Name:………………………………………………………………………Centre/ Index No.:…………….…./….….

**535/1**

**PHYSICS**

**Paper 1**

**Jul / Aug 2016**

**2 ¼ Hours**

**MUKONO EXAMINATIONS COUNCIL**

**Uganda Certificate of Education**

**PHYSICS**

Paper 1

**2 Hours 15 Minutes**

**INSTRUCTIONS TO CANDIDATES**

* *Section A contains 40 objective type of questions. You are required to write the correct answer A, B, C or D against each question in the box on the right hand side.*
* *Section B contains 10 structured questions. Answers are to be written in the spaces provided on the question paper.*
* *Mathematical tables and non-programmable scientific calculators may be used.*
* *The following values of physical quantities may be useful to you:*
* *Acceleration due to gravity = 10ms-2*
* *Specific heat capacity of ice = 2100JKg-1K-1*
* *Specific heat capacity of water = 4200JKg-1K-1*
* *Specific latent heat of fusion of ice = 336000JKg-1*
* *Velocity of light in air = 3.0 x 108ms-1*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **For Examiner’s Use Only** | | | | | | | | | | | |
| Qn 41 | Qn 42 | Qn 43 | Qn 44 | Qn 45 | Qn 46 | Qn 47 | Qn 48 | Qn 49 | Qn 50 | MCQ | TOTAL |
|  |  |  |  |  |  |  |  |  |  |  |  |

**SECTION A (40MARKS)**

1. The plate that accelerates electrons from a heated metal in the cathode ray oscilloscope is the

A. cathode B. y – plate C. anode D. x-plate

1. A stationary object cannot start moving unless a force is applied on it. This is an application of

A. Newton’s second law of motion

B. Newton’s first law of motion

C. Newton’s third law of motion

D. Law of inertia

1. A car travelling at 50ms-1 slows down to 20ms-1 in minutes. What is its acceleration?

A. 3ms-2  B. -10ms-2 C. -3ms-2  D. 4ms-2

1. Fluid pressure can be accurately measured using a …………………

A. barometer B. Hygrometer

C. Manometer D. Lactometer

1. When ice charges into water at 0°C;
2. Work is done in breaking the molecular structure of ice in solid state.
3. Energy is absorbed to raise the temperature
4. Internal energy is increased

A. i only B. iii only

C. i and iii only D. i, ii and iii

1. The following are renewable sources of energy except

A. Geothermal B. wind C. wood D. coal

1. Which of the following is NOT an electromagnetic wave?

A. sound B. light

C. x – rays D. micro waves

3N

X N

12N

**Fig. 1**

Figure 1 above, find the value of x is the magnitude of the resultant force is 13N

A. 1N B. 2N C. 4N D. 5N

1. A machine will have an efficiency of 50% if the;
2. effort is equal to load
3. distance moved by the load is equal to the distance moved by the effort.
4. Work done by the load is a half the work done by the effort.
5. Work done by the effort is half of the work done by the load.
6. The following are scaler quantities except

A. mass B. volume C. weight D. energy

1. A weight of 20N stretches a spring by 0.5cm. Calculate the extension when the applied weight is 60N.

A. 0.25cm B. 1.5cm C. 2.0cm D. 4.0cm

Water

Syringe

**Fig. 2**

Figure 2 above shows the principle of operation of a syringe. Which of the following best explains the observations.

1. When the piston is pushed down, atmospheric pressure acts upwards on the surface of the water.
2. When the piston is pulled upwards, atmospheric pressure acts upwards on the surface of water.
3. The upward stroke causes the barrel to be filled with air which prevents upward movement of water.
4. The downward stroke pushes air out of barrel so that on the upward stroke atmospheric pressure pushes water up the syringe.

13. When a charged body is brought near a cap of a negatively charged gold leaf

electroscope the;

1. Divergence of the leaf doesn’t charge
2. Leaf falls if the body is negatively charged.
3. Leaf diverges if the body is positively charged.
4. Leaf diverges if the body is negatively charged.

14. Two straight conductors near each other

1. always repel each other
2. repel each other when no current flows in them.
3. repel each other when they carry current in opposite direction.
4. Repel each other when they carry current in the same direction.

15. A pin-hole camera of length 8cm is used to focus on object 6cm high which is 24cm

away from the tiny hole of the camera on a school compound. What size of the image will be formed on the screen?

A. cm B. cm

C. cm D. **cm

16. An oil drop has a volume of 0.1mm3 and forms a film of approximate diameter 10cm.

Calculate the thickness of the oil film in metres.

A.  B. 

C.  D. 

17. Which of the following will take place as water travel from shallow and to the deep end

of the ripple tank?

|  |  |  |  |
| --- | --- | --- | --- |
|  | Speed | Frequency | Wave length |
| A | Increases | Remains the same | Remains the same |
| B | Decreases | Remains the same | Decreases |
| C | Increases | Remains the same | Increases |
| D | Increases | Increases | Increases |

18. Which of the following shows the correct order of energy changes that occur when a

teacher addresses an assembly using a microphone.

1. Sound energy Electrical energy
2. chemical mechanical sound
3. chemical mechanical electrical sound
4. chemical electrical chemical sound

19.

Normal

Medium A

Medium B

The figure above shows a ray of light travelling from medium A to B. Which of the following statements is true?

1. Medium A is less dense than medium B
2. Medium A is denser than medium B
3. Light travels slower in medium B than in medium A.
4. Light travels slower in medium A than in medium B

20. A fire alarm rated 240V, 1.5KW runs for 10 hours a day. If the cost per unit of electricity

is shs 380, find the daily cost of running the alarm.

A. shs. 570 B. shs.2400

C. shs 3800 D. shs 5700

21. A chopper of mass 5 tonnes moving with an initial velocity of 10ms-1 on Soroti airport

runway, accelerates at a rate of 4ms-2 for 25 seconds before it takes off. Calculate the

change in momentum before takeoff.

A. 5.5 x 105 B. 5.0 x 105

C. 3.0 x 105 D. 2.5 x 105

22. Drying a body with a towel after bath is an application of

A. Osmosis B. Diffusion

C. Capillarity D. Surface tension

23. Pieces of ice of mass 0.5kg at 0°C are mixed with 3kg of water at 0°C. How much heat is

needed to convert the mixture at 10°C?

A. 168KJ B. 126KJ

C. 147KJ D. 322KJ

24. A block of wood is pulled by a force of 200N through a distance of 300m in 5 minutes.

Calculate the power developed if the block moves with a constant speed.

A. 40W B. 60W C. 200W D. 3000W

25. The energy transformation that takes place when an electrophorus is used to charge

bodies are;

1. Kinetic to potential energy B. Mechanical to electrical energy

C. Mechanical to heat energy D. Heat to mechanical energy

26. Which one of the following is NOT true about hard x-rays?

A. have high penetrating power B. have short wave length

C. have long wave length D. have high frequency

27. A radioactive material decays by loss of  its original quantity in 2 hours. What is its

half-life?

A. 10 minutes B. 30 minutes

C. 45 minutes D. 15 minutes

28. When a convex lens is used as a magnifying glass, the image is

A. real and upright B. real and inverted

C. virtual and diminished D. virtual and upright

29. An experimenter standing 160m from a vertical cliff makes a loud sound and hears an

echo. If the speed of sound in air is 320ms-1. How long does it take to hear the echo?

A. 0.5s B. 1.0s C. 2.0s D. 4.0s

S

R

Q

30.

Extension

P

Load

**Fig 4**

The graph above shows the extension of the wire with increasing load. Where does the

elastic deformation occur?

A. between points P and Q B. between points P and S

C. between points Q and R D. between points P and R

31. A lens of power 4 diopters is used to focus an object at infinity. How far the screen

must be placed from the lens so that a clearly focused image is seen?

A. 0.20cm B. 0.25cm C. 20cm D. 25cm

2V

4

4

3

2V

32.

**Fig 5**

The figure above shows two cells each of emf 2V and negligible resistance connected in

the circuit. What is the reading of the ammeter?

A. 0.18A B. 0.36A C. 0.40A D. 0.80A

33. Convection is the transfer of thermal energy due to

A. vibration of the particles

B. expansion of fluid

C. radiation of wave

D. movement of particles from one place to another.

38cmrcury

68cm

Mercury

34.

**Fig 6**

In figure 6 above, a fixed mass of dry gas is trapped in bulb M. determine the total

pressure of the gas in M given that the atmospheric pressure is 760mm of mercury

A. 114cmHg B. 106mmHg

C. 30cmHg D. 46mmHg

35. Which of the following best describes matter?

1. In solids, particles are vibrating in an average position
2. In liquids, molecules move around freely but are held together by very strong cohesive forces.
3. In gases, molecules are close together and moving at high velocities.

A. i only B. i and ii only

C. i and iii only D. i, ii and iii

36. A block of metre of mass 0.01kg at temperature 100°C was dropped in 0.05kg of water

at 20°C. The final temperature of the mixture was 40°C. Calculate the specific heat

capacity of the metal.

A. 4200JKg-1K-1  B. 21000JKg-1K-1

C. 7000JKg-1K-1 D. 2800JKg-1K-1

37. The resistance of a wire increases when

A. length is increased B. length is decreased

C. temperature is reduced D. cross – sectional area is doubled.

38.

A

H

G

F

E

C

D

**Fig 7**

Figure 7 shows a travelling wave. Which the points are in phase?

A. A and G B. B and D

C. C and E D. E and H

39. A transformer cannot function normally with d.c because d.c;

A. reduces the efficiency of the transformer

B. has extremely high heating effect

C. cannot produce a changing magnetic field

D. cannot provide high voltages required for power transmission.

40. The following is/are properties of Beta particles

1. They have atomic mass of one
2. They have a high penetrative power
3. They are deflected by both electric and magnetic fields.

A. i, ii and iii are all correct B. ii and iii only

C. i and ii only D. i only

**SECTION B (40MARKS)**

*Answer* ***all*** *questions in this section*

41. a) (i) Define moment of a force. ***(01mark)***

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

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b) A body A of a mass 30kg is placed at 80cm from the pivot of a see-saw. Find the

position at which body B of mass 40kg can be placed in order to balance the see-saw

horizontally. ***(02marks)***

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42. a) State any one way of reducing power loss in a transformer. ***(01mark)***

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b) A radio has a transformer with an output of 6V, and a power rating of 9W. If the

primary circuit has 1200 turns and is connected to 240Vmains, determine;

(i) the current in the secondary circuit. ***(02marks)***

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(ii) the number of turns in the secondary coil. ***(01mark)***

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43. a) Define the following terms as used in nuclear reactions.

(i) Nuclear fission ***(01mark)***

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(ii) Nuclear fusion ***(01mark)***

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b) Determine the value of a and b in the following reaction.

  ***(02marks)***

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44. a) Define absolute zero temperature. ***(01mark)***

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b) (i) A mass of a gas occupies a volume of 200cm3 at a temperature of 27°C and pressure of 1 atmosphere. Calculate the volume of the gas when the pressure is doubled at constant temperature. ***(02marks)***

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(ii) Define a saturated vapour. ***(01mark)***

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45. a) Sketch the I-V characteristic graph for a semi- conductor diode. ***(01mark)***

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b)

r

R

In figure above, the cell has an emf of 1.5V and internal resistance, r. if the voltmeter reads 1.35V and ammeter 0.3A; calculate;

(i) The internal resistance of the cell. ***(1 ½ marks)***

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(ii) the value of the resistance R. ***(1 ½ marks)***

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46. a) (i) State the law of floatation. ***(01mark)***

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

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b) A body weighs 65N in air, 40N when completely immersed in cooking oil and 25N

when completely immersed in water. Find the density of oil in kgm-3. ***(02marks)***

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47. a) Define the terms as applied to waves.

(i) frequency. ***(01mark)***

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(ii) Wave length ***(01mark)***

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b) The wave form in the figure below shows a wave motion of a rope.

1.0

0.6

0.8

0.4

0.2

1.6m

t(s)

Find;

(i) the frequency of vibrations. ***(01mark)***

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(ii) the speed of the wave. ***(01mark)***

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48. a) Explain what happens to an insulator when it is rubbed by another insulator of

different material? ***(02marks)***

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b) (i)

The diagram above shows a conductor supported on an electrical insulator. The conductor is given some positive charge. Show how the charge is distributed on the conductor. ***(01mark)***

(ii) Explain what will happen when the cap of the electroscope is touched when the

positively charged rod is near the cap of the electroscope. ***(01mark)***

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49. a) (i) Distinguish between real and virtual image as applied to light. ***(01mark)***

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(ii) State two properties of the image formed by real object using a diverging lens. ***(01mark)***

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b)

Image

Eye lens

I

The figure above shows how light from a near object is refracted through a human eye.

(i) Explain whether the eye has a clear vision of the object or not. ***(1 ½ marks)***

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(ii) How can light in (b) (i) be made to focus on the retina. ***( ½ mark)***

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50. a) Define velocity ratio as applied to machines. ***(01mark)***

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b)

4800N

1920N

The figure above shows a block and tackle pulley system used for raising heavy loads. Find the efficiency of the system. ***(03marks)***

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