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535/1

**PHYSICS**

**Paper 1**

July/August 2022

2¼ hours



WESTERN JOINT MOCK EXAMINATIONS

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 the box provided 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 silent non-programmable calculators may be used.*

*Where necessary;*

Acceleration due to gravity = 10 ms-2

Specific heat capacity of water = 4200Jkg-1K-1

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| **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 |  |
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**SECTION A (40 MARKS)**

1. Which of the following is the S.I unit of work?
2. N B. J C. Pa D. W
3. Two forces of 6 N and 8 N act at right angles on the body of mass 5 kg. Determine the acceleration of the body.
4. 1 ms-2  B. 2 ms-2 C. 3 ms-2 D. 4 ms-2
5. Which of the following consists of vector quantities only?
6. Work and mass C. Velocity and acceleration
7. Energy and force D. Velocity and speed
8. The fundamental quantities of physics are
9. mass, length and volume. C. time, mass and length.
10. length, volume and time. D. pressure, volume and force.
11. When a body of mass 5 kg is taken from the earth to the moon,
12. its weight increases. (iii) its weight decreases.
13. its mass increases. (iv) its mass remains constant.
14. (i) and (ii) only. B. (i) and (iii) only. C. (ii) and (iii) only. D. (iii) and (iv) only.
15. Pressure increases with two of the following.
16. Volume of the liquid. (iii) Shape of the container holding the liquid.
17. Density of the liquid. (iv) Column of the liquid.
18. (i) and (ii) only. B. (i) and (iii) only. C. (ii) and (iv) only. D. (iii) and (iv) only.
19. A force of 20 N extends a spring by 10 mm. The extension caused by a mass of 0.5 kg is
20. m. B. m. C. m. D. m.
21. Surface tension of a liquid
22. reduces with increase in temperature.
23. reduces with decrease in temperature.
24. remains constant when the temperature changes.
25. increases with increase in temperature.
26. Which one of the following is a ductile material?
27. glass B. rubber C. plasticine D. copper
28. Paraffin moves up the wick of a lamp by a process called
29. transpiration. B. osmosis C. capillarity. D. surface tension.
30. An object is placed in front of a concave mirror at a distance less than the focal length. Which of the following properties is shown by the image formed?
31. Diminished B. Inverted C. Virtual D. Real
32. A piece of wood floating on water displaces 5 cm3 of water. This means that
33. the volume of the piece of wood is 5 cm-3.
34. the density of wood is the same as that of water.
35. the weight of the piece of wood is 5 N.
36. the mass of the piece of wood is 5 g.
37. The specific heat capacity of copper is 400 Jkg-1K-1. This means that
38. 400 J of heat raises the temperature of copper by 1 Kelvin.
39. 400 joules of heat is used to raise the temperature of copper by 1 kg.
40. 400 joules of heat is used to change the temperature of 1 kg of water by one Kelvin.
41. 400 joules of heat is the only standard heat that can melt copper.
42. Three forces act on a body as shown in the diagram below.

20 cm

30 cm

20 cm

10 N

1.2 N

**F**

If the body is in equilibrium, the value of **F** is

1. 10.0 N. B. 13.2 N C. 20.0 N. D. 26.2 N.
2. X – rays are
3. high speed electrons. C. longitudinal waves.
4. electromagnetic waves. D. helium particles.
5. Two boys stand at a distance of 300 m from a cliff and clap their hands at once. They hear the echo after 2 seconds. Determine the speed of sound in air.
6. 150 ms-1 B. 300 ms-1 C. 600 ms-1 D. 900 ms-1
7. Which of the following graphs shows a correct variation of pressure with volume of a fixed mass of a gas at constant temperature?

B

P

P

V

V

P

C D.

P

V

V

1. The rate of evaporation of a liquid increases when
2. temperature increases.
3. pressure increases.
4. surface area increases.
5. All (i), (ii) and (iii) B. Only (i) and (iii) C. Only (ii) and (iii) D. Only (i) and (ii)
6. Which of the following would be suitable to use in the construction of transformer core?
7. Lead B. Copper C. Soft iron D. Aluminium
8. Which of the following wave patterns is formed when a.c is applied on y-plates and the time base is switched off in an X-ray tube?
9. B. C.

1. Which of the following is **true** for photoelectric effect?
2. The higher the frequency of light the more the number of electrons ejected.
3. The higher the frequency of light the faster the rate of ejecting electrons.
4. The higher the frequency of light the fewer the electrons ejected.
5. The high frequency of light ejects larger electrons.
6. Which of the following are complementary colours?
7. Yellow and green. B. Magenta and red C. Cyan and blue. D. Yellow and blue
8. Total internal reflection occurs when
9. light is from air to glass.
10. light is from a denser medium to a less dense medium.
11. the angle of incidence in a denser medium exceeds critical angle.
12. (i) only B. (ii) only C. (iii) only D. (ii) and (iii) only
13. A ray of light travels from glass of refractive index 1.5 to air and grazes the boundary between glass and air. Determine the critical angle of glass.
14. 40.0° B. 41.8° C. 42.6° D. 45.0°
15. Which of the following is a secondary colour?
16. Red B. Blue C. Yellow D. Green
17. Which of the following is a **correct** order of energy interchanges which occur in a simple cell connected to a bulb using copper wires?
18. Electrical energy heat energy light energy.
19. Chemical energy electrical energy heat energy light energy.
20. Chemical energy heat energy light energy.
21. Heat energy electrical energy light energy.
22. Polarization in a simple cell can be minimised by
23. sulphuric acid. B. mercury. C. manganese dioxide. D. using clean electrodes.
24. A p.d of 20 V is applied across two resistors of 4 and 6 connected in parallel. Determine the current flowing through the 4 resistor.
25. 5.0 A B. 3.0 A C. 2.0 A D. 1.0 A
26. A uniform wire of uniform cross sectional area 210-3 m2 has a resistance of 3.6 . What will be the resistance in Ohms of a similar material wire of uniform cross sectional area of 310-3 m2?
27. B. C. D. .
28. The purpose of fuse in a circuit is to
29. protect the appliance.
30. limit current in a circuit.
31. stop the current when too much of it flows.
32. reduce the voltage to a safe value.
33. A cable that supplies electricity from an electric pole into the house contains
34. neutral wire. (ii) live wire (iii) earth wire
35. (i) only B. (i) and (ii) only C. (ii) and (iii) only D. (i), (ii) and (iii)
36. Which of the substances listed below is the poorest conductor of heat?
37. Air B. Glass C. Brick D. Water
38. An alloy is made up of 70 g of tin and 30 g of lead. Find the volume of the alloy in cm3. (Density of tin = 7.3 gcm-3, Density of lead = 11.3 gcm-3)
39. 4.8110-1 B. 5.38 100 C. 1.0310-1 D. 1.23101
40. A trolley of mass 1.5 kg moves with an acceleration of 2 ms-2 when pulled by an elastic cord. If the tension in the cord is 5 N, find the frictional force.
41. 2.0 N B. 2.5 N C. 3.0 N D. 8.0 N
42. An object of height 1 cm is placed 4 cm from a convex lens and forms an image five times the image of the object. Find the distance of the image from the lens.
43. 0.80 cm B. 1.25 cm C. 4.00 cm D. 20.00 cm
44. Which one of the following optical devices can be used as a solar concentrator?
45. Concave mirror B. Convex mirror C. Concave lens D. Glass prism
46. The force which holds the molecules of water together is called
47. gravity. B. adhesion C. cohesion D. electrostatic.
48. A kettle rated 1200 W contains 2 kg of water at 25°C. How long would it take to raise the temperature of water to 85°C if 80% of the electrical energy supplied is absorbed by water?
49. 5.60 minutes B. 7.00 minutes C. 8.02 minutes D. 8.75 minutes
50. A boy starts from rest and accelerates uniformly at a rate of 8 ms-2. Find the time it takes to cover a distance of 100 m.
51. 25.0 s B. 5.0 s C. 12.5 s D. 3.5 s
52. A beam of yellow light is incident on the red filter as shown in the figure below.

Screen

Yellow light

Magenta filter

Red filter

Which colour of light will be seen on the screen?

1. Yellow B. Green C. Blue D. Red

**SECTION B (40 MARKS)**

*Answer* ***all*** *questions in this section. All working* ***must*** *be shown clearly in the spaces provided.*

1. (a) Define **mass** of a body. (*01 mark*)

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(b) A block of wood weighs 480 g in air and 400 g in methylated spirit.

1. Calculate the apparent loss in mass. (*01 mark*)

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1. (a) What are **isotopes**? (*01 mark*)

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(b) In what way does the nucleus of uranium-235 differ from that of uranium-238? (*01 mark*)

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(c) Uranium-238 decays to leave 1 g in 24 days. If the half-life of uranium-238 is 8 days, find the original mass of uranium-238. (*02 marks*)

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43. (a) What are **girders**? (*01 mark*)

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(b) State **two** ways of reducing the notch effect from spreading in a piece of wood. (*01 mark*)

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(c) A mass of 10 kg is suspended on a spring. If the spring constant is 2500 Nm-1, find the extension in the spring. (*02 marks*)

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1. (a) What are **X-rays**? (*01 mark*)

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(b) The figure below shows an X-ray tube.

A

D

B

C

Name the parts labeled; (*02 marks*)

**A**.........................................................B ...........................................................

**C**.........................................................D ...........................................................

(c) Why is the X-ray tube evacuated? (*01 mark*)

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45. a) Define the terms;

1. **Mechanical advantage**. (*01 mark*)

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(b) (i) Draw a pulley system with a velocity ratio 4. (*01 mark*)

1. Explain how the efficiency of the system in (b)(i) can be increased. (*01 mrk*)

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46. (a) (i) Draw a diagram to show the effect of a narrow gap in the path of

plane waves. (*01 mark*)

(ii) Define **interference of waves**. (*01 mark*)

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(b) A radio wave has a wavelength of 300 m. Calculate the frequency of the radio wave if the speed of electromagnetic waves is 3.0108 ms-1. (*02 marks*)

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1. (a) (i) Define the term **force**. (*01 mark*)

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(ii) State any **two** effects of force on the body. *01 mark*)

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(b) A body of mass 200g rests on the table.

1. Draw a diagram and indicate the forces on the object and table. (*01 mark*)
2. Calculate the reaction of the table on the body. (*01 mark*)

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48 (a) What is a **step up transformer**? (*01 mark*)

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(b) The figure below shows a transformer.

Laminated soft iron ore

Secondary coil

Output voltage

Input voltage

Primary coil

If the number of turns in the primary coil and secondary coil respectively are 800 and 3200 and the input voltage is 240 V, calculate the output voltage. (*03 marks*)

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1. (a) State **two** conditions for total internal reflection. (*02 marks*)

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(b) A ray of light travelling from glass to air is refracted along the boundary **OY** as shown in the figure below.

Glass Air

**O**

**Y**

If the refractive index of glass is 1.52, find angle . (*02 marks*)

................................................................................................................................................................................................................................................................ (a) Name **one** factor that affects resistance of a material. (*01 mark*)

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(b)

2 V, 0.5

**P**

4

1

1. Name the device labeled **P**. (*01 mark*)

................................................................................................................................. Calculate the current flowing in the circuit above. (*02 marks*)

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