

NAME:..... INDEX NO.....

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535/1
PHYSICS
Paper 1
2 ¼ Minutes



**KAYUNGA SECONDARY SCHOOLS HEAD TEACHERS AND PRINCIPALS
 ASSOCIATION (KASSHPA)
 UGANDA CERTIFICATE OF EDUCATION
 JOINT MOCK EXAMS
 JULY / AUGUST 2017
 PHYSICS
 PAPER ONE
 2 HOURS 15 MINUTES**

INSTRUCTION TO CANDIDATES

- Write your name, signature, centre and index number clearly in the space above.
- Section A contains 40 objectives type 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, slide rules and silent non-programmable calculators may be used.
- Acceleration due to gravity = 10ms^{-2}
- Specific heat capacity of water = $4200\text{Jkg}^{-1}\text{K}^{-1}$

For Examiner's Use Only

Q41	Q.42	Q.43	Q.44	Q.45	Q.46	Q.47	Q.48	Q.49	Q.50	MCQ	TOTAL

SECTION A (40 MARKS)
Answer all questions in this section.

1. When a car is suddenly brought to rest, a passenger jerks forward because of
 - A. inertia
 - B. friction
 - C. gravity
 - D. momentum

2. The direction of induced current in 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

3. The mode of transfer of heat between the boiler and the storage tank of a hot water supply system is
 - A. radiation
 - B. conduction
 - C. convection
 - D. evaporation

4. A rectangular block of tin is 0.5m long and 0.01m thick. Find the width of the block if its mass and density are 0.45kg and 9000kgm^{-3} respectively.
 - A. $0.005 \times 0.45 \times 9000\text{m}$
 - B. $\frac{0.45}{9000 \times 0.005} \text{ m}$
 - C. $\frac{0.005}{0.45 \times 9000} \text{ m}$
 - D. $\frac{0.45 \times 0.005}{9000} \text{ m}$

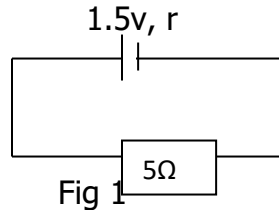
5. A charged conductor usually loses charge gradually by a process called
 - A. induction
 - B. insulation
 - C. conduction
 - D. leakage

6. In a four-stroke combustion engine, the correct order of strokes is
 - A. compression \longrightarrow power \longrightarrow exhaust \longrightarrow induction
 - B. exhaust \longrightarrow compression \longrightarrow power \longrightarrow induction
 - C. induction \longrightarrow compression \longrightarrow power \longrightarrow exhaust
 - D. induction \longrightarrow power \longrightarrow compression \longrightarrow exhaust

7. A cork held under water rises to the surface when released because the upthrust on it is
 - A. greater than the weight
 - B. less than the weight

- C. equal to the weight
- D. equal to the weight of water displaced.

8. A cell of e.m.f 1.5V and internal resistance, r , is connected in series with a 5Ω resistor as shown in Figure.1.



If the current in the circuit is 0.25A, find r .

- A. 1Ω
 - B. 6Ω
 - C. 11Ω
 - D. 16Ω
9. The width of a meter rule is accurately measured by a
- A. micrometer screw gauge
 - B. vernier caliper
 - C. tape measure
 - D. metre rule
10. A body moves with uniform acceleration if
- A. its momentum remains constant.
 - B. it covers equal distances in equal times
 - C. the velocity changes by equal amount in equal times
 - D. the net force on the body is zero
11. Which one of the following statements is true when a stone of mass 2kg and that of 1kg are released from the same point at the same time?
- A. Both masses will hit the ground at the same time
 - B. The 2kg mass will hit the ground first
 - C. The 1kg mass will hit the ground first
 - D. They fall with different speeds
12. Force is given by the product of
- A. displacement and velocity
 - B. displacement and mass
 - C. acceleration and mass
 - D. velocity and mass
13. A cyclist travelling at a constant acceleration of 2 ms^{-2} passes through two points A and B in a straight line. If the speed at A is 10ms^{-1} and the points are 75m apart, find the speed at B.
- A. 15.8ms^{-1}

- B. 17.3ms^{-1}
- C. 20.0ms^{-1}
- D. 400.0ms^{-1}

14. A vibrator produces a sound wave that travels 900m in 3s. If the wave length of the wave is 10m, find the frequency of the vibrator.

- A. 30Hz
- B. 270Hz
- C. 300Hz
- D. 3000Hz

15. The distance between the fixed points on a mercury in glass thermometer is 25cm. What is the temperature in degrees celcius if the mercury thread is 8cm long above the lower fixed point?

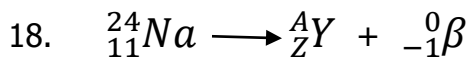
- A. $\frac{100 \times 25}{8}$
- B. $\frac{100 \times 8}{25}$
- C. $\frac{25 \times 8}{100}$
- D. $\frac{100}{25 \times 8}$

16. A solid, Q, silks deeper in liquid, N, than in liquid, M, because the

- A. upthrust on the solid is greater in liquid N than in M.
- B. density of liquid M is greater than that of N
- C. density of liquid N is greater than that of M.
- D. surface tension of liquid N is less than that of M.

17. A crane raises a mass of 500kg vertically upwards at a speed of 10ms^{-1} . Find the power developed.

- A. 5.0×10^0
- B. 5.0×10^1
- C. 5.0×10^2
- D. 5.0×10^4



A radioisotope of sodium atom decays by emission of a beta particle as shown in the equation above. Find the values of A and Z.

- | | | |
|----|----|----|
| | A | Z |
| A. | 24 | 10 |
| B. | 24 | 11 |
| C. | 24 | 12 |
| D. | 24 | 13 |

19. The strength of a material depends on the

- (i) nature of the material
- (ii) diameter of the material
- (iii) length of the material

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

20. Figure 2 shows a wave produced in a string.

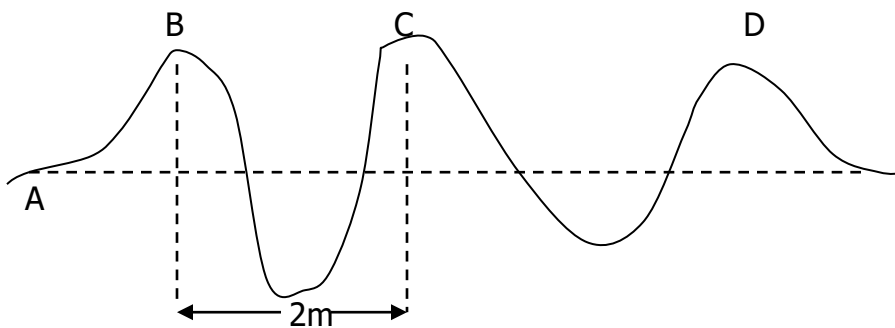
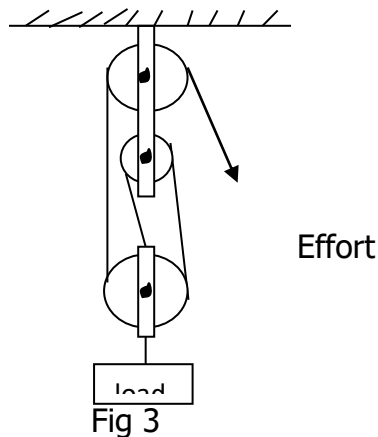


Fig. 2

If the frequency is 2 Hz, at what speed do the waves travel along the string?

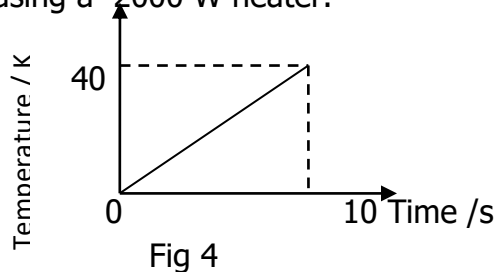
- A. $0.5, s^{-1}$
- B. $1.0ms^{-1}$
- C. $2.0ms^{-1}$
- D. $4.0ms^{-1}$

21. What is the velocity ratio of the pulley system shown in Figure 3?



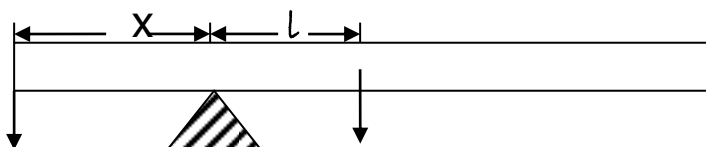
- A. 1
- B. 2
- C. 3

- D. 4
22. When a crystal of potassium permanganate is carefully placed at the bottom of a beaker containing water, it spreads uniformly in the water after some days due to
- A. diffusion
 - B. capillarity
 - C. surface tension
 - D. Brownian motion
-
23. The electromagnetic radiation which causes the body temperature to rise is called
- A. X – rays
 - B. gamma rays
 - C. infra red
 - D. ultra violet
-
24. Figure 4 shows a graph of the temperature rise with time when a body of mass 4kg is heated using a 2000 W heater.



Find its specific heat capacity in $\text{Jkg}^{-1} \text{K}^{-1}$.

- A. $\frac{40 \times 10}{2000 \times 4}$
 - B. $\frac{2000 \times 20}{40 \times 4}$
 - C. $\frac{2000 \times 4}{40 \times 10}$
 - D. $\frac{40 \times 4}{2000 \times 10}$
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25. Power loss due to eddy currents in the core of a transformer can be minimized by.
- A. laminating the core
 - B. using thick copper wires in the windings
 - C. using a soft iron core
 - D. winding the secondary coil on top of the primary coil
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26. Soap is used to wash clothes because it
- A. increases capillarity in the clothes
 - B. reduces capillarity in the clothes
 - C. increases surface tension allowing water to penetrate the dirt easily.
 - D. reduces surface tension allowing water to penetrate the dirt easily.
-
27. Figure 5 shows a uniform beam in equilibrium when a force R acts on it at one end.



R

W

Fig. 5

Find the weight, W , of the beam.

A. $\frac{X}{Rl}$

C. $\frac{Rl}{X}$

B. $\frac{l}{RX}$

D. $\frac{RX}{l}$

28. A brass rod which is positively charged is brought near a positively charged gold leaf electroscope. The divergence of the leaf will

- A. increase
- B. decrease
- C. not change
- D. increase slightly and fall back

29. A concave mirror can be used as a shaving mirror because when an object is placed between the focus and the pole, the image formed is

- A. magnified, virtual and erect
- B. magnified, real and inverted
- C. diminished, real and inverted
- D. diminished, virtual and erect.

30. Forces of 60N, 10N, 40N and 10N act on a body as shown in Figure 6.

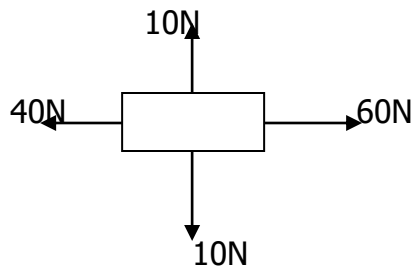


Fig. 6

In which direction does the body move?

- A. Upwards
- B. Downwards
- C. To the left
- D. To the right

31. A current of 10A flows through an electric heater for 1h. If 7.2×10^6 J of electrical energy is converted to heat, find the p.d. across the heater.

- A. 2.0×10^2 V
- B. 2.0×10^3 V

- C. $1.2 \times 10^4\text{V}$
- D. $7.2 \times 10^5\text{V}$.

32. A mass of 0.2 kg produces an extension of 8cm in a spring. The force required to produce an extension of 6 cm is

- A. 0.75N
- B. 1.50N
- C. 2.70N
- D. 24.00N

33. Figure 7 shows a beam of electrons incident mid way between two charged metal plates

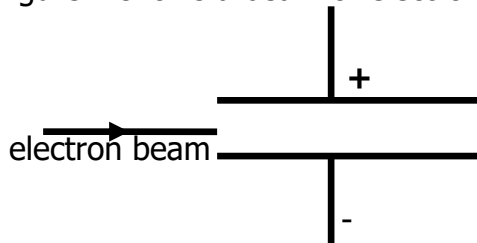


Fig 7

Which of the following is correct? The beam

- A. is deflected toward the positive plate
- B. is deflected towards the negative plates
- C. moves perpendicular to the plates
- D. passes through the plates undeflected.

34. The result of rubbing a glass rod with silk and separating them is

- A. a negative charge on the rod and an equal positive charge on the silk
- B. Equal amounts of negative charge on both
- C. a positive charge on the rod and an equal negative charge on the silk.
- D. no charge on both the rod and the silk

35. If the cost of one unit of electrical energy is sh. 150, find the cost of using two 75W lamps for 2 hours

- A. sh. 0.30
- B. sh. 4.00
- C. sh. 22.50
- D. sh. 45.00

36. The half life of a radioactive element is 2 minutes. What fraction of the initial mass is left after 8 minutes?

- A. $\frac{1}{2}$
- B. $\frac{1}{4}$
- C. $\frac{1}{8}$
- D. $\frac{1}{16}$

37. Light energy is reflected when,

- A. angle of incidence is greater than angle of reflection
- B. angle of incidence is equal to angle of refraction.
- C. angle of incidence is equal to angle of reflection
- D. the normal at the point of incidence makes the same angle as the incident ray.

38. In a dry cell, manganese (iv) oxide is used to

- A. reduce the p.d across it

- B. double its resistance
 - C. increase its resistance
 - D. keep the p.d. constant.
39. A longitudinal wave is one in which the
- A. direction of propagation is parallel to that of the vibration producing it.
 - B. particles of the medium through which it travels move opposite to the direction of propagation
 - C. direction of propagation is perpendicular to that of the vibration producing it
 - D. particles of the medium through which it travels move together with it
40. An object is placed 30cm in front of a plane mirror. If the mirror is moved a distance of 6cm towards the object, find the distance between the object and its image.
- A. 24.cm
 - B. 36cm
 - C. 48cm
 - D. 60cm

SECTION B (40 MARKS)

Attempt all questions in this section

All working must be shown in the space provided.

41. (a) What is meant by
- (i) mass number, (1 mark)
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.....
 - (ii) atomic number (1 mark)
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- (b) Name any two radiations emitted by radioactive substances (2 marks)
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42. (a) What is an echo? (1 mark)
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- (b) An echo sounder on a boat sends down a pulse through the water and receives its echo 0.9 seconds later. If the velocity of sound in the water is 1450s^{-1} , Calculate the water depth. (2 marks)
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- (c) State any two factors which determine the frequency of a vibrating string. (1 mark)
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43. (a) State the law of floatation. (1 mark)

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(b) A cube of sides 0.1m floats in a liquid of density 1200kgm^{-3} while a third of it submerged. Find the density of the material of the cube. (3 marks)

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44. (a) Name two physical properties which change with temperature. (1 mark)

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(b) Convert a temperature of 25°C to Kelvin (1 mark)

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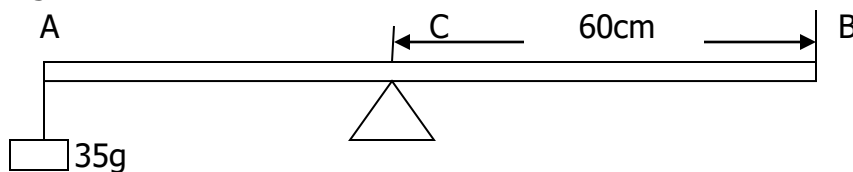
(c) Explain why evaporation causes cooling. (2 marks)

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45. (a) State the principle of moments (1 mark)

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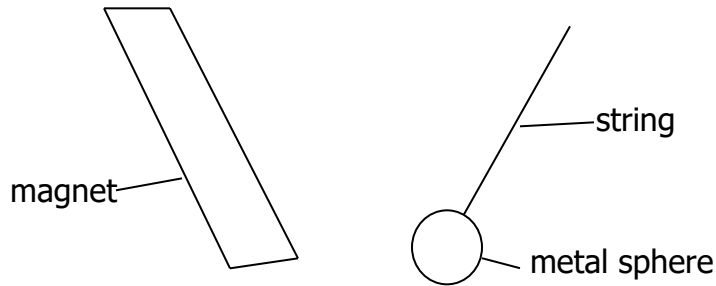
(b) In the diagram below a uniform metre rule AB balances at C when a mass at A is 35g.



Calculate the mass of the metre rule. (3 marks)

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46. (a) The diagram below shows a metal sphere of weight W in equilibrium.



Complete the diagram to show the forces acting on the metal sphere. (2 marks)

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(b) State two effects that a force can have on a body. (2 marks)

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47. (a) What is meant by refractive index? (1 marks)

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(b) (i) Define focal length of a converging lens. (1 mark)

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(ii) With the help of a ray diagram show how a converging lens can be used as a magnifying glass. (2 marks)

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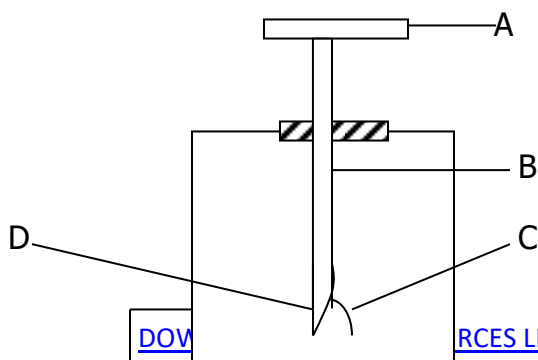
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48. (a) The diagram below shows the main parts of an electroscope .



Name them (2 marks)

A.....

B.....

C.....

D.....

(b) State two uses of an electroscopes (2 marks)

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49. (a) Sketch a p.d against current graph for an ohmic conductor. (1 mark)

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(b) Give one example of a non – ohmic conductor. (1 mark)

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(c) Find the voltage across a 3Ω resistor if a current of 4A passes through it. (2 marks)

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50. (a) What is a soft magnetic material? (1 mark)

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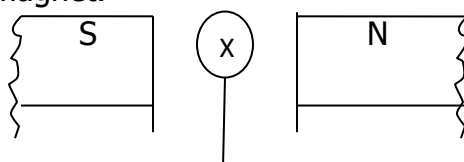
(b) State two ways in which a bar magnet can be demagnetized.(1 mark)

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(c) The diagram below shows a conductor carrying current between the poles of a permanent magnet.



Conductor carrying a current

Sketch on the diagram the resultant magnetic field pattern.

(2 marks)

END