mass	(2mks)
(ii) The frequency of the waves produced on the water surface	(2mk)
(iii)The speed of the waves if the students counted four ripples between the mass and end	<b>B</b> of the
tank	(3mks)
(b) State any <b>two</b> factors that would increase the speed of sound in air	(2mks)
(c)An echo sounder of a ship received the reflected waves from a sea bed after 0.20s.	
(i) Determine the depth of the sea bed if the velocity of sound in water is 1450m/s	(2mks)
(ii) When the ship above passes over a sunken reef, the echo sounder receives an echo aft	er 0.16s.
Determine the height of the sunken reef	(2mks)

**12.** (a) The diagram below shows an X-ray tube drawn by a student. Use it to answer the questions which follow.



(i) State with reason the material used for the part labeled **R**.

(2mks)

(ii) V	Why is the tube evacuated	(1mk)
(iii)	How can the wavelength of the X-rays emitted from this tube be reduced	(1mk)
(b) X	X-rays are emitted when a tube operates at 3 x $10^2$ V and a current of 0.01 A is	passing through
it	(take $e = 1.6 \times 10^{-19}$ C, Me = 9 x 10 <sup>-31</sup> kg). Calculate;	
(i)	The velocity of the electron on hitting the target.	(3mks)
(ii	) The minimum wavelength of the X-rays emitted	(3mks)
C (i)	State one properties of X-rays	(1mk)
(ii) S	ate one uses of X-rays	(1mk)
<b>13.</b> a)	Differentiate between a nuclear fusion and nuclear fission.	(2mks)
b) Th	e equation below represents a nuclear reaction.	
	218	
	$ \begin{array}{c} 218 \\ 84 \end{array} \xrightarrow{218} \mathbf{A} + \begin{array}{c} 4 \\ p \end{array} \mathbf{Y} \\ 85 \end{array} $	

c) The figure below represents deflection of various radiations from a radioactive source S placed in electric field between two plates X and Y.



Identify the radiations marked with letters M and P.

d) A sample of radioactive substance initially has 8x10<sup>25</sup> particles. The half life of the sample is 98 seconds. Determine the number of particles that will have decayed after 294 seconds. (3mks)
14. a) State Ohm's Law. (1mk)

b) The figure below shows a circuit that can be used to verify Ohm's law

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#### (2mks)

(2mk)

(3mks)



Explain briefly how the setup can be used to verify ohm's law (3mks)

c) The graph below was obtained from experiment to determine the effective resistance of two resistors connected in parallel. If the value of one resistor is 50 ohms, determine the value of the other resistor.



From the graph, determine

- i) effective resistance of the two resistors
- ii) the value of the other resistor
- **15.** (a) An object **O** stands on the principal axis of a concave mirror as shown in figure 9 below.



(3mks)

(2mks)

(2mks)

- (i) By drawing suitable rays, show the position of the image
- (ii) Determine the magnification of the image formed (2mks)
- (b) In an experiment to determine the focal length of a converging lens, a group of form four

students collected some data and used the results to plot the graph shown in figure below.



Using the graph above, determine:

- (i) The object position when the image position is 45 cm
- (ii) Slope of the graph.
- (iii) The focal length of the lens given  $\mathbf{m} = \frac{v}{f} 1$

## **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

## **EXPECTED EXAM 10**

## 232/1 PHYSICS

## PAPER 1

#### **TIME: 2 HOURS**

NAME	•••••
SCHOOL	SIGN
INDEX NO	ADM NO

## Kenya Certificate of Secondary Education.

#### **INSTRUCTIONS TO CANDIDATES**

- Write your name, admission number, class and signature in the spaces provided at the top of the page. This paper consists of two sections; **A** and **B**.
- Answer ALL the questions in the spaces provided.
- Mathematical tables and electronic calculator may be used.
- All working MUST be clearly shown.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
А	1 – 12	25	
В	13	13	
	14	12	
	15	10	
	16	13	
	17	9	
	TOTAL SCORE		
		80	

#### FOR EXAMINER'S USE ONLY

#### **SECTION A (25 MARKS)**

#### Attempt all the questions

1.The figure (a) below shows the reading of a micrometer screw gauge when the micrometer is closed and figure (b) shows the reading on the same micrometer when used to measure the diameter of a marble.



Determine;

(i) the zero error of the micrometer.

(ii) the actual diameter of the marble.





Points **A** and **B** are near the ends of the boat. A drop of oil is placed at point **B**. State and explain what happens to the boat. (2 marks)

3.A girl in a school in Nakuru plans to make a barometer using a liquid of density 1.25gcm<sup>-3</sup>. If the atmospheric pressure in the school is 93750Nm<sup>-2</sup>. Determine the minimum length of the tube that she will require? (3 marks)

(1 mark) (2 marks) 4.Smoke is enclosed in smoke cell and sealed. When illuminated and viewed under a microscope, it is observed to be moving in continuous random motion. State and explain the observation when cold water is poured on the smoke cell. (2 marks)

<b>5.</b> At 27 <sup>o</sup> C the pressure of a gas is 50cmHg.	At what temperature in degree Celsius	would the
pressure of the gas fall to 40cmHg if the	e volume is kept constant?	(3 marks)

6.State two factors that affect the spring constant of a spring. (2 marks)
7.Describe briefly how a fire alarm that uses a bi-metallic strip works. (2 marks)
8.An empty density bottle weighs 22g when empty and 65g when full of a liquid of density 800kg/m<sup>3</sup>. Determine the volume of the bottle. (2 marks)

**9.**The figure below shows a uniform rod of length 4m and pivoted at 3.6m mark. The rod is held horizontally with a vertical rope at 4m mark as shown.



If the tension in the rope is 160N, determine the weight of the rod.(2 marks)10.Water flows through a tube of length 60cm and cross-sectional area 5cm² in 0.05 minutes.<br/>Calculate the mass flow in kg/s. (density of water = 1000kg/m³).(2 marks)11. Explain why two thin blankets are warmer than a thick one.(1 mark)12. Distinguish between elastic collision and inelastic collision.(1 mark)

### **SECTION B (55 MARKS)**

Answer ALL questions in the spaces provided.

**13.(a)** Define angular velocity.

(b) State the reason why a body in uniform circular motion is said to be accelerating.

(1 mark)

(1 mark)

(c) The graph of centripetal force against the square of angular velocity ( $\omega^2$ ) is plotted as shown below.



(i) From the graph determine the slope.	(2 marks)
(ii) Given that $F = mrw^2$ ; determine m when $r = 1.23$ m.	(2 marks)
(iii) Determine the angular velocity attained when a force of 16N is applied.	(2 marks)

(d)An elastic spring of a spring constant 500N/m is compressed to give an extension of 10cm. A marble of mass 10g is placed on the spring and then released. Determine the velocity with which the marble will move. (3 marks)

- (e)A brick of mass 80kg is pulled along a horizontal surface with uniform velocity by a force of 60N. Determine the co-efficient of friction between the two surfaces? (2 marks)
- 14.(a) State the law of conservation of energy. (1 mark)
  (b)Complete the diagram below by showing how the string is connected for the effort of 45N to be applied to raise a load of 171N through a height of 5m. (1 mark)

(1 mark)



(c) From the block and tackle system shown in (b) above, determine;

	(i) the ve	locity ratio.	(1 mark)
	(ii) the wo	ork done on the load.	(2 marks)
	(iii)	the work input.	(2 marks)
(iv)	the efficie	ency of the system.	(2 marks)
(v)	Why is the	efficiency of the machine less than 100%?	(2 marks)
(vi)	It is obser	ved that the efficiency of the machine increases when it is used to lift	large loads

Give a reason for this. (1 mark)

**15.(a)** State Archimede's principle.

(b)The following set-up shows a metal block of density 11,500 Kg/m<sup>3</sup> and dimensions  $40cm \times 20cm \times 20cm$  suspended inside a liquid with <sup>3</sup>/<sub>4</sub> of its volume submerged in the liquid. The block is held in position by a string attached to a point above the liquid.



(i)Determine the weight W of the block.		(2 marks)
( <b>ii</b> )If	the tension on the string is 1684N, determine the upthrust U of the liquid.	(1 mark)
(iii)	Determine the density of the liquid.	(2 marks)

- (iv)If a liquid of density 1100kg/m<sup>3</sup> is poured on top of the liquid until the block is just submerged, determine the new tension in the string.
   (2 marks)
- (c)A hydrometer of mass 30g floats in oil of density 0.9g/cm<sup>3</sup> with 6cm of its stem above the oil. If the cross-sectional area of the stem is 0.5cm<sup>2</sup>, calculate the total volume of the hydrometer.(3 mrks)

**16.(a)**Define specific heat capacity of a substance.

(1 mark)

(b)The figure below shows a circuit that was used to determine the specific

latent heat of fusion of ice by electrical method.



(i) Complete the circuit diagram shown above.

(1 mark)

(ii) State the measurement to be carried out during the experiment. (iii) State the purpose of experiment Q.

(2 marks) (1 mark)

- (c)Describe how the measurement taken can be used to determine the specific latent heat of fusion of ice. (2 marks)
- (d) A heater rated 300W was used to heat water from  $0^{\circ}$ C to  $40^{\circ}$ C. If the heating took 5 minutes; determine;
- (i) the heat capacity of water.
- (ii) the mass of water. (specific heat capacity of water  $4.2 Jg^{-1}k^{-1}$ )
- **17.(a)**The figure below shows a velocity time graph of a body.



For Marking Schemes Contact 0746 222 000 / 0742 999 000

(2 marks)

(1 marks)

(2 marks)

Describe the motion of the body between;

- (1 mark) (i) OA (ii) AB (1 mark)
- (b) A simple pendulum is set swinging and the string is cut when the bob is at the centre of its oscillation and 8cm above the ground. If the velocity of the bob is then 2m/s;
- (i) how long does the bob take to reach the ground?
- (ii) how far does the bob travel horizontally. (Assume g = 10m/s) (2 marks)
- (iii) A and B represents parts of the ticker tape of a trolley run. Each successive tick represents a time interval of  $\frac{1}{50}$  th second.



(1) Find the initial velocity in region A.	(1 mark)
(II) Find the final velocity in region B.	(1 mark)
(III) Hence find the average acceleration of the trolley.	(1 mark)
## **KCSE 2025 TOP SCHOOLS' PREDICTIONS**

## **EXPECTED EXAM 10**

## 232/2

## PHYSICS

## PAPER 2

#### **TIME: 2 HOURS**

NAME	•••••••••••••••••••••••••••••••••••••••
SCHOOL	SIGN
INDEX NO	ADM NO

### Kenya Certificate of Secondary Education.

#### Instructions to Candidates

- 1. Write your name, index number, class and admission number in the spaces provided above.
- 2. This paper consists of TWO sections: Sections A and B.
- 3. Answer ALL the questions in sections A and B in the spaces provided.
- 4. ALL working **MUST** be clearly shown.
- 5. Mathematical tables and electronic calculators may be used.

#### FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
Α	1-12	25	
В	13	14	
	14	13	
	15	14	
	16	14	
TOTAL	SCORE	80	

(2 marks)

## SECTION A (25 Marks)

- Answer all questions in the spaces provided
- 1. The figure below shows a ray of light incident along the normal. The mirror is rotated at an

angle of 15° in a clockwise direction without changing the position of the incident ray,



Determine the angle through which the reflected ray is rotated.

- Describe how to charge a gold leaf electroscope positively by induction method using a polythene rod and a silk cloth (2 marks)
- 3. An object O is placed in front of a concave mirror as shown in the figure below. Complete the light ray diagram to locate the position of the image. (3 marks)



**4.** A student set up the circuit shown in figure below.



State the observation when;

**i.** Switch S1 is closed

(1 mark)

- **ii.** If all switches are closed; compare the lighting between  $B_1$ ,  $B_2$  and  $B_3$
- 5. State two ways of increasing the strength of an electromagnet. (2 marks)
- 6. The figure below shows one of the method used to magnetise a magnetic material



State the polarity of B.

 Two identical loudspeakers are arranged as shown and connected to the same signal generator. Line OR is equidistant from the speakers.



- i. An observer moves along line PQ. State and explain the observation.
- ii. If the frequency of sound from the generator is increased, what effect does this have on the interval at which the observer hears the soft sound? (1 mark)
- 8. The figures below show the profiles of a transverse wave.



#### (1 mark)

(2 marks)

(2 marks)



#### Determine for the wave the:

#### (i) Wavelength

#### (iii) Velocity

9. The diagram below shows a capacitor network connected to a 100V supply.



Calculate the total charge in the circuit.

- **10.** Define the term doping as applied in **electronics**
- **11.** The graph below shows the variation of percentage mass remaining against age in years of a certain radioactive substance



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## (1mark)

(2 marks)

(3 marks)

(1 mark)

Determine the half-life of the source

**12.** State one difference between the Cathode ray tube of a television and that of a Cathode ray Oscilloscope. (1mark)

#### **SECTION B (55 marks)**

#### Answer all questions in the spaces provided

13 (a) State the Ohm's law

(b) You are provided with the following apparatus; a coil of nichrome wire, two dry cells, ammeter, voltmeter, connecting wires, switch and rheostat.

 $4\Omega$ 

50

6Ω

- (i) Draw a circuit diagram that can be used to verify Ohm's law
- (ii) State the measurements to be taken
- (i) Describe how these measurements obtained can be used to verify Ohm's law (3marks)

7Ω

(c) Study the figure below and answer the questions that follow



Crown has a refractive index of 1.55. Determine its critical angle.

(b) A ray of light strikes the crown prism in (b) above as shown below.



Trace the path of the ray till it emerges (show your working above) For Marking Schemes Contact 0746 222 000 / 0742 999 000 (3 marks)

#### MWALIMU CONSULTANCY

(1 mark)

## (1mark)

(1mark) (2marks)

(c) Using a well labeled diagram, show how you would use a converging lens as a simple microscope

(3 marks)

**MWALIMU CONSULTANCY** 



(i) Name the defect shown above

(ii) On the same diagram show how you can correct the above defect (2 marks)

- 15. (a) State the Lenz's Law
- (b) The diagram below shows a simple generator

(ii) On the diagram, show the direction of rotation, such that the current flows in the direction indicated by the arrows (1 mark)

- (iii) State two ways of making the generator produce more current (2 marks)
- (iv) On the axes below, sketch the graph of the output voltage for two complete cycles if the C.R.O is connected as shown (1 mark)



(1 mark)



$\sim$			
	ti	ime (t)	

- (v) Explain how you would modify the generator above to produce d.c. voltage (1 mark)
- (c) A power line supplies electrical energy to a transformer in a factory. The input voltage to the transformer is 11000V. The transformer changes voltage to 415V for use in a factory. The power input to the transformer is 40KW. Calculate the current in the secondary coil of the transformer if the transformer is 90 percent efficient. (3 marks)
- (d) A Form four student spent the April holiday at home and used the following electrical appliances per day:-

8KW cooker for 1 hour,

40W study bulb for 12 hours

- (i) Find the total monthly bill for the above household if the power company charges ksh. 2.50 per unit if in addition to the energy consumed, the power company charges each consumer.
- I A standing charge of Ksh.200.
- II Fuel cost levy at 70 cents per unit.
- 16 (a)Apart from the intensity of light, state two other factors which affect photoelectric effect.2 mks)
- (b) A material has a work function of 2.9eV. The wavelength of an incident radiation on its surface is 2.9 X 10<sup>-7</sup> m. (Given that; C =  $3.0 \times 10^8$  m/s, h =  $6.63 \times 10^{-34}$  Js, 1eV =  $1.6 \times 10^{-19}$  and mass of an electron =  $9.11 \times 10^{-31}$ kg).

(i) Determine frequency of incident radiation	(2 marks)	
(ii) Determine the stopping potential.	(3 marks)	
(iii) Determine the speed of the emitted electrons	(3 marks)	
(c) (i) State how you can increase the strength of X- rays	(1 mark)	
(ii) Give one application of X- rays in industry.	(1 mark)	
(iii) Give reason why the X- ray tube is evacuated.	(1 mark)	
(iv) State why the anode is made of copper	(1 mark)	

#### (3 marks)



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