535/3
PHYSICS
PRACTICAL
Paper 3
Nov./Dec. 2020
2¼ hours

WAKISO-KAMPALA TEACHERS' ASSOCIATION (WAKATA)

WAKATA MOCK EXAMINATIONS 2020

Uganda Certificate of Education

PHYSICS PRACTICAL

Paper 3

2 hours 15minutes

INSTRUCTIONS TO CANDIDATES:

Answer **Question 1** *and* **one** *other question.*

Any additional question answered will **not** *be marked*

For each question candidates will be required to select suitable apparatus from the equipment provided

You will **not** *be allowed to start working with the apparatus for the* **first quarter** *of an hour.*

Marks are given mainly for a clear record of the observation actually made, for their suitability and accuracy, and the use made of them.

Candidates are reminded to record their observations as soon as they are made

Where possible, candidates should put their observations and calculations in a suitable table drawn in advance

An account of the method of carrying out the experiment is not required.

Squared paper is provided.

Mathematical tables and silent non-programmable calculator may be used.

1. In this experiment, you will determine the constant, $\boldsymbol{k}$ of the spiral spring provided. *(30marks)*

(a) Suspend the spring with a pointer fixed at its free end from a clamp.

(b) Support one end of the metre rule against the wooden block and suspend the other end from the spring using a piece of thread as shown in figure **1**

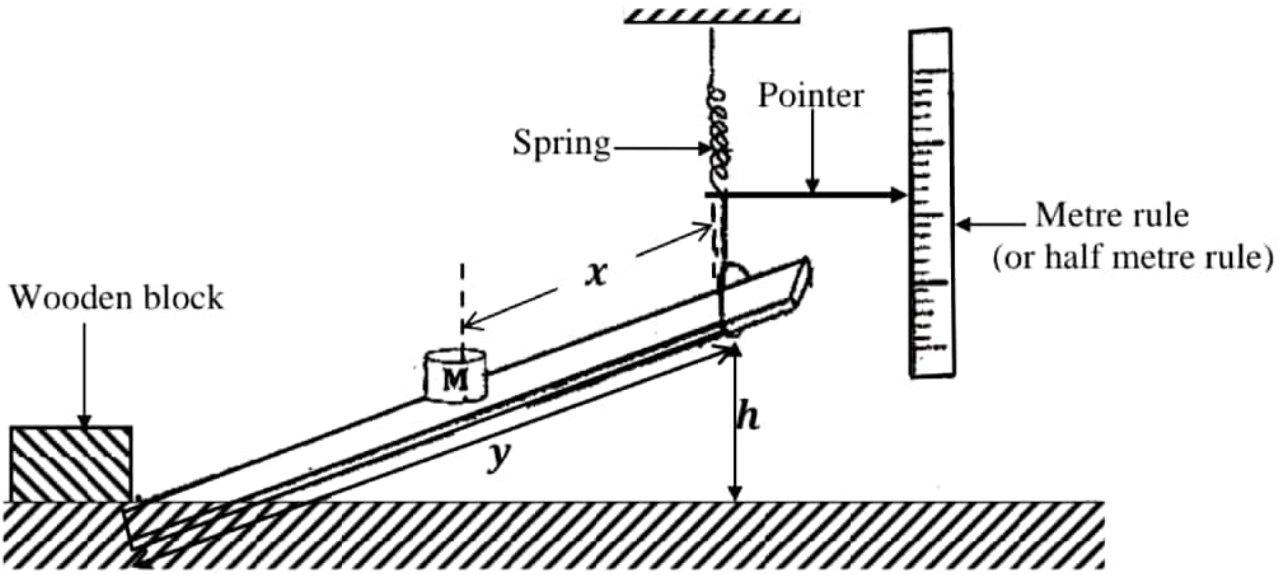


Fig.1

(c) Adjust the height, h above the table surface to $30cm$.

(d) Measure and record the distance, y between the end of the rule pressing against the wooden block and the point of suspension of the meter rule.

(e) Clamp the half meter rule vertically with its scale against the end of the pointer.

(f) Read and record the position, P_0 of the pointer.

(g) Place a mass, M at a distance, $x = 20.0cm$ from the point of suspension of the metre rule.

(h) Read and record the new position, P of the pointer.

(i) Find the extension, e of the spring.

(j) Repeat procedures (g) to (i) for values of x = 30.0, 40.0, 50.0, 60.0 and $70.0cm$.

(k) Tabulate your results including values of $(y - x)$.

(l) Plot a graph of e against $(y - x)$.

(m) Find the slope, S of the graph.

(n) Calculate, $\boldsymbol{k}$ from: $\boldsymbol{k} = \frac{0.98}{Sy}$

DISMANTLE THE SET UP OF THE APPARATUS

2. In this experiment, you will determine the refractive index, $\cap$ of a glass block provided.

(30marks)

(a) Fix a fresh plain sheet of paper on the soft board using drawing pins.

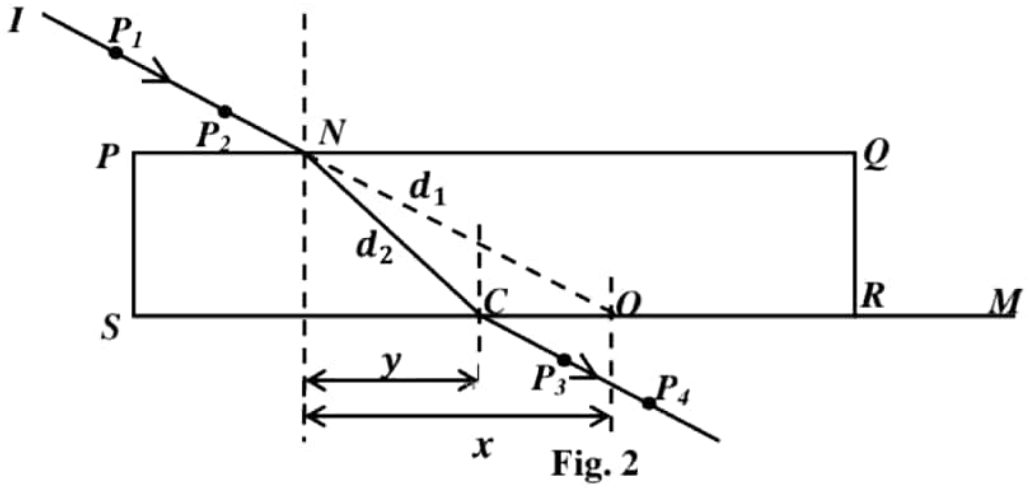


Fig. 2

(b) Place the glass block on the sheet of paper provided with the largest face top most.

(c) Trace its outline $PQRS$.

(d) Remove the glass.

(e) Mark point N on PQ such that the distance $PN = 2.0cm$.

(f) Draw a normal to PQ at N. Extend SR to M such that the distance $RM = 8.0cm$

(g) Mark another O on SR such that $x = 2.0cm$.

(h) Join O to N and extend to I as shown in figure **2**.

(i) Stick two optical pins P_1 and P_2 on IN. Put the glass block on its outline.

(j) While looking through the glass block from side SR, stick two pins P_3 and P_4 such that they appear to be in line with the images of P_1 and P_2.

(k) Remove the glass block and the pins

(l) Draw a line through P_3 and P_4 to meet SR at C. Join C to N.

(m) Measures and record distances d_1, d_2 and y.

(n) Repeat procedures (g) to (m) for values of $x = 4.0, 6.0, 9.0, 10.0$ and $13.0cm$.

(o) Tabulate your results including values of $\frac{d_1}{d_2}$ and $\frac{x}{y}$.

(p) Plot a graph of $\frac{d_1}{d_2}$ against $\frac{x}{y}$.

(q) Determine the slope, S, of the graph.

(r) Calculate $\cap$ from the expression: $\cap = \frac{1}{S}$.

N.B **Hand in the tracing papers used in the experiment together with your results.**

DISMANTLE THE SET UP OF THE APPARATUS

3. In this experiment, you will determine the potential difference per metre, K of the wire W provided.
(30marks)

(a) Connect the circuit shown in figure **3**.

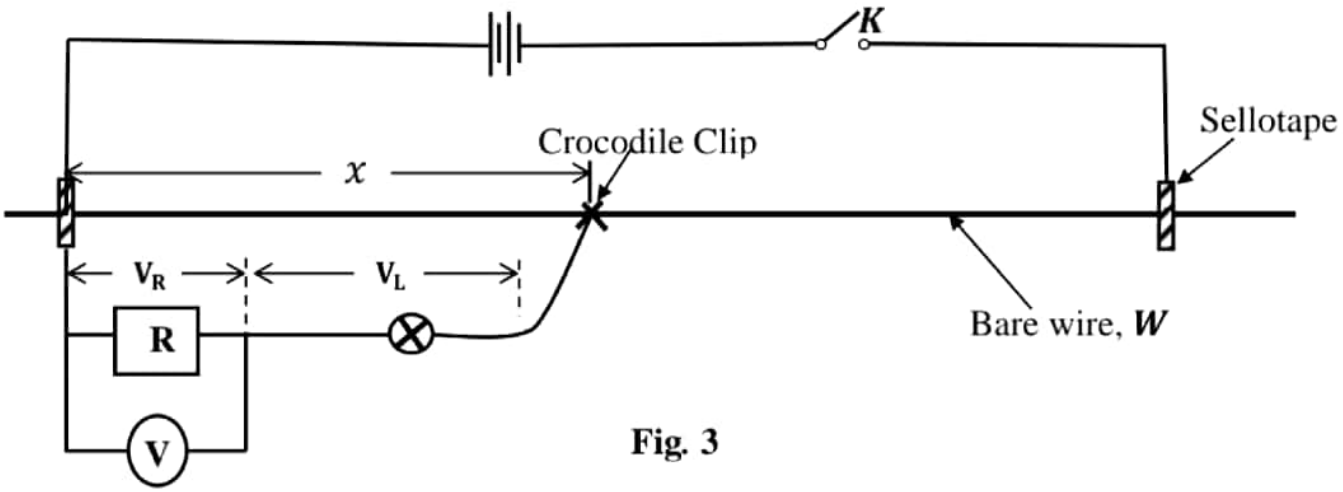


Fig. 3

(b) Record the value of the resistor R Provided.

(c) With $x = 0.10$m, close the switch, K.

(d) Read and record the voltmeter reading V_R.

(e) Open switch K.

(f) Disconnect the voltmeter and connect it across the bulb, L.

(g) Close switch, K.

(h) Read and record the voltmeter reading, V_L.

(i) Repeat procedures (c) to (h) for values of $x = 0.20, 0.30, 0.40, 0.50, 0.60, 0.70$ and 0.80.

(j) Tabulate your results in a suitable table.

(k) Plot a graph of V_L against V_R.

(l) Locate the point, V_0 on the graph for which $V_R = V_L$.

(m) Plot a graph of V_L against x.

(n) From your graph find values of $x = x_0$ for which $V_R = V_L$ is V_0.

(o) Calculate the potential difference per metre K, of the wire, W from the expression:

$$K = \frac{V_0}{x_0}.$$

DISCONNECT THE CIRCUIT

END

Candidate's Name: ……

Random No.						Personal No.		

Signature:……

(Do not write your School Name anywhere on this booklet)

535/1
PHYSICS
Paper 1
Jul. / Aug. 2020
2¼ hours

WAKISO-KAMPALA TEACHERS' ASSOCIATION (WAKATA)

WAKATA MOCK EXAMINATIONS 2020

Uganda Certificate of Education

PHYSICS

Paper 1

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Section **A** *contains* **40** *objective type questions. You are required to write the correct answer* **A**, **B**, **C** or **D** *in* **blue** *or* **black** *ink against each question in the box at the right hand side.*

Section **B** *contains* **10** *structured questions. Answers are to be written in the spaces provided on this question paper.*

Mathematical tables and silent non-programmable calculators may be used.

Acceleration due to gravity, g = $10\ ms^{-2}$.
Specific heat capacity of water = $4200Jkg^{-1}K^{-1}$

For Examiners' use only

Q.41	Q.42	Q.43	Q.44	Q.45	Q.46	Q.47	Q.48	Q.49	Q.50	MCQ	Total

SECTION A (40 MARKS)

1. Which of the following is correct about current that flows through resistors connected in series?

A. Current through each of the resistors is the same.
B. Current through each of the resistors is proportional to the resistance.
C. Current increases as it flows through the resistors.
D. Current decreases as it flows through the resistors.

2. The amount of heat absorbed by a 3kg mass at constant temperature is called?

A. Specific latent heat. B. Latent heat..
C. Specific heat capacity. D. Heat capacity.

3. Which of the following forms Mechanical energy?

A. Nuclear energy and Kinetic energy. B. Potential energy and Kinetic energy.
C. Electrical energy and Kinetic energy. D. Potential energy and Nuclear energy.

4. Mass, Luminous intensity and Current are;

A. derived quantities. B. units of measurement.
C. fundamental quantities. D. basic quantities.

5. The brightness of the spot on a C.R.O screen is controlled by:-

A. Anodes. B. Grid.
C. Cathode. D. X – plates.

6. Brownian motion experiment shows that molecules of gases are:

A. in motion in one direction only. B. more closely packed than in liquid.
C. in constant random motion D. stationary

7. A stone falls freely from rest to the ground. Which one of the following presents the correct order of energy changes which occur when the stone falls to the ground.

A. Kinetic energy ⟶ Potential energy ⟶ Sound energy ⟶ Heat energy
B. Sound energy ⟶ Potential energy ⟶ kinetic energy ⟶ Heat energy
C. Potential energy ⟶ Sound energy ⟶ Kinetic energy ⟶ Heat energy
D. Potential energy ⟶ kinetic energy ⟶ Heat energy ⟶ Sound energy

8. Which one of the following is true for an object under shearing forces?

A. The object does not change in shape.
B. The object tends to shorten.
C. The layers of the object tend to slide on one another.
D. The object gets twisted.

9. When a pin hole camera is moved nearer an object, the size of the image:

A. remains the same. B. becomes larger.
C. becomes diminished. D. becomes smaller.

10. In a domestic hot water supply system, hot water in a boiler flows to the taps by convection because:

A. cold water is prevented from mixing with hot water.

B. warm water displaces cold water.

C. hot water is denser than cold water, therefore it sinks.

D. hot water is less dense and therefore rises.

11. Which one of the following affects the frequency of a vibrating string?

A. Tension and velocity of sound produced.

B. Mass per length of the string and temperature

C. Tension and length of the string

D. Length and mass of the string

12. A liquid of mass 120g and density 4g/cc is mixed with a liquid of 20cc and density 8g/cc. The density of the mixture in g/cc is

A. $\frac{120 + 160}{30 + 20}$ B. $\frac{120 \times 4}{20 \times 8}$ C. $\frac{30 + 20}{120 + 160}$ D. $\frac{120 + 20}{4 + 8}$

13. The major reason why helium may be preferred to hydrogen in filling ballons is:

A. Helium is less denser than hydrogen. B. Hydrogen is not flammable.

C. Helium is more denser than hydrogen. D. Helium is not flammable.

14. When the North pole of a bar magnet is moved torwards a coil, which of the following ways can be used to increase the size of the induced emf in the coil?

(i) Moving the magnet at a higher speed.

(ii) Reducing the number of turns in the coil.

(iii) Using a stronger magnet.

A. (i), (ii) and (iii). B. (ii) and (iii) only

C. (i) and (ii) only D. (i) and (iii) only

15. A man of mass 50kg climbs 40 steps upstairs. If each step is 0.2m high, the potential energy gained is

A. $4000J$ B. $100J$ C. $20{,}000J$ D. $400J$

16. In the reaction below, U is likely to be

$$^{234}_{90}X \longrightarrow {}^{234}_{91}Y + U$$

A. a neutron.

B. a gamma particle.

C. a beta particle.

D. an alpha particle.

17. When a yellow dress with blue dots is placed in a room lit with pure red light, the dress appears

A. yellow with blue dots.
B. black with yellow dots.
C. red with black dots.
D. green with red dots.

18. A body moves with a uniform acceleration of ams^{-2}. If its initial velocity is $40ms^{-1}$ and it travels for 12s to attain a final velocity of $60ms^{-1}$, find the value of a.

A. $\frac{40}{60 \times 12}$ B. $\frac{60 + 40}{12}$ C. $\frac{60 \times 12}{40}$ D. $\frac{60 - 40}{12}$

19. Which of the following statements are true about electric wiring?

(i) The fuse is connected into the neutral wire leading to a circuit.
(ii) When a fault develops in the circuit, it is the neutral wire which has to be disconnected.
(iii) The fuse is always connected into the live wire leading to a circuit.

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

20. When sound waves pass through a metal bar, the atoms of the metal

A. move along the bar.
B. rotate in circles.
C. vibrate about fixed points.
D. expand and contract.

21. A gas occupies a volume of $0.45m^3$ at a temperature of 27^0Cand a pressure of 70cmHg. Find the volume at s.t.p.

A. $\frac{70 \times 0.45 \times 273}{300 \times 76}$ B. $\frac{300 \times 76}{70 \times 0.45 \times 273}$

C. $\frac{70 \times 76}{0.45 \times 27}$ D. $\frac{0.45 \times 27}{70 \times 76}$

22. Figure **1** shows a thermionic diode.

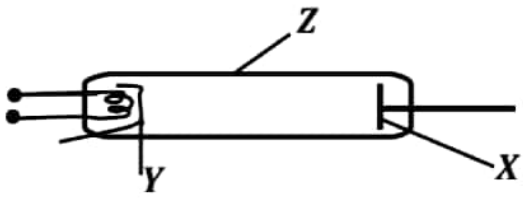


Fig. 1

Which one of the following are represented by X, Y and Z.

A. Anode, Glass tube, Cathode.
B. Anode, Cathode, Glass tube.
C. Cathode, Anode, Glass tube.
D. Cathode, Glass tube, Anode.

23. If a load of 1N extends a spring by 5cm, what extension will a load of 0.6N produce?

A. 3.0 cm
B. 1.2 cm
C. 30.0 cm
D. 8.5 cm

24. Figure 2 shows a ray of light incident at an angle of 40^0 at mirror, M_1; which is inclined with mirror M_2 at 60^0.

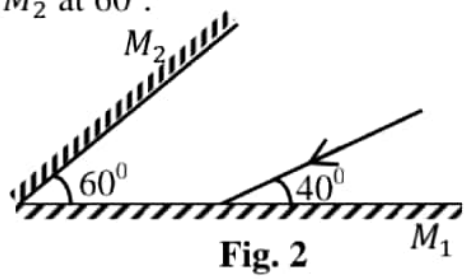


Fig. 2

Find the angle between the incident ray at M_1 and reflected ray at M_2.

A. 50^0 B. 10^0

C. 100^0 D. 60^0

25. In a hydraulic press, the area of the piston on which the effort is applied is made smaller in order to

A. transmit a force as large as possible to the load.
B. obtain a pressure as large as possible
C. facilitate the movement of the piston dowards
D. transmit pressure equally throughout the liquid.

26. The leaf of a charged electroscope gradually collapses with time due to

A. Leakage to the surroundings
B. similar charges from the sorroundings.
C. surrounding magnetic field.
D. pressure variation in the surroundings

27. A car of mass 1200kg moving with a velocity of $60ms^{-1}$ collides head – on with another car of mass 1000kg at rest and they stick together. Calculate their velocity after collision

A. $\left(\frac{1200 \times 60}{1200 + 1000}\right) ms^{-1}$ B. $\left(\frac{1000 \times 60}{1200 + 1000}\right) ms^{-1}$

C. $\left(\frac{1200 + 1000}{1000 \times 60}\right) ms^{-1}$ D. $\left(\frac{1200 + 1000}{1200 \times 60}\right) ms^{-1}$

28. Which of the following properties are true about cathode rays?

(i) They travel in straight lines.
(ii) They darken photographic plates.
(iii) They are deflected by a magnetic field

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

29. The amount of heat required to raise the temperature of 0.5kg of iron from 25 °C to 50 °C is *(specific heat capacity of Iron is 460 $Jkg^{-1}K^{-1}$)*

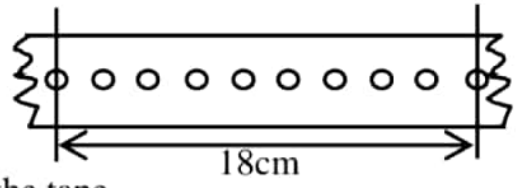
A. $0.5 \times 460 \times 25\ J$

B. $\left(\frac{0.5 \times 25}{460}\right) J$

C. $\left(\frac{0.5 \times 460}{25}\right) J$

D. $\left(\frac{460 \times 25}{0.5}\right) J$

30. Figure **3** shows a paper tape pulled at a constant speed through a ticker timer vibrating at 50Hz.



Find the speed of the tape. **Fig. 3**

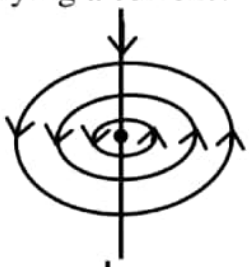
A. $\left(\frac{18 \times 50}{100 \times 9}\right) ms^{-1}$

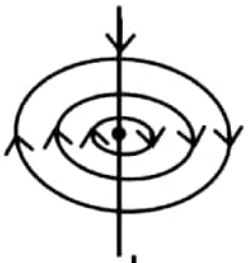
B. $\left(\frac{18 \times 50}{100 \times 10}\right) ms^{-1}$

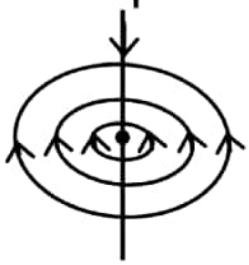
C. $\left(\frac{18 \times 50}{100 \times 12}\right) ms^{-1}$

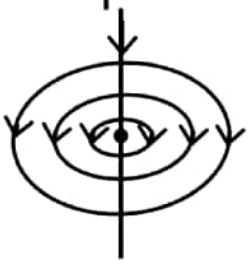
D. $\left(\frac{100 \times 9}{18 \times 50}\right) ms^{-1}$

31. Which one of the following diagrams represents the correct magnetic field around a straight wire carrying a current?

A. 

B. 

C. 

D. 

32. What occurs when a body is made to vibrate with its natural frequency due to external vibration?

A. Echo.

B. Refraction.

C. Reverberation.

D. Resonance.

33. The strength of the magnetic field between the poles of an electromagnet remains the same if;

(i) the number of turns are halved

(ii) current in the electromagnetic windings is doubled.

(iii) direction of the current in the electromagnetic windings are reversed.

A. (i), (ii) and (iii)

B. (i) and (iii) only

C. (ii) and (iii) only

D. (iii) only

34. A load of 500N is placed at 2m from a pivot of a sea saw. At what distance from the pivot should a weight of 250N be placed to balance the sea saw?

A. $\left(\frac{250 \times 2}{500}\right) m$

B. $\left(\frac{250}{500 \times 2}\right) m$

C. $\left(\frac{500 \times 2}{250}\right) m$

D. $\left(\frac{500}{250 \times 2}\right) m$

35. Which of the following occurs when a wave passes through a small opening?

A. Interference.

B. Difraction.

C. Refraction.

D. Reflection.

36. A voltage of 440V is applied to the primary of a transformer of 2000 turns. If the voltage across the secondary is 11kV, what is the number of turns in the secondary coil?

A. 80,000

B. 50,000

C. 50.

D. 80

37. A detergent is used to wash clothes because it

A. increases capillarity in the clothes

B. reduces capillarity in clothes.

C. increases surface tension allowing water to penetrate the dirt.

D. Decreases surface tension allowing water to penetrate the dirt easily.

38. Figure **4** shows a circuit diagram of two resistors of resistances 4Ω and 2Ω connected to a 3.0V supply and 2 switches K_1 and K_2.

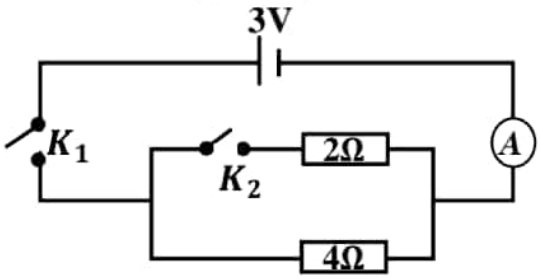


Fig. 4

What will be the reading of the ammeter if switch, K_2 is open and K_1 closed?

A. 0.75A

B. 2.25A

C. 9A

D. 8A

39. Total internal reflection occurs when

(i) light travels from a dense to a less dense medium.

(ii) the angle of incidence in a dense medium is greater than the critical angle.

(iii) the angle of incidence is equal to the critical angle.

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

40. Figure **5** shows a graph of load against extension for a wire.

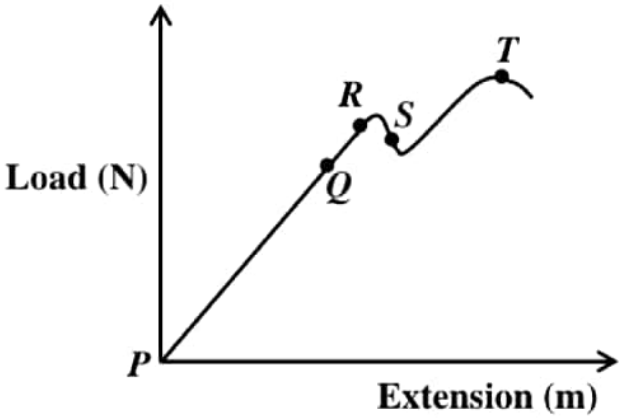


Fig. 5

Which of the portions of the graph corresponds to a permanently strained wire?

A. ***PQ*** and ***QR***

B. ***QR*** and ***RS***

C. ***PQ*** and ***RS***

D. ***RS*** and ***ST***

SECTION B (40 MARKS)

Write in the spaces provided

41. (a) What are **cathode rays**? *(01mark)*

……

……

(b) Figure **6** shows cathode rays directed in magnetic field.

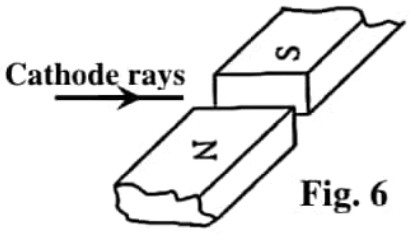


Fig. 6

Draw to show the direction taken by the rays. *(01mark)*

(c) State **two** advantages of a Cathode Ray Oscilloscope (CRO) as a voltmeter. *(02marks)*

……

……

42. (a) What is meant by a **sensitive galvanometer**? *(01mark)*

……

……

(b) State **two** factors that determine the sensitivity of a moving coil galvanometer. *(01mark)*

……

……

(c) Describe briefly how a galvanometer can be converted into a voltmeter. *(02marks)*

……

……

……

43. (a) State Graham's law of gaseous diffusion. *(01mark)*

……

……

(b) Give **one** example of a gas that has high diffusion rate. *(01mark)*

……

(c) State **two** factors that affect the rate of diffusion of a gas. *(02marks)*

……

……

44. (a) State **one** application of a hydrometer in Agriculture. *(01mark)*

……

(b) Explain why a ship is able to float on water inspite of being made of a metal. *(02marks)*

……

……

……

(c) Calculate the relative density (*R.D*) of a body whose density is $1420 kgm^{-3}$. *(01mark)*

……

……

45. (a) Define **pitch of a screw**. *(01mark)*

……

……

(b) Figure **7** shows a simplified Screw Jack of radius 0.42m and velocity ratio 329.7.

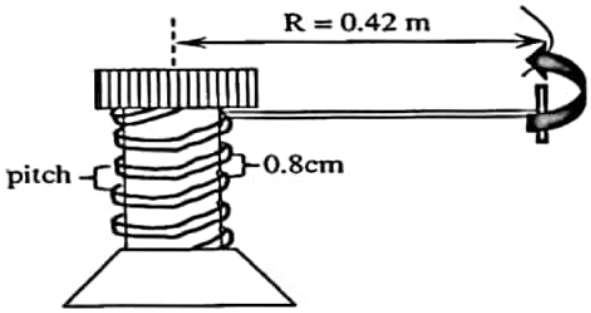


Fig. 7

(i) Find the pitch of the Screw Jack *(01mark)*

……

……

(ii) Calculate the effort that would be necessary to raise a load of 500N if the Screw Jack is 45% efficient. *(02marks)*

……

……

……

……

46. (a) What are **ultrasonic waves**? *(01mark)*

……

……

(b) In sonar navigation, the emitter sends a pulse of an ultrasonic wave vertically towards the bottom of the sea and its receiver next to the emitter receives its echo after 0.65 seconds. If the velocity of sound in water is $1450ms^{-1}$, estimate the sea depth at the point. *(02marks)*

……

……

……

……

(c) State **one** application of ultrasonic waves. *(01mark)*

……

47. (a) What is a **Joule**? *(01mark)*

……

……

(b) State how energy from the sun is utilized. *(01mark)*

.....

.....

(c) A ball of mass 800g falls from a height of 20m. If it loses 5% of the energy it strikes with, find the kinetic energy with which it bounces. *(02marks)*

.....

.....

.....

48. (a) What is meant by **accommodation of the eye**? *(01mark)*

.....

.....

(b) Explain how a normal eye is able to see near objects. *(01mark)*

.....

.....

(c) A man can see far objects clearly. The nearest object he can see well is 0.80m away. Calculate the focal length of the lens he needs. *(02marks)*

.....

.....

.....

49. (a) "A body accelerates at $4ms^{-2}$". What do you understand by this statement? *(01mark)*

.....

.....

(b) Explain why a car originally moving at $20ms^{-1}$ with its engine off on a straight road eventually stops. *(01mark)*

.....

.....

(c) A presidential convoy moving at $20ms^{-1}$ notices a goat crossing the road at a distance of 100m away and then applies the brakes 3 seconds later. Find out whether the goat will be knocked if the convoy decelerates at a rate of $4ms^{-2}$. *(02marks)*

.....

.....

.....

.....

50. (a) Sketch a graph of current gainst voltage for a semi – conductor diode. *(01mark)*

(b) A house has one 100W bulb, two 75W bulbs and five 40W bulbs. Find the cost of having all these bulbs switched on for 2 hours every day for 30 days at a UMEME cost of sh.980 per unit. *(03marks)*

.....

.....

.....

.....

.....

.....

.....

.....

END

535/2
PHYSICS
Paper 2
Nov./Dec. 2020
2¼ hours

WAKISO-KAMPALA TEACHERS' ASSOCIATION (WAKATA)

WAKATA MOCK EXAMINATIONS 2020

Uganda Certificate of Education

PHYSICS

Paper 2

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Answer **five** *questions*

Any additional question(s) answered will **not** *be marked.*

Mathematical tables and silent non programmable calculators may be used.

These values of physical quantities may be useful to you:

Acceleration due to gravity	= 10 ms^{-2}
Specific heat capacity of water	= 4,200 $JKg^{-1}K^{-1}$
Specific heat capacity of copper	= 400 $JKg^{-1}K^{-1}$
Specific latent heat of fusion of water	= 340,000 JKg^{-1}
Speed of sound in air	= 330 ms^{-1}
Density of water	= 1,000 kgm^{-3}

[redacted]

1. (a) (i) What is meant by **acceleration due to gravity**? *(01mark)*

(ii) Describe an experiment to determine acceleration due to gravity using a pendulum bob. *(06marks)*

(b) Explain briefly why a person feels heavier than usual at the instant an elevator starts accelerating upwards. *(02marks)*

(c) A bomb is released vertically down wards from a fighter jet moving at a horizontal velocity of $100ms^{-1}$ and 2km high as shown in figure **1**

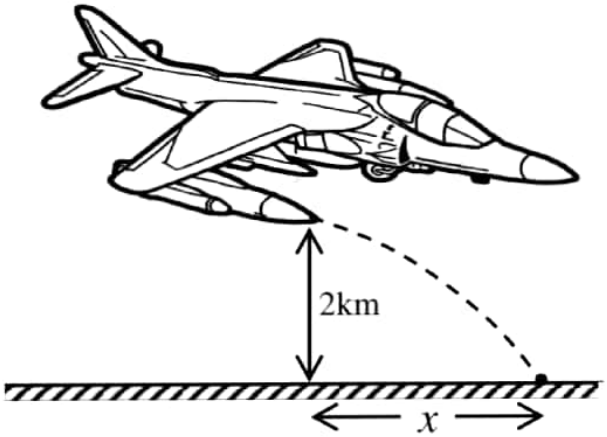


Fig. 1

Find the;

(i) distance x moved by the bomb. *(03marks)*

(ii) velocity with which the bomb is moving on striking the ground. *(04marks)*

2. (a) (i) State **Pascal's principle of transmission of pressure**. *(01mark)*

(ii) Describe an experiment to verify Pascal's principle of transmission of pressure *(03marks)*

(b) (i) Explain why it is difficult to take a drink using a straw with a hole. *(02marks)*

(ii) State **two** uses of pressure measurement. *(02marks)*

(c) A U – tube of cross – sectional area $0.5cm^2$ has some mercury first poured in, then $7cm^3$ of liquid X is poured through one limb and $4.5cm^3$ of liquid Y is poured through the other limb. If liquid X has a density of $1000kgm^{-3}$ and liquid Y has a density of $800kgm^{-3}$, calculate the;

(i) difference in levels between the mercury surfaces. *(05marks)*

(iii) difference in levels between the surfaces of liquid X and Y. *(01mark)*

3. (a) (i) What is **diffusion**? *(01mark)*

(ii) Describe an experiment to demonstrate the diffusion of a solute in a solvent. *(04marks)*

(b) Explain what happens to the molecules of a heated solid as more and more heat is added. *(03marks)*

(c) (i) Define **a spring constant**. *(01mark)*

(ii) A 5.0 cm long spring was used in an experiment. When a 200g mass was suspended using a mass hanger on the spring its new length became 6.5 cm. When the mass on the hanger was changed to 410g, the length of the spring changed to 8.0cm. Calculate the constant, K, of the spring. *(04marks)*

(d) State **two** ways how concrete may be made to withstand tensional forces. *(02marks)*

4. (a) Define **resonance** as applied to sound waves. *(01mark)*

(b) Describe an experiment to demonstrate resonance in an air tube. *(04marks)*

(c) Figure **2** shows a cross section of a ripple tank in which **A** is a straight dipper attached to a vibrator and **B** is a barrier with two gaps.

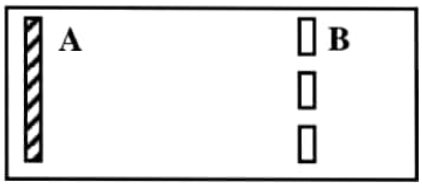


Fig. 2

(i) Sketch the diagram showing the waves produced when **A** vibrates perpendicular to the water surface. *(02marks)*

(ii) State **two** properties of waves shown in your diagram. *(02marks)*

(d) Sound of frequency 264 Hz has a velocity of $320ms^{-1}$. At a later time, the temperature changed and the velocity increased to $330ms^{-1}$.
Calculate the change in wave length and explain why increase in temperature increases velocity of sound. *(05marks)*

(e) State **two** applications of beats. *(02marks)*

5. (a) State the conditions for total internal reflection to occur. *(02marks)*

(b) Figure **3** shows light incident on a glass prism and refracted.

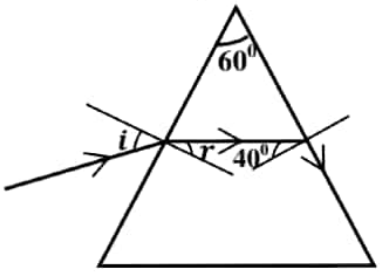


Fig. 3

Find the size of angle ***i*** .

(c) Using a ray diagram show how a converging lens is used as a magnifying glass. *(03marks)*

(d) Distinguish between secondary and primary colours. *(02marks)*

(e) Explain why an object illuminated by white light appears

(i) black *(02marks)*

(ii) coloured *(02marks)*

6. (a) (i) Define **specific latent heat of fusion of a solid.** *(01mark)*

(ii) Describe a simple experiment to determine the specific latent heat of fusion of ice using an electric current. *(06marks)*

(b) 1.8kg of water is put in an ice making machine. If the water is at 40^0C and the machine removes heat at a rate of 200J/s, how long would it take to convert it into ice at -15^0C ? (*specific latent heat capacity of ice* $= 336{,}000Jkg^{-11}$
specific heat capacity of ice $= 2{,}100Jkg^{-1}K^{-1}$) *(04marks)*

(c) State what happens when salt is added to ice. *(01mark)*

(d) Explain how a green house is able to maintain higher temperatures than the sorroundings. *(03marks)*

(e) State **one** use of forests in the reduction of the green house effect. *(01mark)*

7. (a) Define

(i) **Self induced emf**.

(ii) **Mutual induction** *(02marks)*

(b) With the aid of a diagram, describe the action of a step up transformer. *(05marks)*

(c) Explain briefly how power is transported from Owen falls dam to your home. *(03marks)*

(e) A cell of Emf, E and internal resistance, r is connected to resistors of 2Ω, 4Ω and 6Ω as shown in figure **4**.

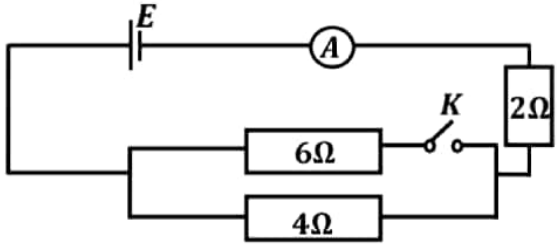


Fig. 4

When switch K is open, the ammeter reads 2.00A and when K is closed, ammeter reads 2.64A. Calcuate:

(i) internal resistance, r of the battery. *(04marks)*

(ii) energy lost per second in driving current through the cell when the switch, K is open. *(02marks)*

8. (a) What is meant by;

(i) **Photo electric emission** *(01mark)*

(ii) **Thermionic emission** *(01mark)*

(b) List **two** applications of photo cells. *(02marks)*

(c) State the energy changes that take place in an X −ray tube. *(02marks)*

(d) (i) Explain how intensity and penetrating power of X −rays produced in an X −ray tube may be varied. *(03marks)*

(ii) Briefly describe how X −rays may be used to locate the broken part of a bone. *(03marks)*

(e) Uranium $^{235}_{92}\mathrm{U}$ decays according to the nuclear equation below.

$$^{235}_{92}\mathrm{U} + ^{1}_{0}\mathrm{n} \longrightarrow ^{x}_{56}\mathrm{Ba} + ^{92}_{y}\mathrm{Kr} + 3^{1}_{0}\mathrm{n}$$

Find the values of x and y. *(03marks)*

(f) Give **one** advantage of a Cathode Ray Oscilloscope (C.R.O) as a voltmeter. *(01mark)*

END