STUDENT'S NAME: ……

SCHOOL NAME: …… INDEX NUMBER ……

535/1
Physics
(Theory)
Paper 1
July/Aug. 2022
2 ¼ hours

AITEL JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

(THEORY)

Paper 1

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Write your name, school, and index number clearly in the spaces above.
Section **A** *contains* **40** *objective type of questions; you are to write the correct answer,* **A**, **B**, **C** *or* **D** *against each question in the box on the right-hand side of each page.*
Section B contains 10 structured questions. Answers must be written in the spaces provided on the question paper.
Mathematical tables, slide rules and silent non-programmable calculators may be used.

Acceleration due to gravity, = $10\ ms^{-2}$
Specific heat capacity of water = $4200\ J\ kg^{-1}\ K^{-1}$
Specific latent heat of steam = $2{,}260{,}00kJ\ kg^{-1}$

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

Turn Over

SECTION A

1. The following are fundamental quantities except
   A. Mass C. Volume
   B. Time D. Length

2. The most suitable instrument for measuring internal diameter of a bicycle spoke is;
   A. Rule C. Micrometer screw gauge
   B. Vernier caliper D. Measuring cylinder

3. A block and tackle system has three pulleys in the fixed block and two pulleys in the movable block. Calculate the effort needed to raise a load of 250N using the system if its efficiency is 80%.
   A. 62.5N B. 100.0N
   C. 250.0N D. 312.5N

4. A ticker timer is connected to the main supply of frequency 60Hz. Find the time it takes to print three consecutive dots.
   A. 120s B. 90s C. 0.03s D. 0.017s

5. What is the frequency of a swinging pendulum if it makes 5 complete swings in 4 seconds?
   A. 1.56Hz B. 1.25Hz
   C. 0.80 Hz D. 0.64Hz

6. The process of using a material of low thermal conductivity to prevent heat loss is called
   A. cooling B. Lagging
   C. absorption D. contraction

7. Which of the following sets consist of scalar quantities only?
   A. Temperature, distance, volume, time
   B. Displacement, velocity, momentum, force
   C. Distance, velocity, volume, momentum
   D. Displacement, temperature, force, time

8. A force of 5.0N causes an extension of 2.0cm on a spring. What extension is caused by a force of 8.0N?
   A. 3.2 cm B. 12.5cm
   C. 20.0 cm D. 80.0 cm

9. Which of the following is the correct difference between hard x-rays and soft x-rays?

	Hard x-rays	Soft x-rays
A	Low frequency	High frequency
B	Short wavelength	Long wavelength
C	Low velocity	High velocity
D	Low penetrating power	High penetrating power

10. A girder under tension is called a

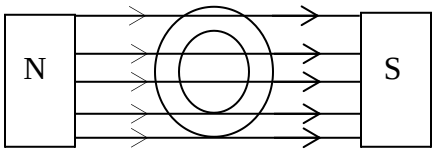
A. tie B. beam
C. strut D. Pillar

11. Which of the following is a unit of power?

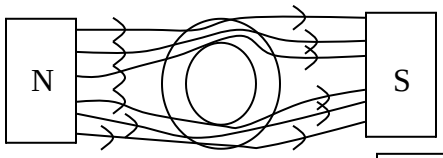
A. Ws^{-1} B. Nms^{-1}
C. $Kgms^{-1}$ D. MHz

12. Which of the following shows the correct magnetic field when a soft iron ring is placed between opposite poles of two magnets?

A



B



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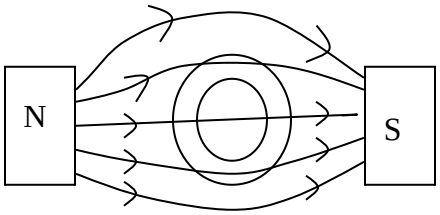

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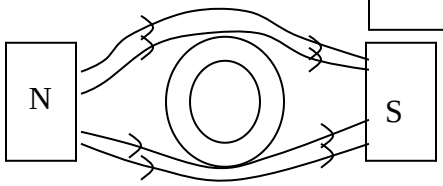
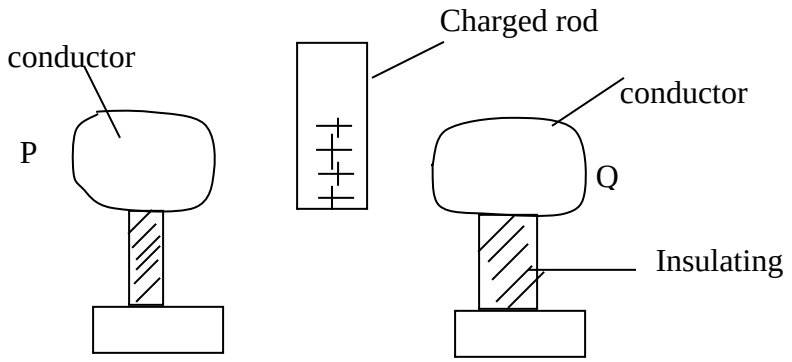


13. The spreading of waves around obstacles or as they pass through small holes is

A. Interference
B. Refraction
C. Diffraction
D. Reflection

14. Figure 3 shows two identical conductors resting on insulating stands and a positively charged rod is brought between them. Which of the following shows the possible charges at ends P and Q?

15.



	P	Q
A	Negative	Positive
B	Positive	Negative
C	Positive	Positive
D	negative	negative

16. Which of the following materials is a good conductor of electricity?

A. Graphite B. Sulphur

C. Diamond D. Phosphorous

17. The following mirror(s) can produce an image which is the same size as the object:

(i) Convex mirror

(ii) Concave mirror

(iii) Plane mirror

A. (i) only C. (i) and (iii) only

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

18. The transformer cores are laminated to

A. Reduce eddy currents

B. Decrease the resistance of the coils

C. Determine the energy lost by the coils

D. Distribute the voltage output equally within the transformer

19. Forces of 4N, 6N, 9N and 18N act on an object O as shown in figure 4. Calculate the magnitude of the resultant force on O.

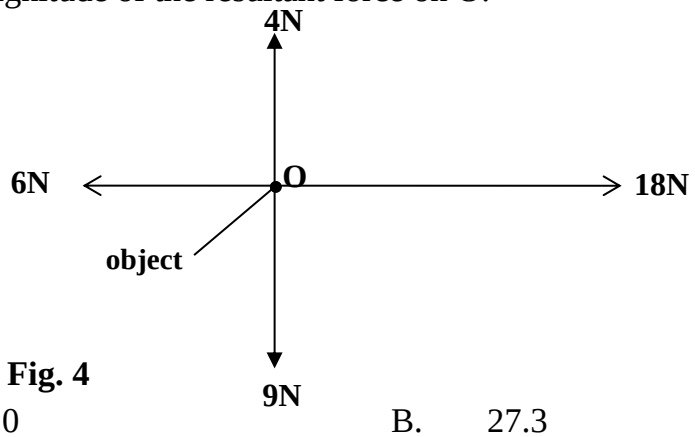


Fig. 4

A. 37.0 B. 27.3
C. 17.0 D. 13.0

20. The image formed by a pinhole camera is always
    (i) Real
    (ii) Inverted
    (iii) Diminished

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

21. Irregular reflection takes place when
    (i) A parallel beam is reflected as a parallel beam
    (ii) A parallel beam falls on a rough surface
    (iii) A parallel beam is reflected in all directions

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

22. The initial and final meter readings, after one month of electricity supplied is 18,500 kWh and 19,000kWh respectively. Calculate the cost of power consumed if each unit costs 800/=

A. Sh $\frac{500}{800}$ C. Shs 500 x 800

B. Shs $\frac{37500}{500}$ D. Sh 37500 x 500

23. The following are applications of capillarity except
A. Drying of the wet body by a towel
B. Movement of water up the tree trunks to leaves
C. Fuel moving up in wicks of stoves or lamps
D. Small insects being able to walk on water

24. The cooling system of a refrigerator extracts 0.7KW of heat. How long will it take to convert 500g 0f water at 20^0C to ice at 0^0C?

A. 100s C. 200s

B. $300s$ $D\ .400s$

25. Calculate the power expended when a body of mass 2.5kg is lifted through a height of 12 metres in 5 seconds.

A. $2.5\times10\times12\times5$

B. $\frac{2.5\times10\times12}{5}$

C. $\frac{2.5\times5\times12}{10}$

D. $\frac{2.5\times10\times5}{12}$

26. Figure 5 shows a 3.0V battery of negligible internal resistance connected to an ammeter and two resistors of 3Ω and 6Ω which are in parallel. Determine the ammeter reading.

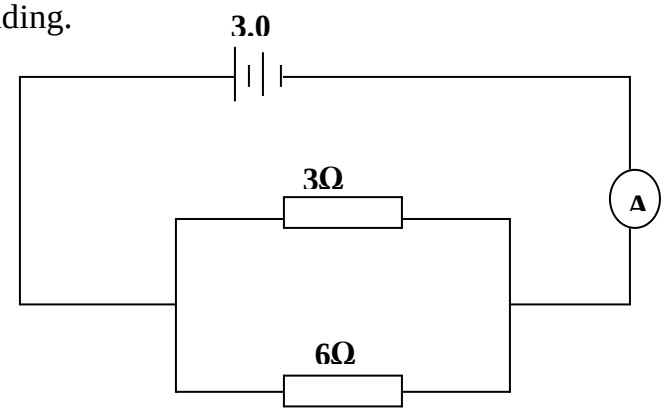


Fig 5

C. 1.50A B. 1.00A 0.67 A D. 0.33A

27. $^{238}_{92}Y$ is an isotope of $^{234}_{b}Y$. Find the number of neutrons in $^{234}_{b}Y$

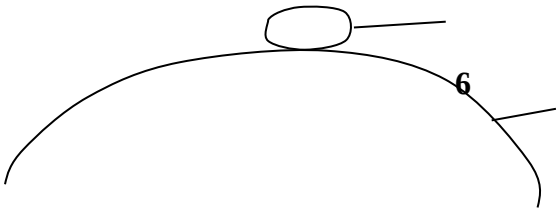
A. 4

B. 92

C. 140

D. 142

28. Fig 6



ball

Hemispherical bowl

Figure 6 shows a ball resting on an inverted hemispherical bowl.
State the kind of equilibrium demonstrated.

A. Neutral equilibrium
B. Stable equilibrium
C. Unusual equilibrium
D. Unstable equilibrium

29. A vibrator in a ripple tank vibrates at 5Hz. If the distance between 10 successive waves is 37.8cm, calculate the wavelength of the wave.

A. 4.20m
B. 3.78m
C. 0.04m
D. 0.02m

30. Magnetic field lines are close at the poles because

A. Attraction between them is greatest
B. Repulsion between them is greatest
C. Magnetic field is greatest at the poles
D. They can easily be contracted.

31. The volume of a fixed mass of a gas at 27^0c and pressure 740 mmHg is $200cm^3$.

What is its volume at a temperature of 77^0c and pressure of 780 mmHg?

A. $\frac{740 \times 350 \times 780}{300 \times 200}$
B. $\frac{780 \times 200 \times 350}{300 \times 740}$
C. $\frac{740 \times 200 \times 350}{300 \times 780}$
D. $\frac{780 \times 350 \times 300}{200 \times 740}$

32. A radioactive nuclide has a half life of 90 seconds. How long will it take a sixteenth of a given sample to remain undecayed?

A. 270 seconds
B. 144 seconds
C. 45 seconds
D. 30 seconds

33. The following is /are properties of alpha particles.

(i) They have high penetrating power
(ii) They have high ionising power

(iii) They are deflected by both magnetic and electric fields.

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

Turn Over

34. Which of the following energy changes take place in a bicycle dynamo?
A. Electrical to sound
B. Kinetic to heat
C. Kinetic to electrical
D. Potential to electrical

35. A girl 1.6m tall stands 4m away from a pinhole and 4.2m from the screen of a pinhole camera. What is the length of the camera?
A. 1.52m
B. 6.34m
C. 1.68m
D. 10.50m

36. A body falling through a fluid moves with uniform velocity when
A. the resultant force on it is zero
B. the resultant force is equal to gravitational force
C. the resultant force is equal to up thrust force
D. the resultant force is equal to viscous force

37. A bullet of mass 80g is fired from a gun of mass 5kg with a velocity of 400 ms^{-1}. Calculate the recoil velocity of the gun.
A. $\frac{80 \times 1000}{400 \times 5}$
B. $\frac{1000 \times 5 \times 80}{4000}$
C. $\frac{1000 \times 400}{80 \times 5}$
D. $\frac{89}{100} \times \frac{400}{5}$

38. A milliammeter has a resistance of 5Ω and full-scale deflection of 15 milliampere. Find the value of resistance which can be connected to the milliammeter to make it register up to 15V.
A. 75Ω
B. 225Ω
C. 995Ω
D. 1492.5Ω

39. Volatile liquids have
A. low saturation vapour pressure
B. high melting points
C. low boiling points
D. low density

40. Which of the following best describes the distance between two successive crests in wave motion?

A. Periodic time
B. Wave length
C. Wave front
D. frequency

SECTION B

41. (a) State **Hooke's law** (1 mark)

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(b) When a body of 50kg stands at the end of a spring board, it is depressed by 15cm. What would be its depression when a man of 80kg stands at the same end of the spring board? (2 marks)

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42. (a) Distinguish between **weight** and **pressure**. (2 marks)

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(b) Fig 8

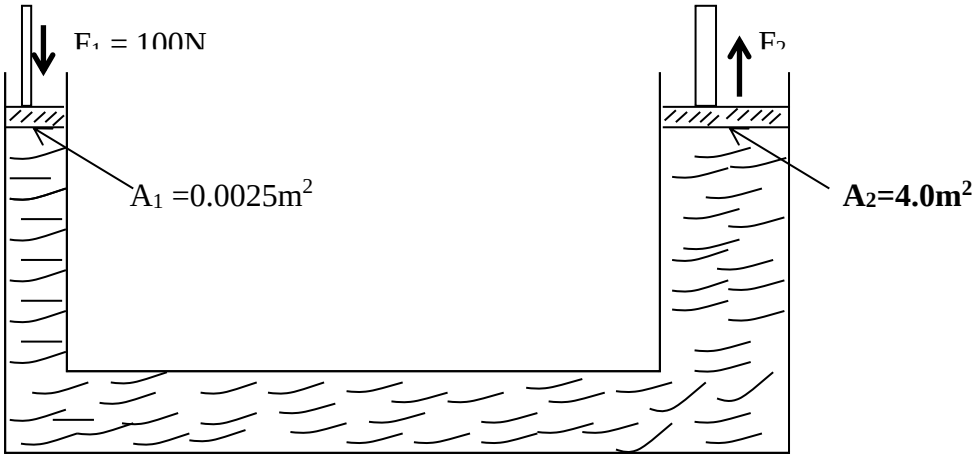

Figure 8 shows a vessel completely enclosed with a liquid.

Determine the value of F_2. (1 ½ marks)

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_____

_____

_____

(c) State one application of the principle demonstrated in Q. 42(b) (½ mark)

_____

43. (a) What is meant by **latent heat of vaporization**?

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(b) A sample of boiling water takes, 20 minutes to vaporise completely when an immersion heater of power 500W is inserted in it. Calculate the mass of the water. (3 marks)

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_____

_____

44. (a) Distinguish between **music** and noise (2 marks)

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_____

(b) A musical note has a frequency of 2.4kHz. What is the wave length of the note if the velocity of sound at a particular place is 320 ms^{-1}?

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45. (a) What is meant by

(i) **A strong material**. (1 mark)

_____

_____

_____

_____

(ii) **A brittle material**? (1 mark)

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(b) (i) Draw a labelled sketch diagram to show how a beam of wood with cracks on one side can be placed across a stream to make a simple bridge. (1 mark)

(ii) Briefly explain, what happens to the bridge if (b) (i) when a heavy person is passing on it. (1 mark)

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46. (a) Define the term **Surface tension** (1 mark)

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_____

_____

b) State any **two** applications of surface tension. (2marks)

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_____

c) Mention **one** way in which surface tension can be reduced. (1 mark)

_____

47. Fig. 9

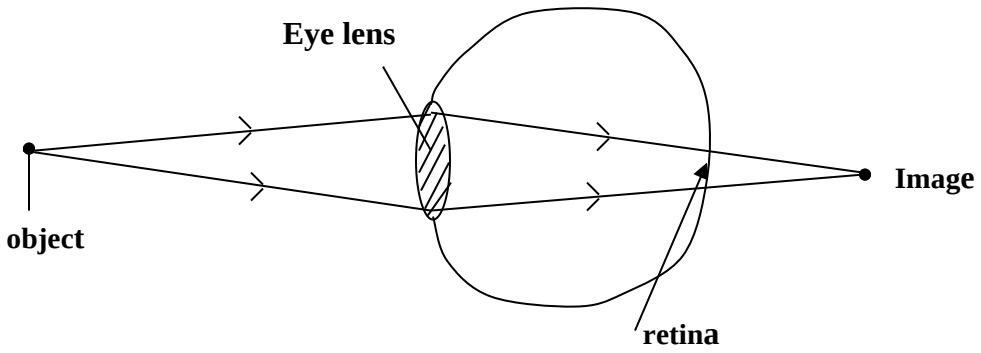

Figure 9 shows how light from a near object is refracted through a human eye.

(i) Explain whether the eye has a clear vision of the object. (1 ½ marks)

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_____

(ii) How can the light in (a) (i) be made to come to focus on the retina?

(1 ½ marks)

_____

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48. (a) What is meant by **a magnetic material**? (1 mark)

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_____

(b) Briefly explain what happens when one pole of a bar magnet is brought near iron fillings. (2 marks)

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(c) State **two** applications of electromagnets. (1 mark)

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49. (a) Fig 10

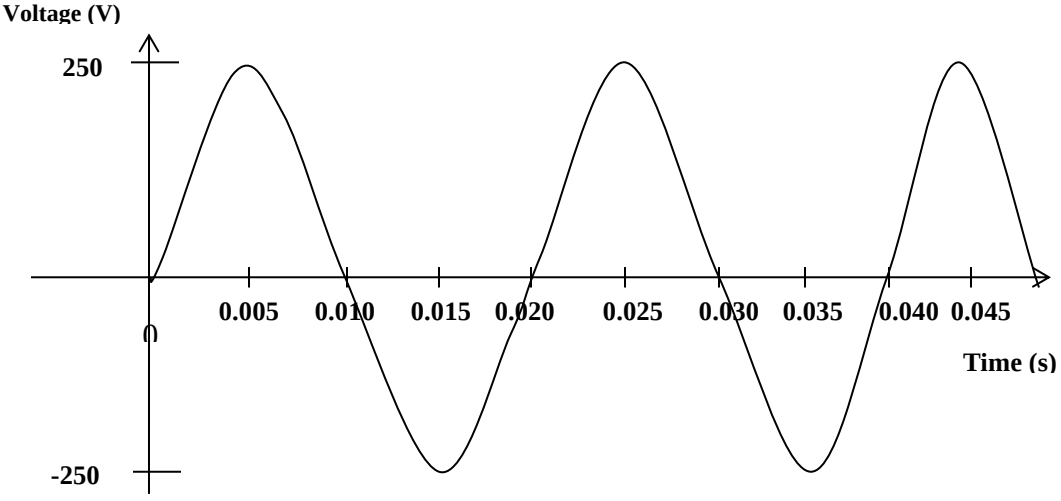

Figure 10 shows the variation of voltage with time of an alternating source. From the graph, determine

(i) the peak value (1 mark)

_____

_____

(ii) the root mean square. (1 mark)

_____

_____

(iii) The frequency of the source. (1 mark)

_____

_____

_____

(b) State **one** advantage of a.c over d.c power transmission. (1 mark)

_____

_____

50. (a) What is meant by **thermionic emission**? (1 mark)

(b) (i) Mention any **two** differences between **cathode rays** and **X- rays**. (2 marks)

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(ii) Mention any **two** industrial uses of X-rays (1 mark)

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END