

535/1
PHYSICS
Paper 1
June 2022
2¼ hours

MWALIMU EXAMINATIONS BUREAU

UCE RESOURCE PRE-MOCK EXAMINATIONS – 2022

PHYSICS Paper 1 2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, centre/Index number and signature in the space above

Section A contains 40 objective type questions. You are required to write the correct answer A,B,C or D in the boxes at the right-hand side

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

Acceleration due to gravity	=	10 m s^{-2}
Specific heat capacity of water	=	$4200 \text{ J kg}^{-1} \text{ K}^{-1}$
Speed of sound in air	=	330 m s^{-1}
Speed of light	=	$3.0 \times 10^8 \text{ m s}^{-1}$

For Examiners use only

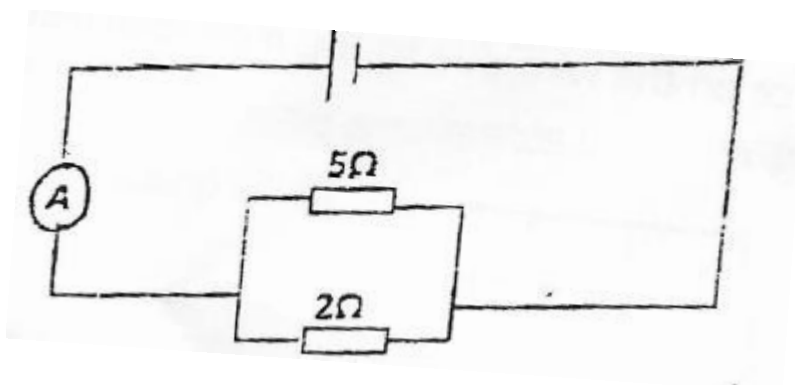
Qn41	Qn42	Qn43	Qn44	Qn45	Qn46	Qn47	Qn48	Qn49	Qn50	MCQ	Total

SECTION A

1. An object is dropped from an aeroplane and falls through a vertical of 500m before hitting the ground. The time it takes to hit the ground is;
- A. 10.0s
B. 25.0s
C. 50.0s
D. 100.0s
2. An object is placed between two plane mirrors inclined at an angle θ . If the number of images formed is 5, calculate θ .
- A. 36°
B. 60°
C. 72°
D. 90°
3. When a balloon is inflated with air and then released without tying the neck, it darts around because;
- A. of upthrust acting on it
B. of atmospheric pressure acting on it from all directions
C. the gravitational force opposing the air from coming out of the balloon
D. the reaction of the force with which air escapes and propels the balloon in the opposite direction
4. The resistance of a wire decreases when its;
- A. length is decreased
B. length is increased
C. temperature is increased
D. cross-sectional area is halved
5. An object is 15cm from a converging mirror forms an image 8cm tall at a distance of 30cm from the mirror. Calculate the height of the object.
- A. 4cm
B. 8cm
C. 16cm
D. 32cm
6. Refraction of light in the eye occurs at;
- A. The Lens only
B. The cornea only
C. The pupil
D. Both the cornea and the lens
7. Which of the following types of radiation has the longest wave length?
- A. Radio waves
B. Light
C. X-rays
D. Infra-red

8. Ice of mass 800g of 0°C absorbs $2.72 \times 10^5 \text{J}$ of heat on melting. The specific latent heat of fusion of ice is;
- A. $3.4 \times 10^5 \text{J kg}^{-1}$
B. $3.4 \times 10^2 \text{J kg}^{-1}$
C. $2.2 \times 10^5 \text{J kg}^{-1}$
D. $2.2 \times 10^8 \text{J kg}^{-1}$
9. Which of the following appliances consumes 5kwh of electric energy?
- A. A 100W lamp left on for 50 hours
B. A 250W drill used for 2 minutes
C. A 500W motor used for 10 minutes
D. A 250W television left on for 20 minutes
10. Local action in simple cells is caused by the presence of;
- A. Zinc amalgam coating of zinc plate
B. Manganese (IV) oxide around the copper plate
C. Hydrogen bubbles on copper plate
D. Impurities in zinc
11. An immersion heater rated at 100W supplies heat for 440s to 2 kg of paraffin oil. Assuming that the specific heat capacity of paraffin is 2200J/kg K and that no heat is lost to surrounding, what is the temperature rise of the paraffin in $^{\circ}\text{C}$?
- A. 1
B. 10
C. 20
D. 40
12. The direction of induced current of a conductor moving in a magnetic field can be predicted by applying.
- A. Faraday's law
B. Maxwell's screw rule
C. Fleming's left hand rule
D. Fleming's right hand rule
13. A negatively charged rod is brought close to the cap of an uncharged gold leaf electroscope. Which of the following is true?
- A. The divergence of the leaf will increase
B. The divergence of the leaf will decrease
C. The leaf will remain un-diverged
D. The leaf diverges
14. A set of Christmas tree light consists of identical lamps connected in parallel to a 240V mains supply. What is the voltage across each lamp?
- A. 12V
B. 240V
C. 20V
D. 4800V

15. Calculate the current in the 2-resistor given the ammeter reading is 2.8A.

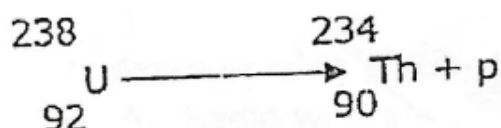


- A. 0.5A
B. 0.8A
C. 2.0A
D. 2.8A

16. A man stands in two cliffs and fires a riffle. He hears the first echo after 2 seconds and the second echo 1.5 seconds after the first echo, calculate the distance in metres between the two cliffs.

- A. 9.08×10^2
B. 9.43×10^1
C. 6.08×10^2
D. 5.78×10^2

17. Uranium 238 decays according to the equation shown below. Particle P is likely to be;

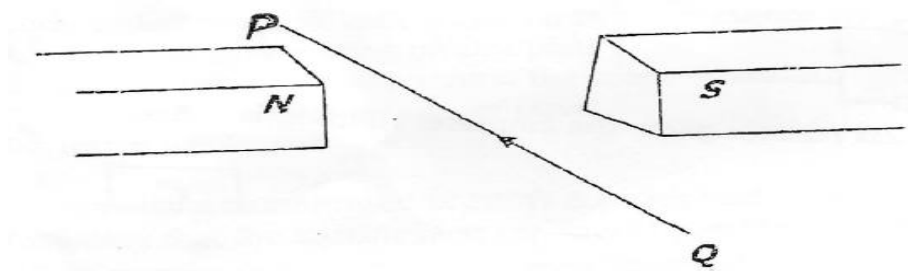


- A. A proton
B. An alpha particle.
C. A beta particle
D. A neutron

18. A gas at 27°C expands from a volume of 5m^3 to 15m^3 at constant pressure. The final temperature of the gas is;

- A. 627°C
B. 500°C
C. 737°C
D. 934°C

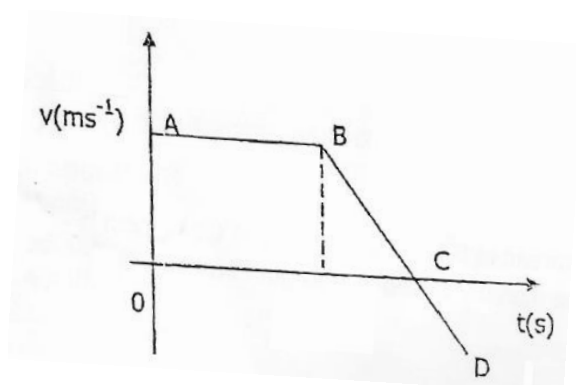
19. A wire carries a current horizontally between two opposite poles of two bar magnets as shown below. The direction of the force on the wire due to the magnetic field is;



- A. From N to S
B. From S to N
C. Vertically upwards
D. Vertically Downwards
20. An electric motor is a device which converts;
A. Mechanical energy into electrical energy
B. Heat Energy into electrical energy
C. Electrical energy into heat only
D. Electrical energy into mechanical energy and heat
21. A uniform beam of weight 20N is pivoted at the 10cm mark and balances horizontally when a force of 5N is hung at the zero mark, Find the length of the beam
A. 0.5cm
B. 2.5cm
C. 22.5cm
D. 25.0cm
22. Which one of the following radiations cannot be deflected by a magnetic field?
A. Alpha
B. Beta
C. Gamma
D. Electrons
23. A radioactive substance has a half-life of 24 days. How many days would it take for 16g of the substance of decay to 2g
A. 24 days
B. 12 days
C. 36 days
D. 72 days
24. A body of mass 10kg accelerates uniformly from rest to a velocity of 20ms^{-1} in 5s. Find the force acting on it
A. 2.5N
B. 4.0N
C. 10.0N
D. 40.0N
25. Which of the following causes bar magnets to lose their magnetism?
(i) Heating them
(ii) Hammering them
(iii) Breaking them into pieces
A. (i) only
B. (i) and (ii) only
C. (i) and (iii) only
D. (i), (ii) and (iii)

26. Sound waves travel a distance of 48cm in 8s. if the distance between two successive compressions is 3.0 cm, Find the frequency of the waves.
- A. 0.5Hz.
B. 2.0Hz.
C. 18.0Hz.
D. 128.0Hz.
27. It is easier to undo a tight-fitting nut from a bolt if the handle of the spanner is longer because the;
- A. Effort applied becomes bigger
B. Turning effect becomes bigger
C. Anticlockwise moments will balance clockwise moments
D. Effort applied becomes equal to the load
28. A heater rated 2KW was used to keep a liquid boiling in a vessel. During a period of 50 seconds, the mass of the liquid decreased by 0.05kg. Assuming that all the heat energy supplied was given to the liquid, the specific latent heat of vaporization of the liquid in Jkg^{-1} is?
- A. 2×10^0
B. 8×10^2
C. 2×10^3
D. 2×10^6
29. A balloon of weight 8000N and volume 1000m^3 is held to the ground by a rope. What is the tension in the rope if the air is of density 1.2kgm^{-3} ?
- A. 1200N
B. 6800N
C. 4000N
D. 12000N
30. What is the distance covered by a car if its velocity reduces from 30ms^{-1} to 20m^{-1} in 5 seconds.
- A. 25m
B. 50m
C. 125m
D. 250m
31. Concrete is useful in structural construction because it is stronger under
- (i) Compressive forces
(ii) Tensile forces
(iii) Torsion forces
- A. (i) only
B. (ii) only
C. (iii) only
D. (i) and (iii) only
32. When wo musical notes of nearly the same frequency are simultaneously struck the result will be;
- A. Beats
B. Echoes
C. Resonance
D. Reverberation

33. A solid volume 400cm^3 has a mass of 3.2kg . What is the density of the solid in kgm^{-3} ?
 A. 8
 B. 125
 C. 800
 D. 8000
34. Which one of the statements below is false?
 A. Electrons have mass
 B. Electrons have negative charge
 C. Electrons have positive charge
 D. Electrons can be deflected by magnetic fields
35. The length of mercury thread at 0°C is 5cm and at 100°C its length is 25cm . What is the temperature when the mercury thread is of length 20cm ?
 A. 60°C
 B. 75°C
 C. 80°C
 D. 300°C .
36. Which of the following will act as the input terminals of a CRO if we wish to study an alternating current?
 A. Cathode
 B. Anode
 C. X-plates
 D. Y-plates
37. In a resonance tube experiment, first resonance occurred at a depth of 25cm . What is the correct estimate of the wave length of sound?
 A. 6.25cm
 B. 13.2cm
 C. 25.0cm
 D. 100.0cm
38. A rectangular block has dimensions $1.0\text{m} \times 1.5\text{m} \times 2.0\text{m}$. If the density of the block is 3gcm^{-3} , find its mass in kg .
 A. 9.0×10^{-3}
 B. 1.0×10^{-3}
 C. 9.0×10^0
 D. 9.0×10^3
39. Cathode rays are;
 A. Electromagnetic waves
 B. Streams of X-rays
 C. Protons emitted by a hot cathode
 D. Streams of electrons moving at a high speed
40. The graph below shows the motion of a car. What is happening to the car between points AB?



- A. Accelerating
- B. Decelerating
- C. At rest
- D. At constant velocity



SECTION B

41. (a) State Boyle's law for gases (01 mark)

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(b) State two precautions necessary in an experiment to verify Boyle's law to be successful (01 marks)

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(c) At 27°C the volume of air in a cylinder was 50ml. What will be the volume if the pressure is doubled at the same temperature? (01 marks)

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42(a) Define the term power of a lens (01 mark)

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(i) State two uses of lenses (01 mark)

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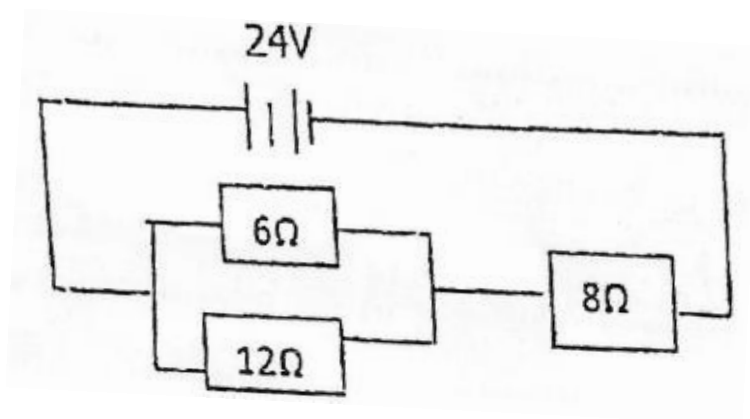
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- (b) In the space below draw a sketch ray diagram to show how a convex lens can give a magnified real image of an object. (02marks)

43.(a) State Ohm's law (01 mark)

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- (b) A p.d of 24V from a battery is supplied to the network of resistors as shown



- (i) What is the total resistance of the resistors above (02 mark)

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- (ii) What is the current in the 8Ω resistor? (01 mark)

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44.(a) (i) Define surface tension of a liquid (01 mark)

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(ii) Give two factors that affect surface tension of a liquid (01 mark)

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(b) The lower ends of two capillary tubes are respectively placed below the surface of water and mercury each placed in a beaker. State and explain what is observed in each case.

(02marks)

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45. (a) What is meant by a uniformly accelerated motion? (01 mark)

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(b) A trolley moving with a velocity of 10ms^{-1} for 6 seconds is brought to rest by application of a force in 4 seconds.

(i) Sketch a velocity-time graph of the motion in the space below.

(01mark)

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(ii) Find the total distance travelled by the trolley (01mark)

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46. (a) Define potential energy (02marks)

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(b) A stone of mass 100kg is released from rest and falls through a height of 20m.

(i) Find its velocity just before it hits the ground (02marks)

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(ii) State the energy changes from the time it is just about to hit the ground
(01 mark)

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47.(a) (i) State the principle of transmission of pressure in fluid (01mark)

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(ii) Give one assumption on which the principle is based (01mark)

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(b) The piston of a motor car brake system has an area of $2.0 \times 10^{-2} \text{ cm}^2$. Calculate the force that will transmit a pressure of $4.2 \times 10^2 \text{ Nm}^{-2}$ to the wheels of the car.
(02 marks)

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48.(a) (i) Define the term wave front as applied to wave motion (01 mark)

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(ii) State two properties of electromagnetic waves (01 mark)

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- (b) The wave length of a television wave is 0.3km. Calculate its frequency. (02 marks)

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- 49.(a) What is meant by half-life of a radioactive nuclide? (01 mark)

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- (b) Radium – 226 has a half-life of 1600 years.

- (i) What fraction remains after 4800 years (02marks)

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- (ii) Give any two uses of radioactivity (02 marks)

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- 50.(a) (i)What is a neutral point? (01 mark)

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- (ii) The diagram below shows a straight wire carrying current vertically downwards into the plane of the paper placed near a bar magnet. Sketch the magnetic field pattern around the wire and the magnet. (03 marks)



END