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535/1
PHYSICS
PAPER 1
July/August 2018
$2^{1}/_{4}$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 1

2 hours 15 minutes

STRUCTIONS TO CANDIDATES:

This paper has **two** *sections;* **A** *and* **B.**

Section **A** *contains* **40** *objective type questions. You are required to write the correct answer* **A, B, C** *or* **D** *in the box on the right hand side of the question.*

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

Assume where necessary:

- *acceleration due to gravity, g* = $10ms^{-2}$
- *specific heat capacity of water* = $4200\ J\ kg^{-1}K^{-1}$
- *specific heat capacity of copper* = $400\ J\ kg^{-1}K^{-1}$
- *density of water* = $1000kgm^{-3}$
- *density of mercury* = $13600kgm^{-3}$
- *speed of sound in air* = $340ms^{-1}$
- *specific latent heat of vaporization of water* = $2.3 \times 10^{6} J\ kg^{-1}$
- *Speed of light in Vacuum* = $3.0 \times 10^{8} ms^{-1}$
- *Refractive index of air* = 1
- *Specific latent heat of ice* = $336,000\ J\ kg^{-1}$

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

SECTION A (40 Marks)

Answer **all** questions in this section

1. The term given to physical quantities used to define other quantities is…
   A. scalar quantities.
   B. vector quantities.
   C. fundamental quantities.
   D. derived quantities.

2. Which of the following observations about a liquid in a narrow tube shows that cohesion is greater than adhesion?
   (i) Concave meniscus. (ii) Convex meniscus.
   (iii) Capillary fall. (iv) Capillary rise.
   A. (i) and (iii) only.
   B. (i) and (iv) only.
   C. (ii), (iii) and (iv) only.
   D. (i), (ii), (iii) and (iv).

3. On which of the following factors does lowness and highness of sound depend?
   A. Frequency.
   B. Amplitude.
   C. Intensity.
   D. Velocity.

4. A sinusoidal wave display can be observed on a cathode ray oscilloscope when
   A. a cell is connected to the Y-plates with the time base off.
   B. a low frequency alternating voltage is connected to the Y-plates with time base on.
   C. a high frequency alternating voltage is connected to the Y-plates with time base on.
   D. a cell is connected to the Y-plates, with time base on.

5. A force of 10N acts on a body and produces an acceleration of $2ms^{-2}$. If the density of the body is $2.5kgm^{-3}$, find the volume occupied by the body.
   A. $50m^3$
   B. $8.0m^3$
   C. $4.0m^3$
   D. $2.0m^3$

6. **Figure 1** below shows a 6V battery P of internal resistance 0.5Ω connected in series with a 3V battery Q of internal resistance **r** Ω and in series with a 3Ω resistor. If the current flowing in the circuit is 0.6A, find the value of **r**.

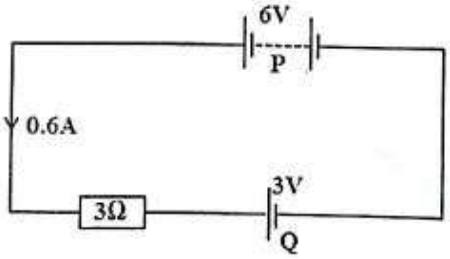


Figure 1

   A. 0.5 Ω
   B. 1.5 Ω
   C. 2.9 Ω
   D. 11.0 Ω

Which of the following arrangements of colours of white light shows increasing frequency?

A. Yellow, Green, Indigo and Violet.
B. Green, Yellow, Indigo and Violet.
C. Violet, Indigo, Green and Yellow.
D. Indigo, Violet, Yellow and Green.

The temperature at which a body has minimum internal energy is called

A. thermodynamic temperature.
B. lower fixed point.
C. absolute zero.
D. final steady temperature.

What is observed when a wave travels from shallow to deep water in a ripple tank?

(i) Increase in frequency.
(ii) Increase in wave length.
(iii) Increase in speed.
(iv) Maintaining a constant direction.

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

When a body is lifted from the ground to a given height, its gravitational potential energy

A. increases while mass is not changed.
B. is not changed while the mass increases.
C. and mass are both not changed.
D. decreases while mass is not changed.

The movement of molecules from a region of high concentration to a region of low concentration is faster in

A. liquids.
B. gases.
C. solids.
D. vacuum.

One of the following options is correct about a positively charged cloud passing over a building onto which a lightening conductor is connected.

A. Positive charges are induced on the spikes.
B. Both positive and negative charges are induced on the spikes.
C. Negative charges are induced on the spikes.
D. Positive charges are conducted to the ground.

All virtual images formed by mirrors and lenses in optics are always

A. magnified.
B. diminished.
C. inverted.
D. upright.

14. **Figure 2** below shows an inclined plane.

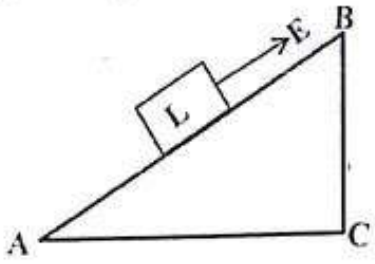


Figure 2

The distance moved by the load and distance moved by effort is:

	Load distance	Effort distance
A	AB	BC
B	AB	AC
C	BC	AB
D	AC	AB

15. A gas of mass 2kg and density 1.6kg is heated from 250K to 400K at constant pressure. What is the density of the gas at 400K?
A. $0.4kgm^{-3}$
B. $1.0kgm^{-3}$
C. $1.5kgm^{-3}$
D. $2.0kgm^{-3}$

16.

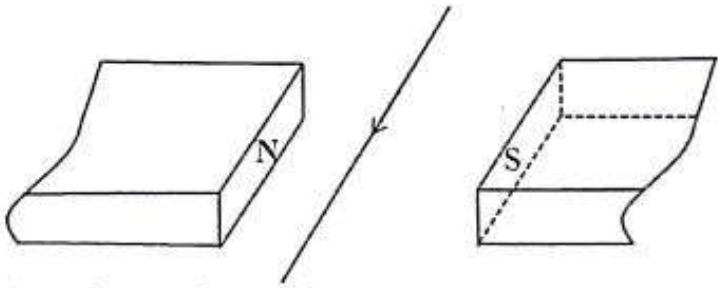


Figure 3

Figure 3 above shows a wire carrying a current between poles of a magnet. It is observed that the wire moves
A. upwards according to Fleming's left hand rule.
B. upwards according to Fleming's right hand rule.
C. downwards according to Fleming's left hand rule.
D. downwards according to Fleming's right hand rule.

17. A uniform beam of length 100cm is acted upon by a downward force of 4N at the 0cm mark and an upward force of 5N at the 100cm mark as shown in **figure 4.**
Find the weight of the beam.

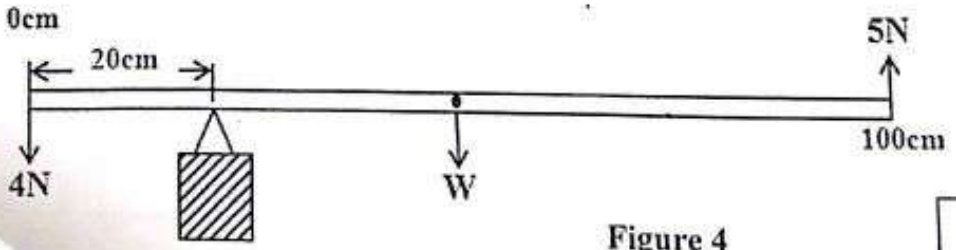


Figure 4

A. 8.0N
B. 10.0N
C. 15.0N
D. 16.0N

Which of the following is/are true about ultra-violet light of the electromagnetic spectrum

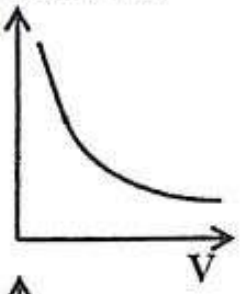
(i) has longer wavelength than visible light.
(ii) has same speed as normal light.
(iii) has shorter wavelength than visible light.
(iv) is faster than normal light.

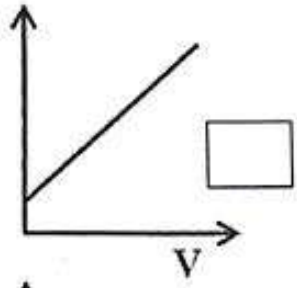
A. (i) only.
B. (i) and (ii) only.
C. (ii) and (iii) only.
D. (i), (ii) and (iii) only.

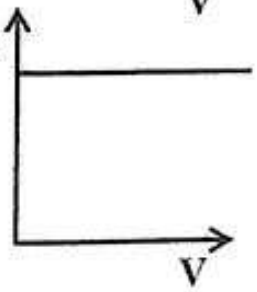
Find the angle of inclination between two mirrors which produce **five** images from an object placed in front of them.

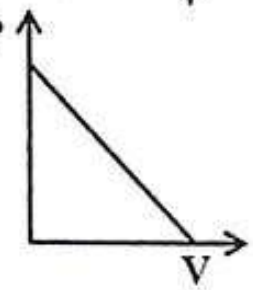
A. 80^0
B. 60^0
C. 20^0
D. 15^0

The correct graph for variation of pressure against volume for a fixed mass of gas at constant temperature is:.

A.


B.


C.


D.


A cone resting on its tip is said to be unstable because it has a

A. wide base and high centre of gravity.
B. wide base and low centre of gravity.
C. narrow base and low centre of gravity.
D. narrow base and high centre of gravity.

The level of cooking oil in a burette fell from $16cm^3$ to $15cm^3$ after dropping on the surface of water in a beaker sprinkled with lycopodium powder.
The oil drop formed a patch of radius 2.1cm. Find the thickness of the oil molecule.

A. 0.011cm
B. 0.002cm
C. 0.072cm
D. 0.130cm

23. For an ideal single movable pulley system the
    A. effort is equal to the load.
    B. effort is less than the load.
    C. effort is greater than the load.
    D. mechanical advantage is one.

24. The main function of the condenser lens in a slide projector is to
    A. collect light and focus it onto the slide.
    B. reflect back the light rays that would otherwise be wasted.
    C. focus the image on the screen.
    D. receive the image on the slide.

25. The rate at which electric charge flows past a point in a circuit is measured in…
    A. watts.
    B. volts.
    C. coulombs.
    D. amperes.

26. Pure water at 0^0C is heated up to 10^0C. What happens to its volume and density between this interval?

	Density	Volume
A.	Increases to a maximum at 4^0C and decreases again.	Decreases to a minimum at 4^0C and increases again.
B.	Decreases to a minimum at 4^0C and increases again.	Increases to a maximum at 4^0C and becomes constant.
C.	Constant up to 4^0C and increases again.	Increases to a maximum at 4^0C and then becomes constant.
D.	Decreases up to a minimum at 4^0C and becomes constant.	Constant up to 4^0C and then decreases.

27. An object is placed at a distance of 40cm from a convex lens of power 5 dioptres. Which of the following are properties of the image formed?

A	Real	Inverted	Diminished
B	Virtual	Erect	Same size as object
C	Real	Inverted	Same size as object
D	Real	Erect	Same size as object

28. When two coherent sound waves overlap they produce regions of loud sound and regions of soft sound. This is due to
    A. destructive and constructive interference respectively.
    B. constructive and destructive interference respectively.
    C. reflection and refraction of sound respectively.
    D. refraction and reflection of sound respectively.

29. Magnetic flux leakage in a practical transformer can be minimised by
    A. laminating the soft iron core.
    B. using soft iron material to make the core.
    C. using thick copper wires.
    D. winding the secondary coil over the primary coil.

30.

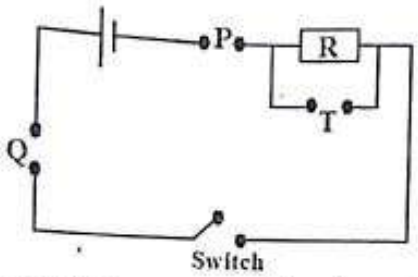


Figure 5

Electrical appliances P, Q and T are arranged as shown in **figure 5** above. Find their correct arrangement in the circuit.

	P	Q	T
A	Rheostat	Ammeter	Voltmeter
B	Rheostat	Voltmeter	Ammeter
C	Ammeter	Voltmeter	Rheostat
D	Voltmeter	Rheostat	Voltmeter

31. Find the speed of a sound wave if the distance between one of its compressions and its successive rarefaction is 0.15m and having a period of $2x10^{-3}$seconds.
A. $330ms^{-1}$
B. $750ms^{-2}$
C. $150ms^{-1}$
D. $300ms^{-1}$

32. The propulsion of a rocket and movement of a jet works on the principle/law which states that;
A. energy can neither be created nor destroyed.
B. action and reaction are equal but opposite.
C. force always opposes motion.
D. energy is always conserved in a closed loop.

33. The lower fixed point of a thermometer is 22.0cm and upper fixed point is 62cm. What is the length of mercury thread at temperature of 50^0C?
A. 240cm
B. 35.5cm
C. 40.0cm
D. 42.0cm

34. Which of the following statements is/are true about a discharged lead acid cell?
(i) both plates slowly change to lead sulphate.
(ii) the acid becomes more dilute.
(iii) the density of the acid increases.
(iv) the density of the acid falls.
A. (i) and (ii) only
B. (ii) and (iii) only
C. (i), (ii) and (iv) only.
D. (iii) and (iv) only.

Turn Over

35.

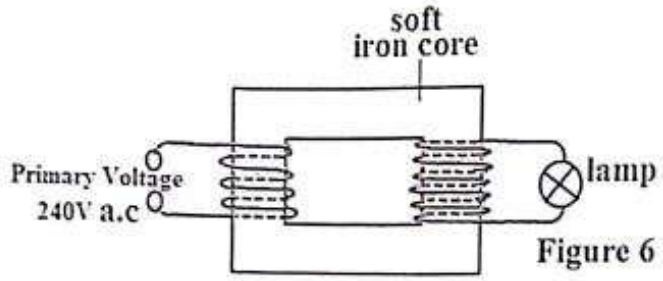


Figure 6

Figure 6 above shows a transformer having 500 turns in a primary coil. Calculate the number of turns in the secondary coil if an output current of 0.1A flows through a lamp of 120Ω.

A. 20turns.
B. 25turns.
C. 100turns.
D. 2500turns.

36. A spherical body of diameter 10cm has a mass of 78g. What is its density in gcm^{-3}?

A. $\frac{78}{10\pi}$

B. $\frac{78}{4\pi \times 26}$

C. $\frac{78}{4\pi \times 125}$

D. $\frac{78 \times 3}{4\pi \times 125}$

37. 1kg of solid wax at 60^0C is melted by a 100W heater in 3 minutes and 20 seconds. Calculate the specific latent heat of fusion of solid wax

A. 1.0×10^4 Jkg^{-1}
B. 2.0×10^4 Jkg^{-1}
C. 3.0×10^4 Jkg^{-1}
D. 6.0×10^4 Jkg^{-1}

38. What happens to an occupant in a lift moving freely downwards under the influence of gravitational force?

A. The occupant becomes weightless.
B. His apparent weight becomes greater than his weight in air.
C. His apparent weight becomes equal to his weight.
D. His apparent weight is less than his weight in air.

39. The number of field lines per cubic meter area is

A. magnetic field.
B. flux leakage.
C. magnetic flux.
D. flux linkage.

40. Coherent sources of waves are waves of

A. the same frequency with a constant phase difference.
B. the same velocity with different amplitudes.
C. the same frequency with different phase difference.
D. decreasing frequency and increasing phase difference.

SECTION B (40 Marks)

Answer **all** questions in this section.

41. (a) What is meant by term **"maximum pressure"**? *(01 mark)*

.....

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(b) A pile of crates of soda have dimensions 100cm by 200cm by 300cm while resting on a floor. If the average density of the pile is $40kgm^{-3}$, find the maximum pressure the crates exert on the floor. *(03 marks)*

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42. (a) Define the term refractive index. *(01 mark)*

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.....

(b) A ray of light is incident on a glass block of refractive index 1.49 as shown in **figure 7** below.

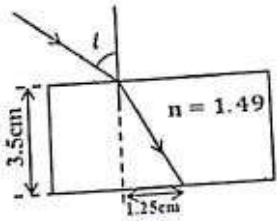

Figure 7

Calculate the angle of incidence ***i***. *(03 marks)*

.....

.....

.....

43. (a) State Hooke's law. *(01 mark)*

.....

.....

(b) Sketch a graph of **extension** against **load** for a ductile material up to a point beyond the elastic limit. *(02 marks)*

(c) State **two** factors which affect Tensile stress of an elastic material. *(01 mark)*

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44. (a) Define an **Ohm.** *(01 mark)*

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(b) State **two** examples of non-Ohmic conductors. *(01 mark)*

.....

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(c)

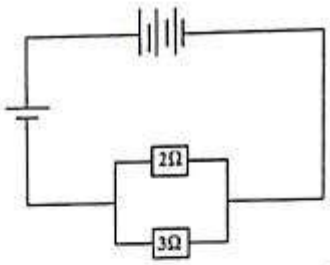

Figure 8

Four cells each of emf 1.5V and negligible internal resistance are connected in series across two resistors of 2Ω and 3Ω in parallel as shown in **figure 8** above. Calculate the current supplied by the cells. *(02 marks)*

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45. (a) Define the following terms:

(i) Amplitude. *(01 mark)*

.....

.....

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

.....

.....

(b) **Figure 9** shows the profile of water wave.

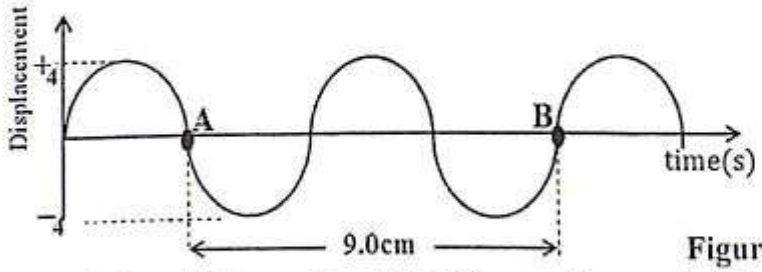

Figure 9

Given that the length between A and B is 9.0cm and the speed of the wave is $18ms^{-1}$, calculate its:

(i) wave length. *(01 mark)*

.....

.....

(ii) frequency. *(01 mark)*

.....

.....

46. (a) Distinguish between a **saturated** and an **unsaturated** vapour. *(02 marks)*

.....

.....

.....

(b) A heater of 1000W is placed in 0.5kg of ice at 0^0C. How long will it take to form water at 20^0C? *(02 marks)*

.....

.....

.....

47. (a) State Lenz's law. *(01 mark)*

.....

.....

(b) A moving coil galvanometer of resistance 5Ω has full range of current of $\mathbf{0-40mA}$. Find the resistance which can be connected in series with the galvanometer so as to measure a p. d of 10V. *(02 marks)*

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(c) State **two** ways of increasing the sensitivity of a moving coil galvanometer. *(01 mark)*

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48. (a) What is meant by the term **''thermionic emission''**? *(01 mark)*

.....

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(b) **Figure 10** shows a thermionic diode.

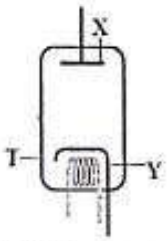

Figure 10

(i) Name the parts labeled **X, Y** and **T**. *(1½ marks)*

X .....

Y .....

T .....

(ii) State one use of the set up. *(0½ mark)*

.....

(c) A nuclide $^{226}_{88}X$ decays to nuclide $^{226}_{88}Y$ and finally to $^{226}_{87}Z$ by emitting radiations P and Q. State the radiations on P and Q.

P..... *(0½ mark)*

Q..... *(0½ mark)*

49. (a) Define a watt. *(01 mark)*

.....

.....

(b) A ball of mass 1 kg falls from a height of 20m above the ground and bounces to a new height of 4.05m. Calculate the change in momentum after the bouncing of the ball. *(03 marks)*

.....

.....

50. (a) State the law of electrostatics.

.....

.....

(b) A positively charged metallic ball is held in space inside a hollow conductor resting on the cap of a gold leaf electroscope as shown in **figure 11** below: *(01 mark)*

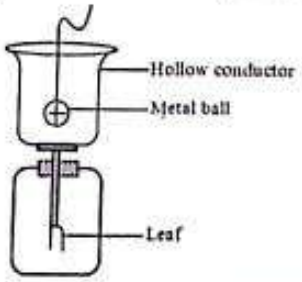

Figure 11

(i) Briefly explain what happens as the positively charged ball is lowered into the hollow conductor. *(02 marks)*

.....

.....

.....

(ii) State the charges acquired by the cap and the leaf when the metallic ball is made to touch the inner surface of the hollow container. *(01 mark)*

Cap.....

Leaf.....

- END -

Name..... Index No.....

School..... Signature .....

535/1
PHYSICS
PAPER 1
July/August 2017
2 1/4 hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 1

2hours 15 minutes

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- *Section* **B** *contains* **10** *structured questions. Answers to this section are to be written in the spaces provided on the question paper.*
- *Assume where necessary:*

- *acceleration due to gravity, g*	$= 10ms^{-2}$
- *specific heat capacity of water*	$= 4200\ J\ kg^{-1}k^{-1}$
- *specific heat capacity of copper*	$= 400\ J\ kg^{-1}k^{-1}$
- *density of water*	$= 1000kgm^{-3}$
- *density of mercury*	$= 13600kgm^{-3}$
- *speed of sound in air*	$= 340ms^{-1}$
- *specific latent heat of vaporization of water*	$= 2.3 \times 10^{6} J\ kg^{-1}$
- *Speed of light in Vacuum*	$= 3.0 \times 10^{8} ms^{-1}$
- *Refractiveindex of air*	$= 1$
- *Specific latent heat of ice*	$= 336{,}000 J\ kg^{-1}$

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 (40 Marks)

Answer **all** questions in this section

1. The product of mechanical advantage and effort of a machine is equivalent to
   A. work output.
   B. work input.
   C. effort.
   D. load.

2. When a body is thrown vertically upwards;
   (i) Its initial velocity is greater than zero.
   (ii) Its velocity at maximum height is zero.
   (iii) Its initial velocity upwards is zero.
   (iv) It moves with uniform velocity.
   A. (i) and (ii) only
   B. (i) and (iii) only
   C. (ii) and (iii) only
   D. (iii) and (iv) only

3. The freezing point of pure water can be lowered by
   A. decreasing pressure.
   B. addition of sugar.
   C. raising temperature.
   D. keeping water in a refrigerator.

4. A force of 4N is used to compress a spring by one fifth of its original length. If the force constant of the spring is $20Nm^{-1}$, calculate its original length.
   A. 0.2m
   B. 0.8m
   C. 1.0m
   D. 1.2m

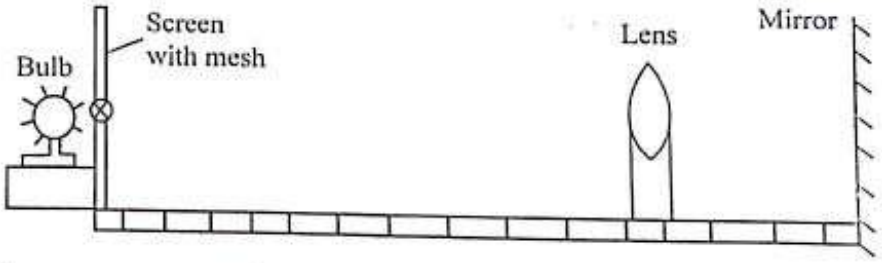
5. 

Figure 1

Figure 1 shows the arrangement used when determining the focal length of a convex lens. When the image of the mesh falls on the screen, the focal length is equal to:
   A. distance between the screen and the lens.
   B. distance between the mirror and the lens.
   C. distance between the mirror and the screen.
   D. half the distance between the screen and the lens.

6. A volt per ampere is equivalent to;
   A. watt.
   B. coulomb.
   C. joule.
   D. ohm.

7. Hysteresis in a transformer refers to the
   A. generation of heat in the copper wires.
   B. demagnetization and magnetization of the core.
   C. loss of magnetic flux.
   D. heating of the soft iron core.

8. Figure 2 shows plane ripples travelling from deep to shallow water. If the frequency of the wave is 5Hz, calculate the change in speed of the waves.

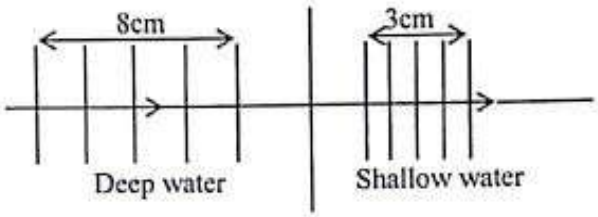


Figure 2

   A. $3.75cms^{-1}$
   B. $6.25cms^{-1}$
   C. $10.00cms^{-1}$
   D. $13.75cms^{-1}$

9. When cooking oil is accidentally poured on a cemented floor, it becomes difficult for one to walk on the floor. This is due to
   A. adhesion force between oil molecules and molecules of the feet being higher.
   B. higher cohesion force between the oil molecules and molecules of the feet.
   C. lower frictional force between the floor and the feet.
   D. oil being a viscous liquid.

10. When gamma rays are directed midway between two oppositely charged parallel metal plates, they are
   A. deflected towards the positive plate.
   B. deflected towards the negative plate.
   C. made to oscillate vertically between the plates.
   D. not affected by the plates

11. A soft iron rod P and steel rod Q in figure 3 below are attached to a permanent bar magnet and then dipped into iron fillings. The rods are then removed from the magnets.

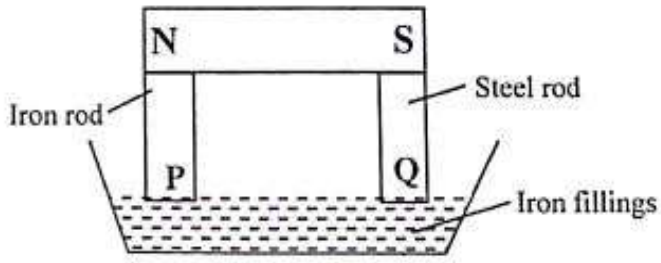


Figure 3

Which of the following statements will be true about P or Q?
   A. P will acquire more iron fillings and will retain more.
   B. P will acquire more iron fillings and will retain less.
   C. Q will acquire more iron fillings and will retain more.
   D. Q will acquire more iron fillings and will retain less.

12. A body of mass 50kg acted upon by a force of 800N accelerates from $0.5ms^{-1}$ to $8.5ms^{-1}$. How long does the acceleration take?
A. 2.0s
B. 1.0s
C. 0.5s
D. 0.2s

13. Which of the following is true about light travelling from glass to air?
A. Its wave length is directly proportional to its speed.
B. Its wave length is inversely proportional to its speed.
C. Its wave length decreases.
D. Its frequency decreases.

14. A lightning conductor has a high density of charge around its spikes so as to
A. allow smooth flow of charge from the cloud.
B. increase the charge on the clouds.
C. induce the same charge on the cloud.
D. ionise the surrounding air molecules.

15.

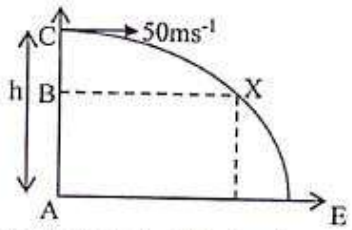


Figure 4

Figure 4 shows a body projected with a horizontal velocity of $50ms^{-1}$. Determine its acceleration at point X after travelling for 2s.
A. $10ms^{-2}$
B. $25ms^{-2}$
C. $50ms^{-2}$
D. $100ms^{-2}$

16. In rubbing two insulators P and Q together, P acquires a negative charge while Q acquires a positive charge, this means that during the rubbing process
A. Q gains electrons.
B. P gains protons.
C. P gains electrons.
D. Q gains protons.

17. A submarine of volume $6m^3$ floats with a third of its volume submerged in water of density of $1000kgm^{-3}$. Determine the mass of the submarine.
A. 1000kg.
B. 2000kg.
C. 3000kg.
D. 4000kg.

18. Which of the following can produce a cooling effect?
(i) Compression of a gas
(ii) Expansion of a gas
(iii) Evaporation of a liquid
A. (i), (ii) and (iii)
B. (i) and (iii) only
C. (ii) and (iii) only
D. (iii) only

19. When a solid is melting, its temperature does not change because
A. the latent heat has reduced to zero.
B. the molecules of the substance have stopped moving.
C. the temperature rise is exactly equal to the heat given out.
D. the heat supplied is used to weaken the bonding between molecules.

20. Which part of a lens camera controls the exposure time?
A. Shutter.
B. Film.
C. Lens cover.
D. Diaphragm.

21. A source of e.m.f of 20.0V and internal resistance 1.0Ω is connected to three resistors each of 2Ω as shown in figure 5 below.

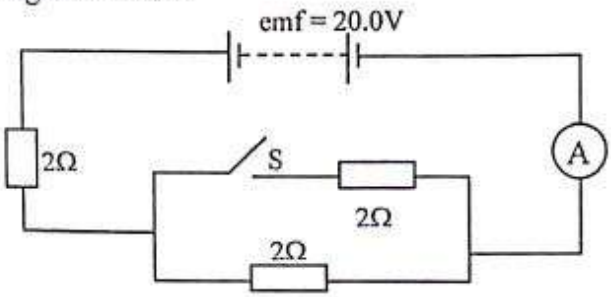


Figure 5

Determine the ammeter reading when switch S is closed
A. 2.9A
B. 3.3A
C. 4.0A
D. 5.0A

22. The half-life of a radioactive element is 14days. If the initial mass of a sample of the element is 32g, find the mass left after 1344 hours
A. 2g
B. 4g
C. 8g
D. 16g

23. A monochromatic ray of light is incident on a water to glass boundary as shown in figure 6 below.

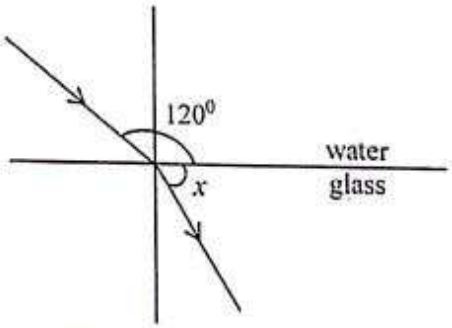


Figure 6

Given that the refractive indices of water and glass are 1.33 and 1.50 respectively, find the value of angle x.
A. 26.3°
B. 30°
C. 60°
D. 63.7°

24.

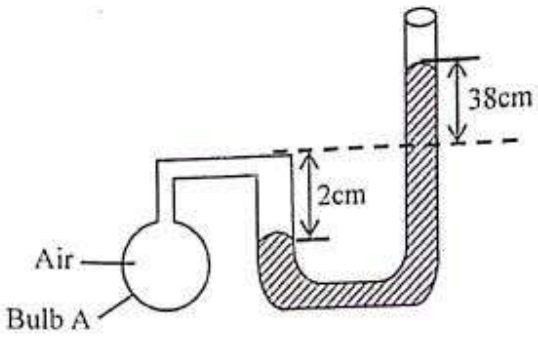


Figure 7

Figure 7 above shows a fixed mass of dry air trapped in bulb A. Calculate the total pressure of air given that atmospheric pressure is 76cmHg.

A. 36cmHg
B. 40cmHg
C. 116cmHg
D. 140cmHg

25. Which order of the following radiations is correct basing on their decreasing frequency.

A. Infrared, Yellow, Blue, Gamma rays.
B. Gamma rays , Blue, Yellow and Infra-red.
C. Blue, Yellow, Gamma rays and Infra-red.
D. Yellow, Gamma rays, Blue and Infra-red.

26. An immersion heater rated 3A, 240V is used to heat 100g of water. How long will it take to raise the temperature of water from 80°C to vapour at 100°C?

A. 11.7 seconds
B. 216.4 seconds
C. 313.9 seconds
D. 331.1 seconds

27. Figure 8 shows a displacement - time graph for a body under motion.

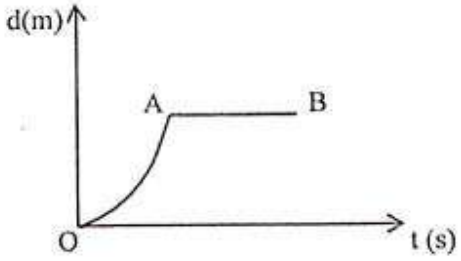


Figure 8

Describe the motion of the body between OA and AB.

	AO	AB
A	Constant acceleration	Constant velocity
B	Constant acceleration	Resting
C	Constant velocity	Constant acceleration
D	Constant displacement	Constant velocity

28. On which basis does a hydrometer operate?

A. Archimedes principle.
B. Pascal's principal.
C. Law of floatation.
D. Bernoulli's principle.

29. Certain atoms emit gamma rays because
A. their nuclei are unstable.
B. they contain protons only.
C. their nuclei emit electrons.
D. their nuclei contain protons and electrons.

30.

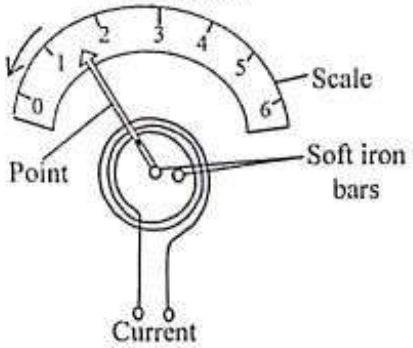


Figure 9

Figure 9 above shows a moving iron-meter. One of these statements is true about the set up when current flows through the coil.
A. The pointer is deflected over a uniform scale.
B. The repulsive force is smaller when the bars are closer.
C. The magnetic force of attraction is proportional to the square of the current.
D. The iron rods become magnetized with same polarity.

31. What happens when the crest of one wave over laps with the trough of another wave?
A. The wave experience constructive interference.
B. The waves are out of phase.
C. The amplitude of the wave becomes greater.
D. The waves are in one phase.

32. Substances which absorb ultra violet radiation and emit visible light are called
A. fluorescent substances.
B. luminescent substance.
C. translucent substances.
D. phosphorescent substances.

33.

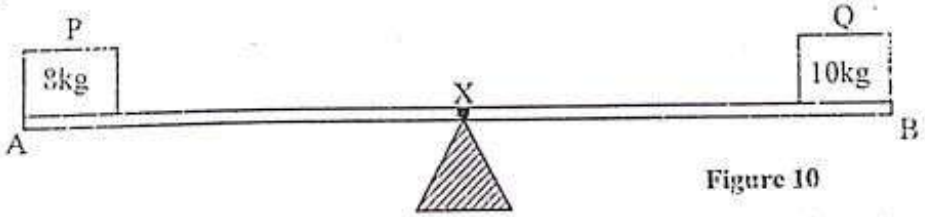


Figure 10

Two bodies P and Q of masses 8kg and 10kg respectively are placed at the ends of a uniform rod originally balancing at its centre as shown in figure 10.
If the rod is to be under mechanical horizontal equilibrium, then
A. distance AX should be decreased.
B. P should be placed at X.
C. distance AX should be increased.
D. distance BX should be increased.

34. An object dropped in a uniformly flowing water obstructs its flow. This effect is called
A. turbulence flow.
B. streamline flow.
C. Bernoulli's effect.
D. fluid flow.

35. A turning fork of frequency 0.45kHz is sounded above the open end of a closed tube. Find the length of the air column for the first overtone to occur.
(Speed of sound in air = $340ms^{-1}$)

A. 1.76m
B. 1.32m
C. 0.75m
D. 0.57m

36. Which of the following pairs gives a defect and its cause in a simple cell?

	Defect	Cause
A	Local action	Presence of zinc amalgam
B	Polarisation	Use dilute electrolysis
C	Polarisation	Formation of hydrogen bubbles
D	Local action	Adding oxidising agent

37. Which of the following statements is correct about self-demagnetization in a bar magnet?

A. The free poles of a magnet repel each other and gradually alter the alignment of the domain axes.
B. It happens when a magnet is stored by using magnetic keepers.
C. The molecular magnets lie in a closed loop with no free poles.
D. It happens when magnets are stored in pairs.

38.

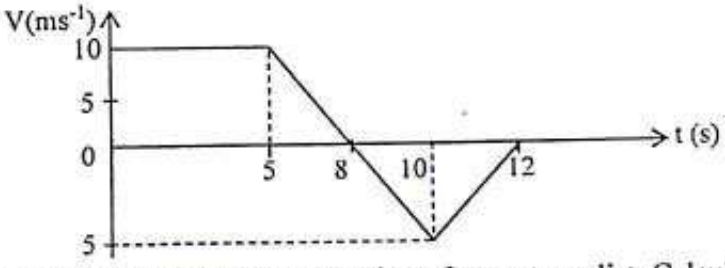


Figure 11

Figure 11 shows a velocity time graph of motion of a motorcyclist. Calculate the total displacement covered.

A. 85m
B. 75m
C. 65m
D. 55m

39. If the cost of one unit of electricity is shs.500 and the total cost of lighting two 75W lamps is shs.4,500, for how long will the lamps light?

A. 60 seconds
B. 60 minutes
C. 60 hours
D. 3600 seconds

40. Figure 12 below shows a source of heat **H** placed midway between two identical flasks p and q connected to the ends of a U – tube containing a liquid.

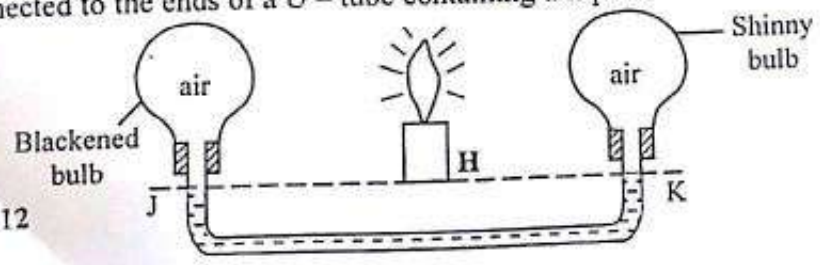


Figure 12

Which one of the following is a correct observation about the liquid level?

A. It rises in J and falls in K.
B. It falls in J and rises in K.
C. It remains the same in both J and K.
D. It falls in both J and K.

SECTION B (40 Marks)

Answer **all** questions in this section.

41. a) Define a pascal. (01 marks)

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b) A mountain climber holding a barometer in his hands, climbs from a height of 200m of the mountain up to its top. If the level of mercury in the barometer falls from 75cmHg to 74cmHg, find the height of the top a mountain from where he started. (03 marks)

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42. a) Define **uniform retardation?** (01 mark)

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b)

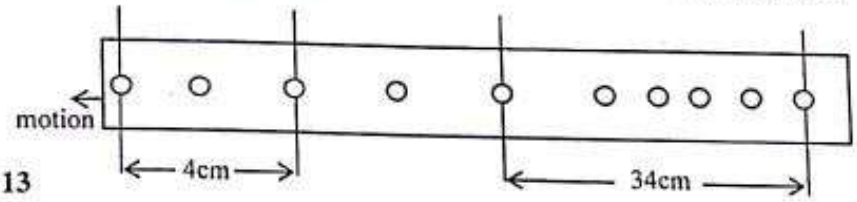

Figure 13

Figure 13 above shows dots made on a ticker tape pulled by a trolley through a timer of frequency 50Hz, calculate the acceleration of the tape. (03 marks)

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43. a) What is meant by term 'Gassing' in relation to the charging process of a lead acid accumulator? (01 mark)

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b) State any **two** ways of prolonging the life of a lead acid accumulator. (01 mark)

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c)

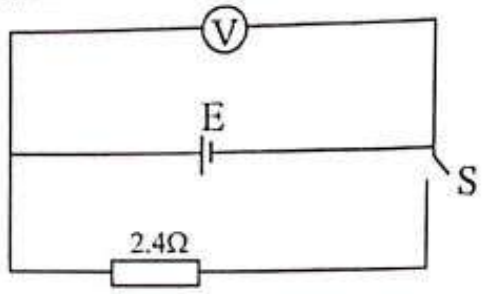

Figure 14

Figure 14 above shows a voltmeter V connected in parallel with a battery E and a 2.4Ω resistor.
When switch S is open, the voltmeter V reads 6V and 4.8V when the switch S is closed.
Find the internal resistance of the battery. (02 marks)

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44. a) Define the term "**hertz**" (01 mark)

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b) Figure 15 below shows circular waves incident on a convex reflector. Draw on the diagram, the wave pattern for the reflected wave fronts and fill in the missing parts. (01 mark)

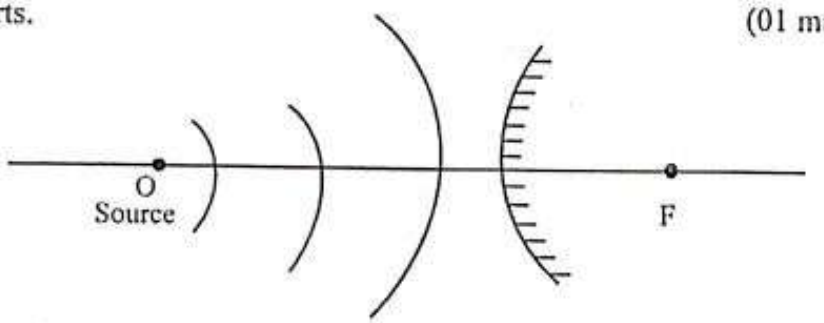

Figure 15

c) The wavelength of a radio wave is 19.2m. Calculate its frequency (02 marks)

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45. a) What is meant by **"Spontaneous disintegration"** in relation to radioactivity? (01 mark)

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b) A radioactive nuclei X decays by emission of an alpha particle and a beta particle to form nuclei Y. If the mass number of X is 215 and the difference between the mass number and atomic number of X is 131. Write a balanced equation for the reaction. (03 marks)

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46: a) (i) State **Archimedes' principle.** (01mark)

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(ii) Mention any **one** use of principle in 46(a) above. (½ mark

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b) A glass block weighs 40N in air, and 30N when wholly immersed in a liquid of density 800kgm^{-3}. Calculate the volume of the glass block. (2½ marks)

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47. a) i) What is meant by the term **'Parallax'** as applied to light. (01 mark)

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ii) State any **two** differences between the nature of images formed by a pin hole camera and a plane mirror. (02 marks)

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b) Sketch a diagram to show the formation of the eclipse of the moon. (01 mark)

48. a) Define **absolute Zero.** (01 mark)

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b) Ice cubes of mass 500g at 0°C are mixed with 3kg of water at 0°C. How much heat will be needed to convert the mixture to water at 10°C? (03 marks)

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49. a) What do you understand by **electrostatic induction?** (01 mark)

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b) State the **law of electrostatics.** (01 mark)

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c)

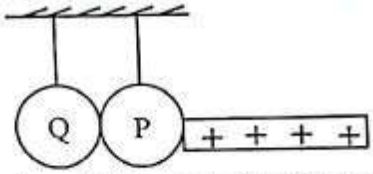

Figure 16

Conductors P and Q are placed into contact with each other and a positively charged rod placed into contact with P as shown in figure 16 above. State the nature of charges acquired by P and Q.

i) P..... (½ mark)

ii) Q..... (½ mark)

d) After sometime, the positively charged rod is withdrawn and the conductors are separated. State the new charges on P and Q

i) P..... (½ mark)

ii) Q..... (½ mark)

50. a) Distinguish between a magnet and a ferro magnetic material. (01 mark)

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b)

Figure 17

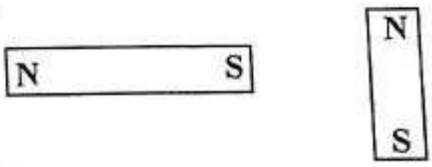

Figure 17 above shows two identical bar magnets placed close to each other.

(i) Sketch on the diagram above the magnetic field pattern between the two magnets. (02 marks)

(ii) State any **two** uses of magnets. (01 mark)

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-END -

Name..... Index No.....

School..... Signature .....

535/1
PHYSICS
PAPER 1
July/August 2015
2¼ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 1

2hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- *This paper has* **two** *sections;* **A** *and* **B.**
- *Section* **A** *contains* **40** *objective type questions. You are required to write the correct answer* **A, B, C** *or* **D** *in the box on the right hand side of the question.*
- *Section* **B** *contains* **10** *structured questions. Answers to this section are to be written in the spaces provided on the question paper.*
- *Assume where necessary:*
  - *acceleration due to gravity, g* = $10ms^{-2}$
  - *specific heat capacity of water* = $4200\ J\ kg^{-1}k^{-1}$
  - *specific heat capacity of copper* = $400\ J\ kg^{-1}k^{-1}$
  - *density of water* = $1000kgm^{-3}$
  - *density of mercury* = $13600kgm^{-3}$
  - *speed of sound in air* = $330ms^{-1}$
  - *specific latent heat of vaporization of water* = $2.3 \times 10^{6} J\ kg^{-1}$
  - *Speed of light in Vacuum* = $3.0 \times 10^{8} ms^{-1}$
  - *Refractive index of air* = 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

SECTION A

1. Which of the following systems possesses potential energy?
   A. Burning fuel
   B. Lighting bulb
   C. Compressed spring
   D. A pendulum bob at minimum displacement.

2. Which of the following work by the principle of reflection of light?
   A. Pinhole camera and plane mirror
   B. Periscope and kaleidoscope
   C. Microscope and plane mirror
   D. Lens camera and pinhole camera.

3. $200cm^3$ of alcohol of density $0.8gcm^{-3}$ is mixed with 500g of water. What is the mass of the mixture?
   A. 600g
   B. 660g
   C. 700g
   D. 750g

4. When the volume of a fixed mass of a gas is reduced at constant pressure, the kinetic energy of molecules of a gas will
   A. decrease
   B. increase
   C. be constant
   D. change to heat energy

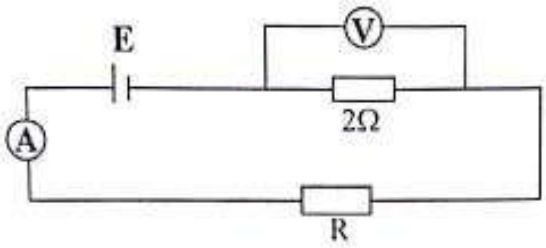
5. A magnetic material is said to have lost its magnetism when:
   A. molecular magnets point in the same direction
   B. it is broken into pieces
   C. it is connected across a direct current.
   D. molecular magnets point in different directions.

6. Which of the following statements are true about a radio isotope which has emitted two Alpha particles and one Beta particle?
   (i) Mass number reduces by 8
   (ii) Mass number reduces by 7
   (iii) Atomic number decreases by 4
   (iv) Atomic number decreases by 3.

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

7. **Figure 1** shows a battery of emf 12V and negligible internal resistance connected as shown below. If the voltmeter and ammeter readings are 8V and 2A respectively. Find the value of R.

Fig. 1



A. 8.0Ω
B. 6.0Ω
C. 4.0Ω
D. 2.0Ω

8. A ball is thrown upwards to a maximum height of 60m above the ground. What is its velocity when it is a quarter way downwards?
A. $17.3ms^{-1}$
B. $24.6ms^{-1}$
C. $30.0ms^{-1}$
D. $34.6ms^{-1}$

9. A coin and a piece of paper are both released at the same time from a given height in a vacuum. Which of the following is true about their motion?
A The coin falls faster than the piece of paper.
B. They both fall downwards at the same rate.
C. The piece of paper falls faster than the coin.
D. No motion occurs in a vacuum.

10. **Fig. 2**

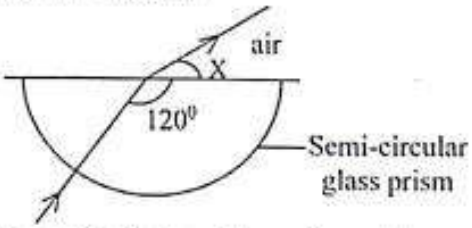
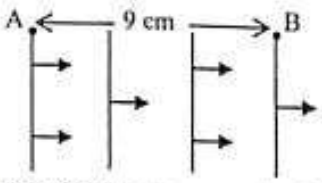


Figure 2 above shows a semi-circular glass prism with a ray of light travelling as indicated above. If the refractive index of the material glass is 1.52, calculate the angle X
A. 60.0^0
B. 49.5^0
C. 40.5^0
D. 30.0^0

11. **Fig. 3**



The diagram in figure 3 above shows parts of plane water waves in water. If the wave travels from point A to point B in 6 seconds, find the frequency of the water wave.
A. 0.5Hz
B. 1.5Hz
C. 3.0Hz
D. 54.0Hz

12. Which of the following materials can be electrified by friction?
    A. Silver rod
    B. Wet wood
    C. Copper rod
    D. Plastic rod

13. In a moving coil galvanometer, the function of the soft iron cylinder is to
    A. Provide magnetic field lines
    B. Concentrate radial magnetic field lines
    C. Hold the pointer in position
    D. Control the rotation of the coil.

14. **Fig 4.**

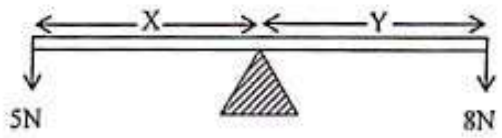


Figure 4 shows a uniform bar 50cm long with negligible weight.
Determine the values of X and Y if the bar is in equilibrium.

	X(cm)	Y(cm)
A	19.2	30.8
B	25.0	25.0
C	30.8	19.2
D	31.3	8.7

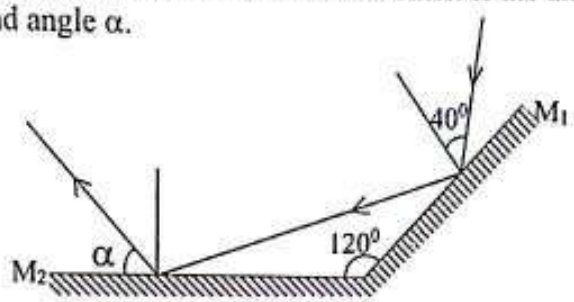
15. When a number of lamps are connected in parallel to each other in an electric circuit,
    A. the effective resistance is the sum of individual lamp resistances.
    B. same current flows through them
    C. they are at the same potential difference.
    D. they can be operated using many switches only.

16. Sound becomes less loud when the source of sound vibrates with a.
    A. decrease in amplitude
    B. increase in amplitude
    C. higher frequency
    D. lower frequency

17. A heater rated 200w was used to keep a liquid boiling in a vessel for 50 seconds, If the mass reduced by 0.05kg, calculate the specific latent heat of vaporization of the liquid.
    A. $8.0 \times 10^{2}\ Jkg^{-1}$
    B. $1.0 \times 10^{4}\ Jkg^{-1}$
    C. $4.0 \times 10^{4}\ Jkg^{-1}$
    D. $2.0 \times 10^{6}\ Jkg^{-1}$

18. Figure 5 below shows a ray of light which goes through successive reflection by two mirrors M_1, and M_2 inclined at 120^0 to each other. If the angle of incidence on mirror M_1 is 40^0, find angle α.

Fig. 5



A. 10^0
B. 40^0
C. 50^0
D. 60^0

19. 87.5% of a radioactive material decays after 60years. What is its half life?
A. 10 years
B. 15 years
C. 20 years
D. 30 years.

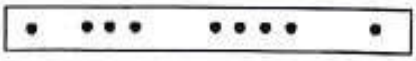
20. A block of metal of density $2700kgm^{-3}$ has a mass of 108kg. Calculate its up thrust when completely immersed in brine of density $1200kgm^{-3}$.
A. 108.4N
B. 480N
C. 3500N
D. 3900N

21. Which of the following figures below represents motion with uniform retardation?

A.  → Direction of motion

B.  → Direction of motion

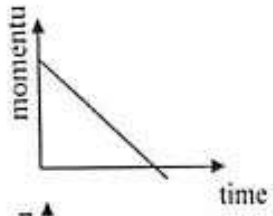
C.  → Direction of motion

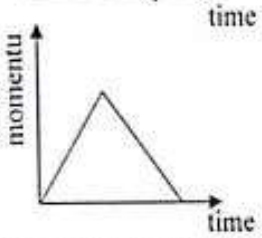
D.  → Direction of motion

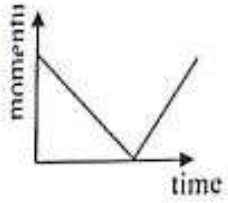
22. During change of state for pure water, the temperature remains constant when heat is supplied. This is because;
A. heat is absorbed to beak adhesive forces.
B. heat is absorbed to form cohesive forces.
C. no heat is absorbed.
D. heat is absorbed to break cohesive forces.

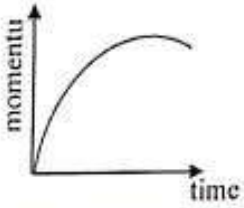
23. Umeme charges 600/= per unit of electric energy consumed. What is the total cost of operating four light bulbs at 100W each for five hours?
A. Sh. 286.7
B. Sh. 1200
C. Sh. 7500
D. Sh. 1,200,000

24. Which of the following graphs below shows variation of momentum with time of a ball thrown vertically upwards from the ground level?

A.


B.


C.


D.


25. Which of the following is the correct order of increasing wavelength of the colours of the spectrum indicated below.
A. Blue, Green, Yellow and Red
B. Green, Yellow, Red and Blue
C. Yellow, Red, Green and Blue
D. Red, Yellow, green and Blue

26. A translucent white plastic bottle has a green printing on it. An electric lamp with red glass is suspended inside the bottle and switched on, in a darkened room. The green printing on the bottle will appear to be;
A. Black
B. Blue
C. Magenta
D. Red.

27. Which of the following is equivalent to the unit of frequency.
A. ms^{-2}
B. s^{-1}
C. ms^{-1}
D. ns

28. Figure 6 below shows alternating voltage connected in series with 4 diodes and a cathode ray oscilloscope (CRO)

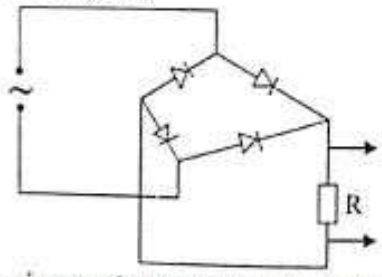
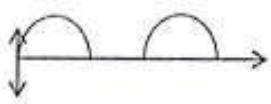


Fig. 6

Which of the following graphs show the wave form seen on the CRO screen?

A.


B.


C.


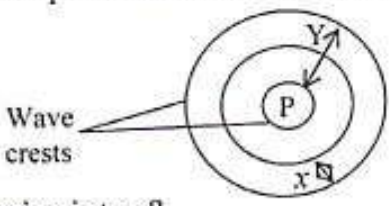
D


29. A. transformer has thrice as many turns in secondary coil as in the primary coil. The a.c input to the primary coil is 4V. The output from the secondary is

A. 0.75V
B. 1.30V
C. 6.0 V
D. 12.0 V

30. A vertical stick is dipped up and down in water at P as shown in figure 7 below. Three wave crests are produced on the surface of water.

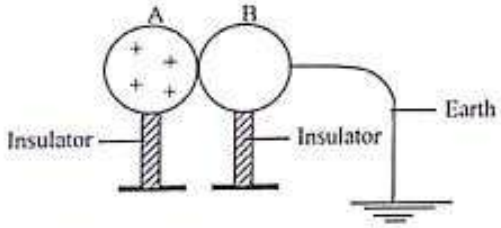
Fig. 7



Which of the following is true?

A. Distance x is the amplitude of the waves.
B. Distance Y is the wave length of the waves.
C. Each circle represents a wave front.
D. The frequency of the wave is 3Hz.

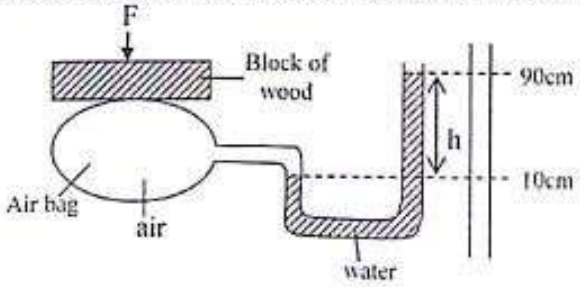
31. **Fig. 8**



A positively changed sphere A is brought into contact with an uncharged insulated sphere B. If sphere B is earthed while still in contact with A as shown in fig. 8, which of the following shows the correct charges acquired by A and B after separation?

	Sphere A	Sphere B
A	Neutral	Neutral
B	Positive	Positive
C	Negative	Negative
D	Positive	Negative

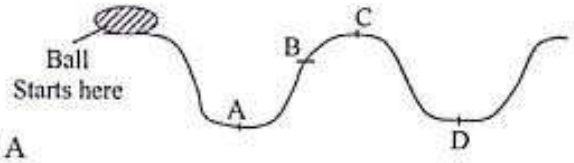
32. **Fig 9.** below shows an air bag connected to a manometer and used to measure force F = 1.088×10^4N from a wooden block placed on top of the air bag.
Calculate the area of contact of the wooden block and the air bag.



A. $0.4m^2$
B. $0.3m^2$
C. $0.2m^2$
D. $0.1m^2$

33. A ball is released from rest and rolls down a tack from the position shown. What is the furthest position the ball could reach?

Fig. 9



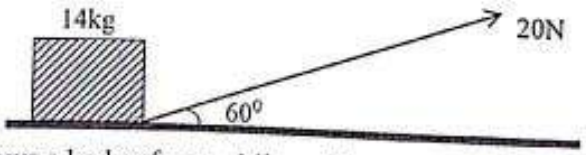
A. Position A
B. Position B
C. Position C
D. Position D

34. An unsaturated vapour is a
A. vapour which is in thermodynamic equilibrium with the liquid in which it comes.
B. vapour which is in stable equilibrium with its own liquid.
C. vapour which is at a temperature that contains less than equilibrium amount of the substance in gaseous state.
D. vapour of a liquid at a temperature which is at visible evaporation occurring in the whole bulk of a liquid.

35. A needle floating on the surface of a liquid can be made to remain floating by
i) Heating the liquid
ii) Adding soap solution to liquid
iii) Decreasing the liquid temperature
A. (iii) only
B. (ii) and (iii) only
C. (i) and (ii) only
D. (ii) only

36. An electric bulb is marked 40W, 220V and another 200W, 220V; what is the ratio of their resistances.
A. 1:8
B. 1:4
C. 1:2
D. 1:5

37. **Fig. 10**



Table

Figure 10 shows a body of mass 14kg pulled by a force of 20N and its moves through a distance of 7m. Calculate the work done.
A. $20 \cos 60^0 J$
B. $20 \sin 60^0 J$
C. $140 \cos 60^0 J$
D. $140 \sin 60^0 J$

38. A metal sphere is heated to a temperature 100^0C and then transferred into a copper calorimeter containing some water at 20^0C. If the temperature of the mixture after stirring is 50^0C and the masses of the copper, metal sphere and water are in the ratio of 2:5:8, calculate the specific heat capacity of the metal sphere.

A. $312.8\ Jkg^{-1}k^{-1}$
B. $3128\ Jkg^{-1}k^{-1}$
C. $4128\ Jkg^{-1}k^{-1}$
D. $4500\ Jkg^{-1}k^{-1}$

39. A. magnetic substance is said to be magnetized only if

A. Another magnet attracts it
B. Another magnet repels it
C. It has no effect on another magnet
D. It points in East west direction when freely suspended.

40. When a person steps forward from rest, one foot pushes backwards on the ground and the ground pushes the foot forwards. This is an application of.

A. Newton's second law of motion.
B. Newton's first law of motion.
C. The law of inertia
D. Newton's third law of motion.

SECTION B

41. (a) Define a **Pascal.** (01 mark)

.....

.....

(b) **Fig. 11**

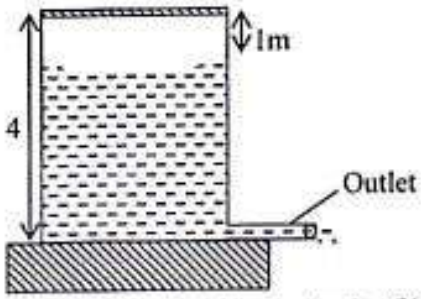


Figure 11 above shows a closed water tank of height 4m containing water to a level of 3m and has an outlet tap fixed at the bottom.
If the cross-section diameter of the outlet is 3.5cm, calculate the force with which the water comes out of the tap. (03 marks)

.....

.....

.....

42. (a) What is meant by the term Effort as applied to machines? (01 mark)

.....

(b) A screw of pitch 2.5cm is used to raise a load of 200kg when an effort of 50N is applied to the screw arm of length 20cm.

Calculate;

(i) Mechanical advantage of the screw. (0½ mark)

.....

.....

(ii) Efficiency of the screw. (02 marks)

.....

.....

(iii) State any **one** application of screws. (0½ mark)

.....

43. (a) State **one** difference between annular eclipse and solar eclipse. (01 mark)

.....

.....

(b) A concave lens of power 5.0D forms a real image of unit magnification.

(i) Calculate the focal length of the lens (1½ marks)

.....

.....

(ii) Sketch the ray diagram to show the image formation. (1½ marks)

.....

.....

44. (a) State **Ohm's law** (01 mark)

.....

.....

(b) Give the main energy changes that occur in a filament lamp. (01 mark)

.....

.....

(c) A 240V, 400W water heater is used is to boil drinking water for 12 minutes.

Calculate the electrical energy converted to heat energy. (02 marks)

.....

.....

45. (a) What is meant by destructive interference as applied to wave motion? (01 mark)

Fig. 12

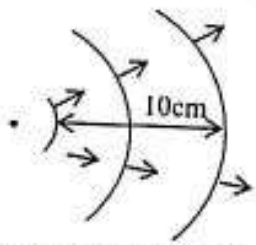


Figure 12 shows circular waves in a ripple tank.

(i) How are circular waves produced in a ripple tank? (01 mark)

.....

.....

(ii) Calculate the velocity of the waves if the frequency is 300Hz. (02 marks)

.....

.....

46. (a) Define **saturated vapour pressure.** (01 mark)

.....

.....

(b) Sketch a graph of density against temperature for pure water between O^0C and 50^0C (02 marks)

.....

.....

(c) State **two** applications of the principle illustrated in the sketch drawn in (b) above. (01 mark)

.....

.....

47. (a) (i) Define **Nuclear fission.** (01 mark)

.....

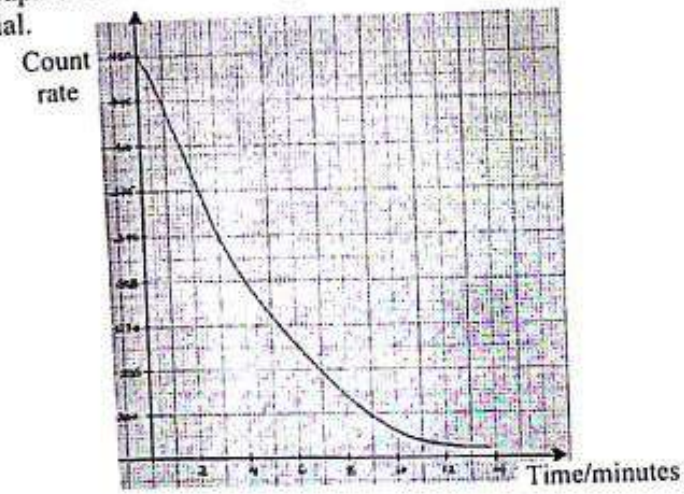
.....

(ii) Give **one** method of starting the process. (01mark)

.....

.....

(b) The graph below shows an exponential decay curve of a certain radioactive material.



Use the curve to determine the half life of the material. (02mark)

.....

.....

Turn Over

48. (a) What is meant by the following terms;

(i) Plastic deformation. (01mark)

.....

.....

(ii) Breaking stress (01mark)

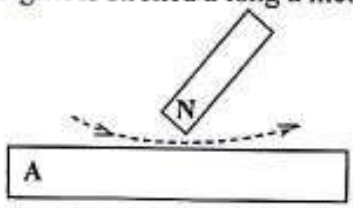
.....

.....

(b) A spring extends by a quarter of the original length when a force of 5N is applied across its ends. By what fraction does it extend when the force is increased by 3N. (02 marks)

49. The north pole N of a magnet is stroked a long a metal bar in the direction shown in figure 13.

Fig. 13



(a) Name a metal which would become permanently magnetized by stroking in this way. (01mark)

.....

(b) Name polarity A. (01mark)

.....

(c) State uses of permanent magnets. (02marks)

.....

.....

50. (a) Define a Coulomb. (01mark)

.....

(b) Draw a well labelled diagram of a gold leaf electroscope. (02marks)

(c) Sketch the electric field pattern between two oppositely charged metal plates. (02marks)

- END -

Name..... Index No.. .....

School..... Signature .....

535/1
PHYSICS
PAPER 1
July/August 2014
$2^1/_4$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 1

2hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- *This paper has* **two** *sections;* **A** *and* **B.**
- *Section* **A** *contains* **40** *objective type questions. You are required to write the correct answer* **A, B, C** *or* **D** *in the box on the right hand side of the question.*
- *Section* **B** *contains* **10** *structured questions. Answers to this section are to be written in the spaces provided on the question paper.*
- *Assume where necessary:*
  - *acceleration due to gravity, g* $= 10ms^{-2}$
  - *specific heat capacity of water* $= 4200\ J\ kg^{-1}k^{-1}$
  - *specific heat capacity of copper* $= 400\ J\ kg^{-1}k^{-1}$
  - *density of water* $= 1000kgm^{-3}$
  - *density of mercury* $= 13600kgm^{-3}$
  - *speed of sound in air* $= 330ms^{-1}$
  - *specific latent heat of vaporization of water* $= 2.3 \times 10^6 J\ kg^{-1}$
  - *Speed of light in Vacuum* $= 3.0 \times 10^8 ms^{-1}$

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

Answer **all** *questions from this section.*

1. The rate at which the distance covered by a body in a particular direction changes with time is called
   A. Speed
   B. Velocity
   C. Displacement
   D. Acceleration

2. A machine raises a given body vertically upwards at a uniform velocity of $10ms^{-1}$, if the power developed by the machine is 30kw, find the mass of the body.
   A. 300,000kg
   B. 3000kg
   C. 300kg
   D. 30kg

3. On a cloudy day, a sealed inflated balloon is taken to the top of the mountain. The balloon is found to increase in size. This is due to the reason that;
   A. The air outside the balloon is under lower pressure than the air inside.
   B. The air outside the balloon is hotter than the air inside.
   C. The ultraviolent radiation has increased on top of the mountain.
   D. The balloon has a small hole that has allowed air to leak in.

4. Given that the refractive index of glass is 1.5, what is the speed of light inside the glass material?
   A. $2.0 \times 10^{7}\ ms^{-1}$
   B. $2.0 \times 10^{8}\ ms^{-1}$
   C. $4.5 \times 10^{8}\ ms^{-1}$
   D. $8.0 \times 10^{8}\ ms^{-1}$

5. A block of material has a volume of $20cm^{3}$ and density $2.5gcm^{-3}$. It is suspended from a spring balance with half of its volume submerged in water. What is the reading of the spring balance?
   A. 50g
   B. 40g
   C. 30g
   D. 25g

6. The p.d in a dry cell is kept constant by the use of:
   A. Ammonium chloride
   B. Potassium permanganate
   C. Potassium dichromate
   D. Manganese IV oxide

7. In a house electric installation system, the earth wire is used to:
   A. Conduct away excess charge
   B. Melt and break the circuit when current through exceeds a given value.
   C. Prevent lightening
   D. Complete the circuit

8. Two waves were superimposed on each other such that a crest of one wave fell on the trough of another coherent wave. Which of the following occurred;
   A. Resonance
   B. Reverberation
   C. Constructive interference
   D. Destructive interference

9.

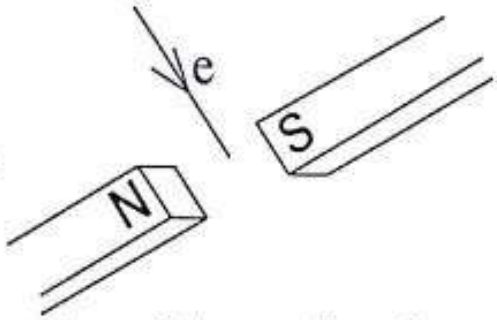


Fig. 1

Fig. 1 shows a beam of electrons directed to pass between the poles of a magnet. The electron beam would be;

A. deflected according to Fleming's left hand rule.
B. deflected according to Fleming's right hand rule.
C. Slowed down.
D. directed towards the North Pole.

10. Cathode rays are passed over the cap of a gold leaf electroscope and the leaf is observed to collapse. State the nature of the initial charge on the electroscope.

A. Positive charge
B. Negative charge
C. Neutral
D. Both positive and negative

11. Petroleum storage tanks are not painted black because black is a;

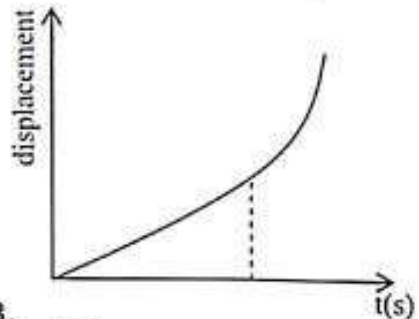
A. poor conductor of heat.
B. good emitter of radiation.
C. good absorber of radiation.
D. good conductor of heat.

12. An object is placed between infinity and centre of curvature of a concave mirror, what is the nature of the image formed?

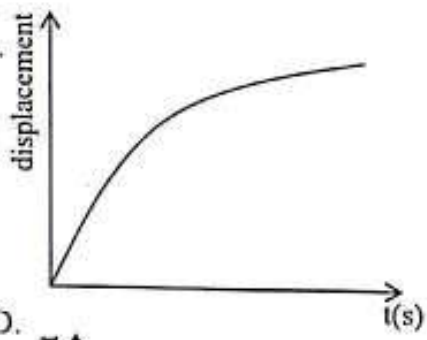
A. virtual diminished and erect.
B. magnified, virtual and inverted.
C. magnified, virtual and erect.
D. diminished, real and inverted.

13. Which of the following displacement – time graphs illustrates the motion of a small metallic sphere falling through a viscous fluid?

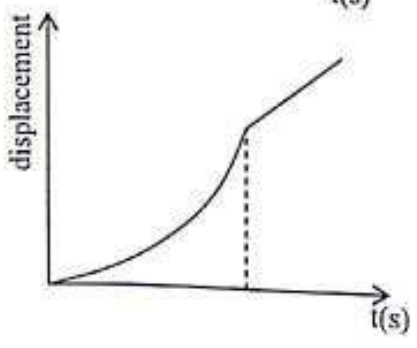
A.



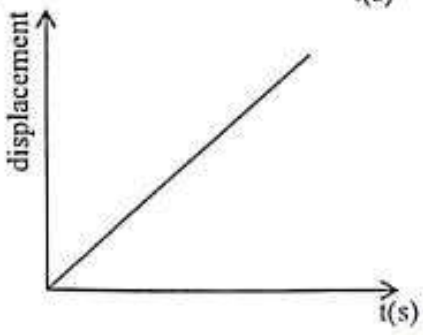
C.



B.



D.



14. A ticker timer is connected to the mains supply of frequency 50HZ, find the time taken to print 5 consecutive dots.
A. 0.08 seconds
B. 0.05 seconds
C. 0.02 seconds
D. 0.01 seconds

15. The force that exists between two conductors carrying current in the same direction is;
A. Friction
B. Repulsion
C. Attraction
D. Zero force

16. Fig.2 below shows a catapult being pulled by a person to propel a stone.

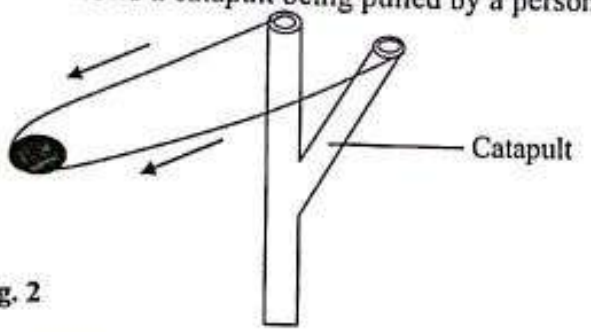


Fig. 2

State the energy changes that take place.
A. Chemical energy → Kinetic energy → Elastic potential energy.
B. Kinetic energy → Elastic potential energy → Heat and sound.
C. Elastic potential energy → Kinetic energy → Heat and sound.
D. Chemical energy → Elastic potential energy → Kinetic energy.

17. Two nuclides $^{a}_{b}X$ and $^{c}_{d}Y$ are isotopes. Which of the following is true about the nuclides?
A. a = c
B. a = d
C. b = c
D. b = d

18. Mercury melts at -39^{0}C and boils at 357^{0}C. Alcohol melts at -115^{0}C and boils at 78^{0}C. At which temperature will the two substances be in liquid state?
A. -49^{0}C
B. -15^{0}C
C. 90^{0}C
D. 360^{0}C

19.

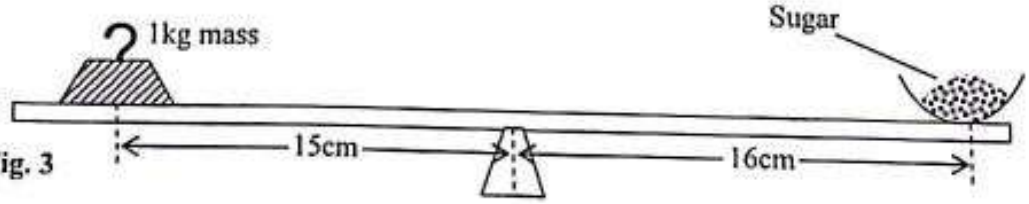


Fig. 3

Fig. 3 above shows a faulty domestic beam balance used in a shop. If one requests for 1kg of sugar, how much will be taken?
A. 1.10kg
B. 1.00kg
C. 0.93kg
D. 0.33kg

20. Which of the following pairs of colours produce white light?
A. Red and yellow
B. Blue and yellow
C. Red and green
D. Green and cyan

21. A hot spoon at 80^0C is cooled by immersing it in 100g water at 40^0C, if the temperature of water rises to 60^0C, find the mass of the spoon if its specific heat capacity is 900Jkg^{-1}K^{-1}
A. 21.43g
B. 250g
C. 466.7g
D. 500g

22.

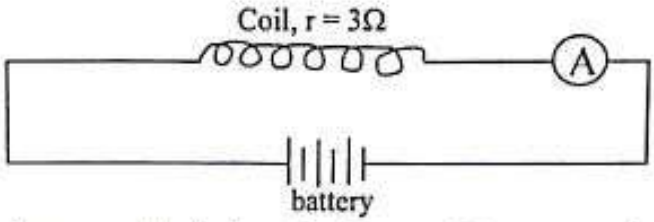


Fig. 4

The fig.4 above shows a coil of wire of resistance 3Ω connected to a battery. If the ammeter reading is 2A and current flows through the coil for 1 minute, how much energy is converted into heat by the coil?
A. 6J
B. 12J
C. 360J
D. 720J

23. Which of the following applies to direct current only? It can easily be;
A. stepped up or down.
B. rectified
C. used internally in domestic electronic gadgets.
D. used in a flat iron.

24. The production of an emf in a given coil due to the change of e.m.f in a nearby coil is called?
A. Mutual induction.
B. Self induction.
C. Electrostatic induction.
D. Electromagnetic induction.

25. A moving coil galvanometer has a resistance of 4Ω and gives a full scale deflection of 2.5mA. Find the value of the resistor required to convert it to a voltmeter measuring up to 20V.
A. 0.0050Ω
B. 0.0005Ω
C. 7966Ω
D. 7996Ω

26. A vibrator produces waves which travel a distance of 35cm in 2 seconds, if the distance between three consecutive crests is 10cm, what is the frequency of the vibrator?
A. 3.5Hz
B. 7.0Hz
C. 14.0Hz
D. 87.5Hz

Turn Over

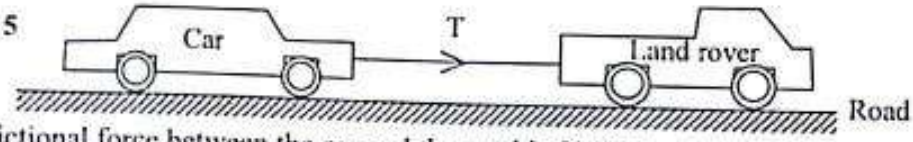
27. In a pin hole camera, blurred and shorter images are observed when;
A. The hole is wider and the object is moved further.
B. The hole is narrower and the object is moved nearer.
C. Using a longer camera with a narrower hole.
D. Using a shorter camera with a narrower hole.

28. A steel rod increases in size when heated. This is due to;
A. increase in size of the electrons.
B. increase in the speed of movement of molecules.
C. decrease in the volume of the molecules.
D. increase in the density of the molecules.

29. When a fixed mass of gas is kept at constant temperature, its volume .....
A. Increase with increase in pressure.
B. Is directly proportional to pressure.
C. Increases with decrease in pressure.
D. Remains the same when pressure is increased.

30. A car of mass 1800kg is pulled by a land rover along a horizontal level road using a chain as shown in the fig.5 below.

Fig. 5



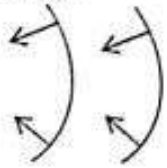
If the frictional force between the car and the road is 5040N and the land rover accelerates at $0.8ms^{-2}$, find the tension in the chain.
A. 8040.8N
B. 7840N
C. 6840N
D. 6480N

31. Air in a $3m^3$ vessel at 27^0C exerts a pressure of 2 pascals, what is the pressure that it would exert if its volume reduced by $1m^3$ and the temperature reduced by 17^0C?
A. 1.11Pa
B. 2.83Pa
C. 3.18Pa
D. 8.10Pa

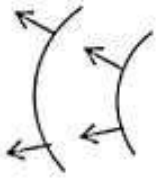
32. An object is placed at a distance twice the focal length of a convex mirror. What is the nature of the image formed?
A. Erect, diminished and virtual.
B Erect, magnified and virtual.
C. Same size, inverted and real.
D. Upright, diminished and real.

33. Which of the following best describes pattern of circular waves reflected from a concave reflector?

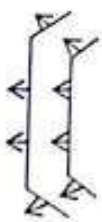
A.



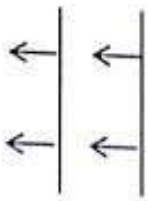
B.



C.



D.



34. The force that pushes rockets at high velocity is caused by;
A. Gases which rotate turbines.
B. Law of conservation of linear momentum.
C. Change of kinetic energy to potential energy.
D. Conversion of heat energy to chemical energy.

35.

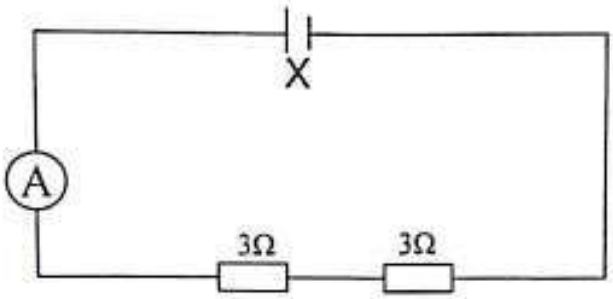


Fig. 6

A cell X of internal resistance r is connected in series with an ammeter and two resistors of 3Ω and 2Ω as shown in fig.6 above. If the ammeter reading is 0.25A and the power delivered by the cell is 0.375W. Calculate the value of r.
A. 3Ω
B. 2Ω
C. 1Ω
D. 0.5Ω

36. Find half life of a radioactive element if 87.5% of its initial mass decayed after 12 days.
A. 1 day.
B. 3 days.
C. 3.5 days.
D. 4 days.

37. A load of 4N causes a strain of 0.01 in a given spring. Calculate the extension caused by a load of 8N if the original length of the spring is 50cm.
A. 1.0cm
B. 2.0cm
C. 2.5cm
D. 4.0cm

38. A notch in a beam can be reduced by keeping the beam under;
A. Tension force.
B. Compression force.
C. Shear force.
D. Friction force.

39. Which of the following can be charged by friction?
A. Safety pin.
B. Copper plate.
C. Razor blade.
D. Ebonite rod.

40. What is the effect on water waves as they travel from shallow to deep region?

	Wave length	Speed	Frequency
A	Increases	Increases	Decreases
B	Constant	Decreases	Increases
C	Increases	Increases	Constant
D	Decreases	Decreases	Constant

SECTION B

Answer **all** questions in this section.

All working must be shown clearly in the spaces provided.

41. a) Define **dynamic friction.** (01 mark)

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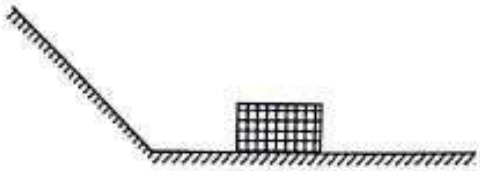
.....

.....

b) i)



A body of 8kg mass slides from the top of an incline and reaches the bottom when moving at $4ms^{-1}$. The body then continues along a rough horizontal surface. If the dynamic friction is 16N, find the horizontal distance it covers before it is stopped.

(02 marks)

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ii) State two applications of **friction force.** (01 mark)

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42. a) Define a **pascal.** (01 mark)

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b) i)

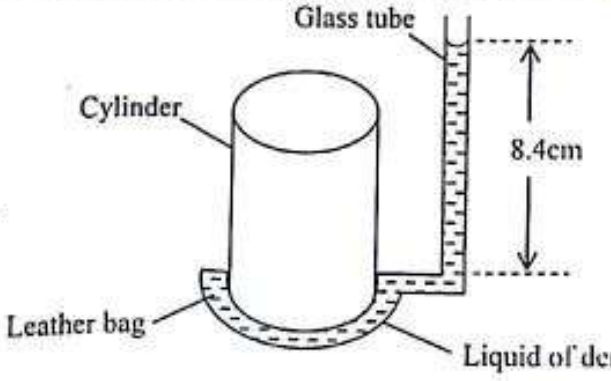

Fig. 7

A leather bag is filled with a liquid of density $1250kgm^{-3}$ and attached to a vertical glass tube as shown in fig. 7 above. A cylinder of radius 0.780m is placed on the leather bag, the liquid rose in the glass tube by 8.4cm, calculate the weight of the cylinder. (03 marks)

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43. a) What is meant by principal focus of a converging lens? (01 mark)

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b) i) Sketch a ray diagram to show the formation of an image by a convex lens when the object is at infinity. (02 marks)

ii) State one applications of the arrangement in b(i) above (01 mark)

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44. a) Define a progressive wave. (01 mark)

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b) i) A turning fork of frequency 850Hz is sounded above an open pipe. Find the length of the air column in the pipe that produces the first overtone. (02 marks)

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ii) State one factor that determines the loudness of sound. (01 mark)

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45. a) State two differences between **hard x – rays** and **soft x – rays.** (02 marks)

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b)

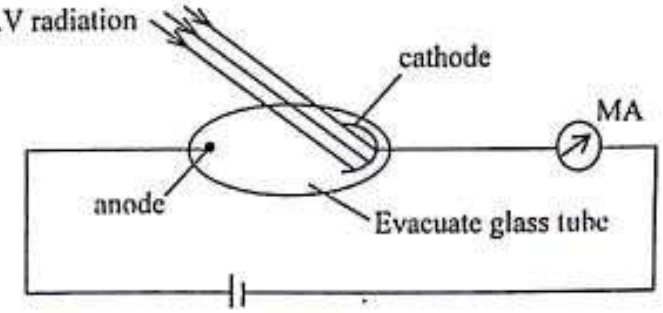

Fig. 8.

Fig.8 shows ultra violet radiation incident on the cathode in a circuit with a galvanometer.

i) State the process through which current is produced. (01 mark)

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ii) Briefly explain what happens when a gas is introduced in the glass tube. (01 mark)

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46. a) Define the term **saturated vapour.** (01 mark)

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b) State two factors affecting boiling point. (01 mark)

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c) 1.8kg of water was put in an ice making machine. If the water was at 40^0C and the machines removes heat at a rate of $200Js^{-1}$, how long will it take to convert all the water into ice at 0^0C. (02 marks)

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47. a) State one difference between a jet engine and a rocket engine. (02 marks)

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b) A goal keeper dives for a ball estimated to be moving at $20ms^{-1}$ and brings it rest in a distance of 4m from the time of impact. If the ball has a mass of 2kg, calculate the force he applies. (02 marks)

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48. a) i) State **Ohm's law**. (01 mark)

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ii) State two factors which affect resistance of a conductor. (01 mark)

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b) Sketch a graph of voltage against current for a **thermionic diode**. (01 mark)

c) A cell containing 1200C of charge is connected to a circuit. What is the time taken to discharge the cell given that that current in the circuit is 6A. (01 mark)

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49. a) Define a **dipole**. (01 mark)

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b) i) Sketch a magnetic field pattern obtained when a South Pole of a bar magnet points in the Northern hemisphere of the earth. (02 marks)

ii) Give two applications of magnets. (01 mark)

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50. a) Define the **surface density**. (01 mark)

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b) i) State any two precautions taken to avoid being struck by lightening. (01 mark)

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ii) With a sketch diagram, draw an electric field pattern for a positively charged point and an uncharged plate. (02 marks)

END

Name.....Index No.....

School.....Signature .....

535/1
PHYSICS
PAPER 1
July/August 2013
$2^{1}/_{4}$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 1

2hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- *This paper has* **two** *sections,* **A** *and* **B.**
- *Section* **A** *contains* **40** *objective type questions. You are required to write the correct answer* **A, B, C** *or* **D** *in the box on the right hand side of the question.*
- *Section* **B** *contains* **10** *structured questions. Answers to this section are to be written in the spaces provided on the question paper.*
- *Assume where necessary:*
  - *acceleration due to gravity, g* = $10ms^{-2}$
  - *specific heat capacity of water* = $4200\ J\ kg^{-1}k^{-1}$
  - *specific heat capacity of copper* = $400\ J\ kg^{-1}k^{-1}$
  - *density of water* = $1000kgm^{-3}$
  - *density of mercury* = $13600kgm^{-3}$
  - *speed of sound in air* = $330ms^{-1}$
  - *specific latent heat of vaporization of water* = $2.3 \times 10^{6} J\ kg^{-1}$
  - *Speed of light in Vacuum* = $3.0 \times 10^{8} ms^{-1}$

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

SECTION A

1. The force per one kilogram is equivalent to.....
   A. Pressure
   B. Thrust
   C. Velocity
   D. Acceleration

2. A machine will have an efficiency of 50% if the....
   A. work done by the load is a half of the work done by the effort.
   B. work done by the effort is a half of the work done by the load.
   C. distance moved by the load is equal to the distance moved by the effort.
   D. effort is equal to the load.

3. A uniform beam pivoted at the 200cm mark balances when a load of 250N is hang at the 0cm mark. If the beam weighs 1kN, find the length of the beam.
   A. 1m
   B. 5m
   C. 100m
   D. 500m

4. A small electric lamp placed at the principal focus of a concave mirror of small aperture will produce....
   A. a converging beam of light.
   B. a diverging beam of light.
   C. a parallel beam of light.
   D. a non – parallel beam of light.

5. 9kJ of heat is supplied to a body and its temperature rises from 10°C to 70°C. what is its heat capacity?
   A. $540JK^{-1}$
   B. $150JK^{-1}$
   C. $0.75JK^{-1}$
   D. $0.15JK^{-1}$

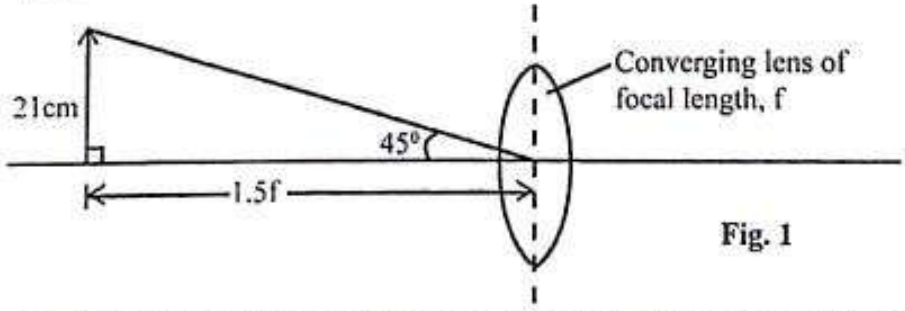
6. 

Fig. 1

An object O of height 21cm placed 1.5f cm from a convex lens of focal length f makes an angle of 45° as shown in fig. 1 above. Find the power of the lens.
   A. 7.1 D
   B. 14 D
   C. 21 D
   D. 71.1 D

Bats are able to move at night without colliding with other objects because they

A. travel slowly
B. travel at the speed of sound
C. make use of ultra sonic sounds
D. make use of reverberation of sound

8.

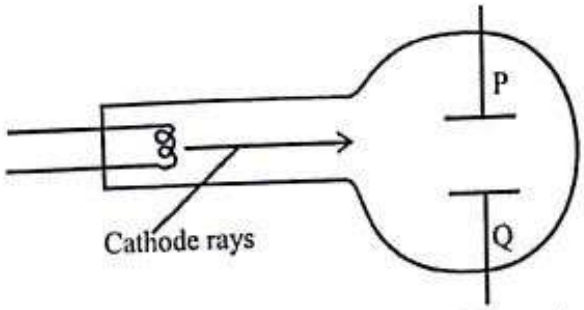


Fig. 2

Fig 2 above shows cathode rays directed mid-way between two parallel plates P and Q, what are the right charges on plates P and Q if the rays are to be deflected downwards?

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

9. The smell of a rotten egg spreads throughout the room due to

A. Osmosis
B. Diffusion
C. Brownian motion
D. Capillarity

10.

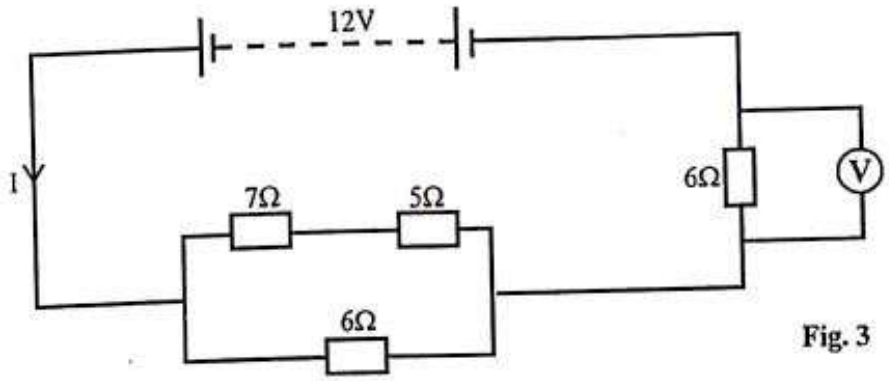


Fig. 3

Fig. 3 above shows a battery of emf 12V and negligible internal resistance connected to four resistors as shown. What is the voltmeter reading?

A. 7.2V
B. 4.8 V
C. 4.0 V
D. 1.2 V

Turn Over

11. An electric cooker is connected directly from the consumer unit using a radical circuit, This precaution helps....
A. to reduce the rate of power consumption.
B. increase the rate of power consumption.
C. to avoid over heating of the connecting wires.
D. to draw less current.

12.

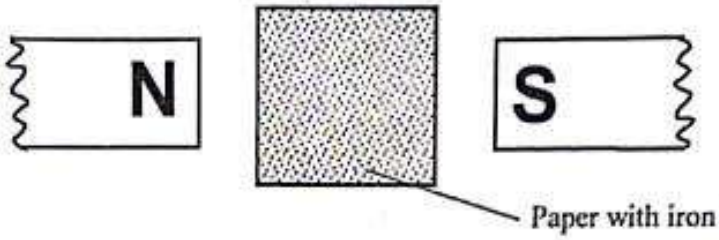
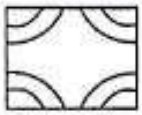
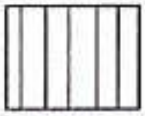
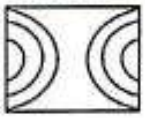


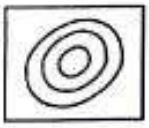
Fig. 4

A piece of paper with iron fillings on top is placed between two magnets with opposite pole facing each other as shown in fig.4 above.
What is the correct pattern of movement of iron fillings?

A. 

B. 

C. 

D. 

13. Surface tension in liquids can be weakened by.
A. lowering the temperature
B. adding soap solution
C. increasing the volume of the liquid
D. increasing the density

14.

Fig. 5

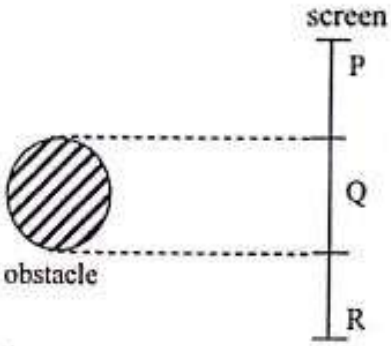


Fig. 5 above shows a lamp, an obstacle and a screen arranged in a straight line.
Name the completely dark region.
A. P only
B. R only
C. Q and R only
D Q only

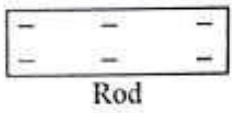
15. The total power developed by a person of mass 50kg after running upstairs 8m high is 200 watts. Determine the reading of the stop clock which was used to record the time he takes.

A. 20.0 seconds
B. 50.0 seconds
C. 100.0 seconds
D. 120.0 seconds

16. A block of mass 5kg and density 3125 kgm^{-3} is immerged in water of density 1000kgm^{-3} such that $^3/_4$ of its volume remains outside, Calculate the up thrust on the block.

A. 4.0 N
B. 12.0 N
C. 50.0 N
D. 160.0 N

17.



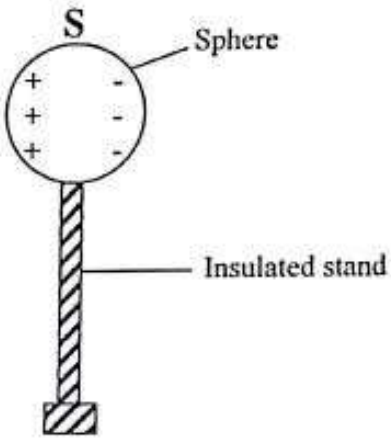


Fig. 6

Fig. 6 above shows a negatively charged rod brought near a metal sphere S. What was the nature of the charge on S before the charged rod was brought close?

A. Positive
B. Negative
C. Neutral
D. Lost charge

18. During vaporization,

A. the vapour needs extra energy to expand against atmospheric pressure.
B. potential energy of molecules is more than their kinetic energy.
C. the cohesion forces of molecules become stronger.
D. internal energy of molecules reduce.

19. Hysteresis in a practical transformer is due to

A. leakage of magnetic flux
B. resistance of thick copper wires
C. currents induced in primary coil by self induction.
D. magnetization and demagnetization of the iron core.

20. Fig. 7 below shows a load being raised by an inclined plane of base length 6m.

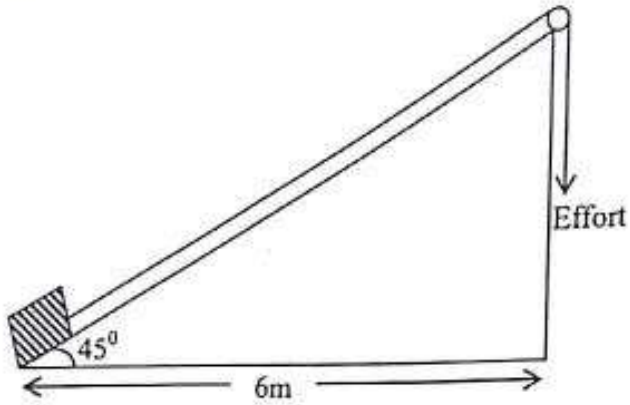


Fig. 7

Determine the velocity ratio of the machine.

A. $\sin 45^\circ \cos 45^\circ$

B. $\tan 45^\circ \cos 45^\circ$

C. $\frac{1}{\cos 45^\circ \tan 45^\circ}$

D. $\cos 45^\circ \tan 45^\circ$

21. A device in communication systems which carries messages over long distances by pulse of infra red light is called.

A. optical fibre

B. a radio

C. mobile telephone

D. internet

22.

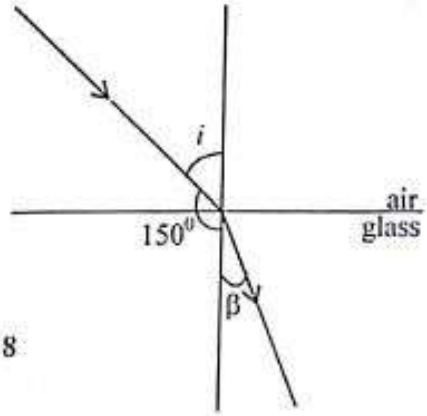


Fig. 8

Fig. 8 above shows a ray of light travelling from air to glass of refractive index 1.50 at an angle of incidence i. Calculate the size of angel β.

A. 15.5°

B. 19.5°

C. 22.5°

D. 25.5°

23. The impulse of a force is equivalent to
A. product of mass and velocity.
B. rate of change of force.
C. product of momentum and velocity.
D. change in momentum.

24. Which of the following are true about sound wave.
i) Is a mechanical wave
ii) Is a transverse wave
iii) Is a longitudinal wave
iv) Is an electromagnetic wave
A. (iii)only
B. (i) only
C. (i) and (iii)
D. (i) and (iv)

25. A nucleus consists of 90 protons and 144 neutrons. After emitting two beta particles, the nucleus will have.
A. 85 protons and 140 neutrons
B. 87 protons and 140 neutrons
C. 92 protons and 144 neutrons
D. 90 protons and 142 neutrons

26.

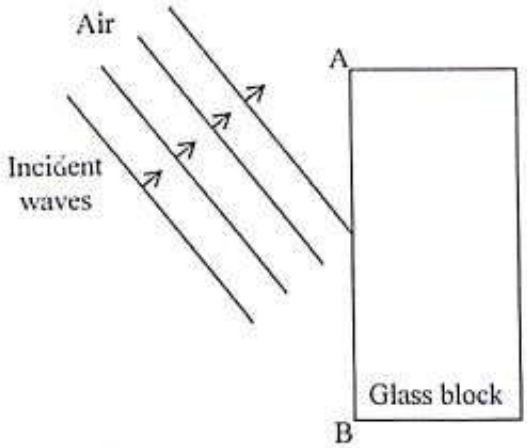
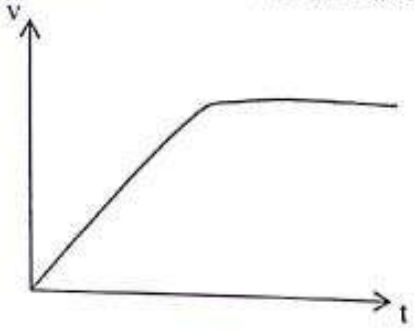
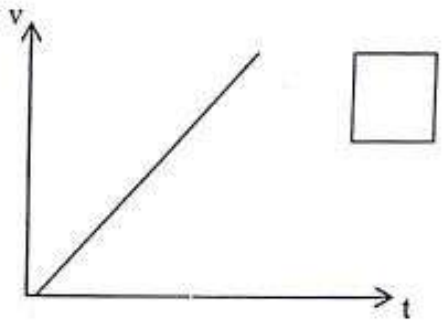


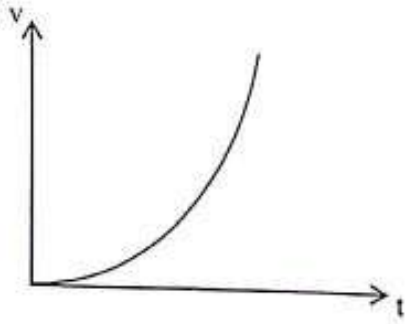
Fig. 9

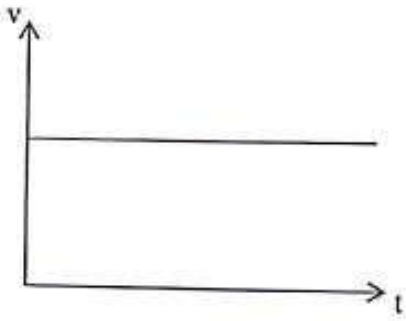
In fig.9 light waves are incident on an air glass boundary AB, if some of the waves are reflected and others are refracted, which one of the following properties is the same for both reflected and refracted waves.
A. wave length
B. frequency
C. speed
D. brightness

27. Which one of the following graphs represents motion of a body falling through a viscous fluid when net force on the body is zero?

A. 

B. 

C. 

D. 

28. Which of the following is true about frictional force between two solid surfaces in contact.
    i) Is maximum just before motion begins.
    ii) Is independent of the speed of the surfaces.
    iii) Increases when the area of contact increases.
    A. (i) only
    B. (i) and (iii) only
    C. (i), (ii) and (iii) only
    D. (i) and (ii) only

29. An electrically charged object may be discharged by being held just above a flame. This is because the;
    A. object becomes a conductor when heated.
    B. object acquires an opposite charge to that of the flame.
    C. hot gases in the flame are ionized.
    D. object is ionized when heated.

30. A strong sealed container is full of dry air at a pressure of 1.0 atmospheres and a temperature of 27°C. To what temperature must the container be heated for the pressure inside it to be equal to 1.5 atmospheres?
    A. 177°C
    B. 240°C
    C. 410°C
    D. 450°C

31. The electrolyte used in a dry cell is
A. manganese IV oxide
B. ammonium chloride
C. potassium dichromate
D. sulphuric acid

32. An electric equipment which works on a principle of a force on current carrying conductor is....
A. motor.
B. dynamo.
C. a.c generator.
D. transformer.

33. The type of radiations that causes most intense ionization of air is?
A. beta particles
B. alpha particles
C. gamma particles
D. cathode rays

34. A coastal guard sees a distress rocket burst in the sky and after t seconds, he hears the bang, if the speed of sound in air is $330ms^{-1}$ and the rocket was 1650m from the coastal guard. Find the value of t.
A. $\frac{330}{1650}$ S
B. $\frac{2 \times 1650}{330}$ S
C. $\frac{1650}{330}$ S
D. $\frac{330}{2 \times 1650}$ S

35. Which force causes a rain drop to fall?
A. Surface tension
B. Centripetal
C. Frictional force
D. Gravitational force

36. A rectangular block of dimensions 8cm X 6cm X 2cm exterts a minimum pressure of $100Nm^{-2}$ when resting on a flat surface. Calculate the mass of the block.
A. 4.8×10^{-2} kg
B. 1.6×10^{-2} kg
C. 1.2×10^{-2} kg
D. 4.8×10^{-3} kg

37. If the forces acting on a moving body are in equilibrium, the body will....
A. slow down to a steady slower speed
B. move in a straight line at a steady speed
C. speed up to a steady faster speed
D. be brought to a state of rest.

38. If a fixed mass of pure water is cooled slowly from 10°c to 0°C, what will happen to its volume?
A. It will increase steadily
B. It will decrease steadily
C. It will first decrease and then increase steadily
D. It will first increase and then decreases steadily

39. Dew point is defined as?
A. The temperature at which water vapour present in air is enough to saturate it
B. The temperature at which saturated vapour pressure is equal to external pressure
C. The temperature of pure melting ice
D. The temperature of steam at standard atmospheric pressure.

40. Which of the following are found in an a.c generator?
i) Slip rings
ii) Commutator rings
iii) Battery
A. (i), (ii) and (iii)
B. (i) and (ii) only
C. (ii) only
D. (i) only

SECTION B

41. a) Define surface tension. *(01mk)*

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b) State any two practical evidences to show existence of surface tension. *(02marks)*

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c) $0.008cm^3$ of oil forms a patch of area $800cm^2$ on top of water. Calculate the height of an oil molecule in this patch. *(02 marks)*

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42. a) (i) What is meant by uniform retardation? *(01 mark)*

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(ii) Sketch a displacement – time graph for a body moving with uniform retardation. *(02 mark)*

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b) A woman of mass 70kg stands in a lift moving downwards with uniform acceleration of $2ms^{-2}$. Calculate her apparent weight. *(01mark)*

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43. a) i) Define latent heat of vaporization. *(01 mark)*

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ii) An electric kettle which produces energy at the rate of 2250W contains 0.8kg of water boiling in it. If the heater continues to supply energy for 100s until 0.1kg of water is converted to vapour, calculate the specific latent heat of vapourisation. *(02 marks)*

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b) State two factors affecting the freezing point of a liquid. *(01 mark)*

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44. a) What is meant by complimentary colours? *(01 mark)*

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b) State any two pairs of complimentary colours. *(01 mark)*

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c) A radio transmitter directs pulses of waves towards a satellite from which reflections are received after 0.01s.
If the speed of the radio wave is $3.0 \times 10^{8} ms^{-1}$, how far is the satellite?
(02 marks)

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a) i) Define resonance. *(01 mark)*

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ii) Sketch a diagram to show the mode of vibration of a string at fundamental frequency. *(01 mark)*

b) A vibrating string produces a fundamental frequency with a string of length 5cm. calculate its wave length. *(02 marks)*

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46. a) Give the difference between tensile force and compression force. *(02 marks)*

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b) A string stretches from 10.0cm to 22.0cm when a force of 4N is applied. Assuming it obeys Hooke's law, what will be its total length when a load of 6N is applied on it. *(02 marks)*

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47. a)

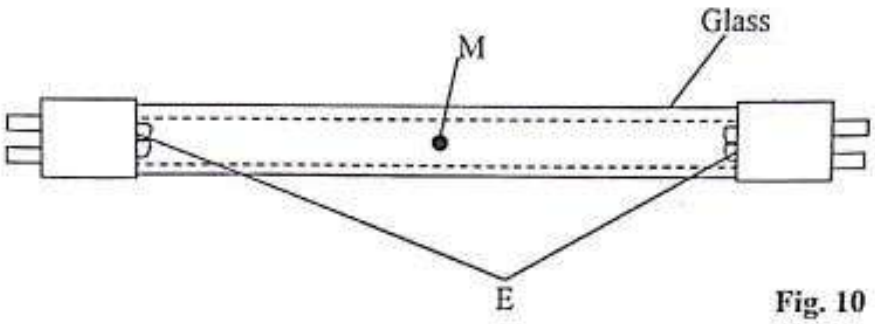

Fig. 10

Fig.10 above shows a simple diagram of a fluorescent tube. *(01 mark)*

i) Name the parts.

E.....

M.....

ii) State one advantage of the above lamp over a filament bulb. *(01 mark)*

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b) How much electrical energy in joules does 0.1kW bulb change in one minute? *(02 marks)*

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48. a) i) Define half-life. *(01 mark)*

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ii) State two differences between x – rays and gamma rays. *(01 mark)*

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b) Lithium nuclide combines with particle X to produce tritium and Helium as shown below.

$$^{6}_{3}Li + X \longrightarrow {}^{3}_{1}H + {}^{4}_{2}He$$

i) Complete the equation of reaction. *(01 mark)*

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ii) Give a name to particle X. *(01 mark)*

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49. a) i) What is a magnetic domain? *(01 mark)*

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ii) Sketch a diagram to show the arrangement of domains in an unmagnetized material. *(01 mark)*

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b) Fig.11 Shows a diagram of an electromagnet.

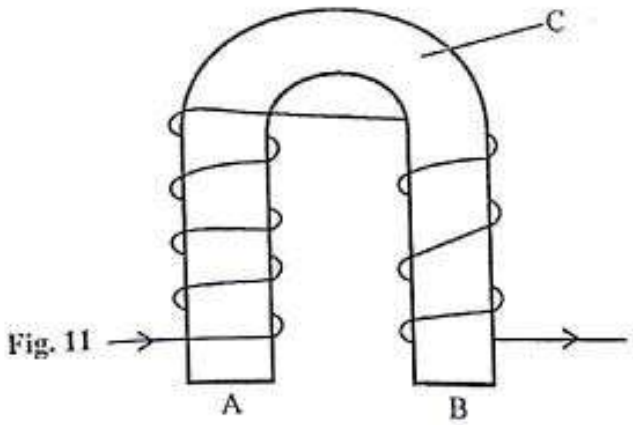

Fig. 11

(i) Name material C..... *(01 mark)*

(ii) Determine the polarities of A and B *(01 mark)*

A: .....

B: .....

50. a) What is meant by the term electrostatic induction? *(01 mark)*

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b) State any two differences between charging a body by induction and charging by contact. *(02 marks)*

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c) Give two uses of a gold leaf electroscope. *(01 mark)*

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END

ame.....Index No .....

chool..... .....Signature .....

535/1
PHYSICS
PAPER 1
uly/August 2012
$2^1/_4$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 1

2hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- *This paper has* **two** *sections;* **A** *and* **B.**
- *Section* **A** *contains* **40** *objective type questions. You are required to write the correct answer* **A, B, C** *or* **D** *in the box on the right hand side of the question.*
- *Section* **B** *contains* **10** *structured questions. Answers to this section are to be written in the spaces provided on the question paper.*
- *Assume where necessary:*
  - *acceleration due to gravity, g* = $10ms^{-2}$
  - *specific heat capacity of water* = $4200\ J\ kg^{-1}k^{-1}$
  - *specific heat capacity of copper* = $400\ J\ kg^{-1}k^{-1}$
  - *density of water* = $1000kgm^{-3}$
  - *density of mercury* = $13600kgm^{-3}$
  - *speed of sound in air* = $330ms^{-1}$
  - *specific latent heat of vaporization of water* = $2.3 \times 10^6 J\ kg^{-1}$
  - *Speed of light in Vacuum* = $3.0 \times 10^8 ms^{-1}$

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

SECTION A

1. Which of the following are specified by both magnitude and direction?

   A. Momentum, acceleration, time, energy
   B. Speed, temperature, mass, time
   C. Velocity, work, power, pressure
   D. Displacement, velocity, acceleration, electric field.

2. Water storage tanks are usually raised in order to;

   A. Reduce pressure of the flowing water.
   B. Increase pressure of the flowing water
   C. Minimise wastage of water
   D. Increase durability of the tank.

3. Figure 1. Below represents a ray of light travelling from water to glass. Given that the refractive indices of water and glass are 1.33 and 1.50 respectively, calculate angle X.

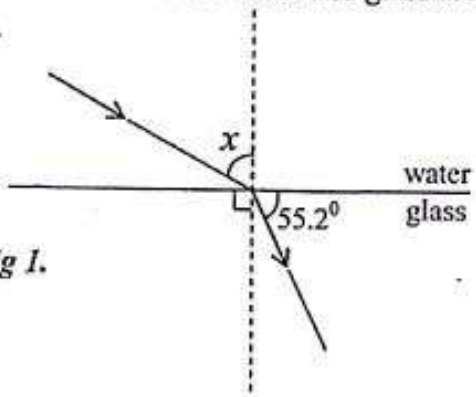


Fig 1.

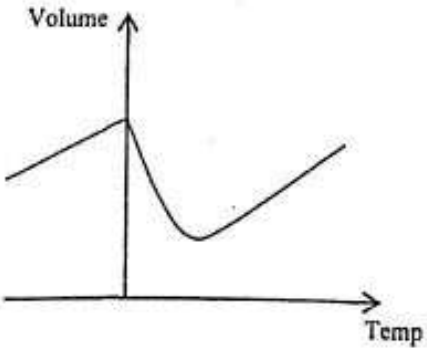
   A. 40^0
   B. 49^0
   C. 59^0
   D. 68^0

4. The rate at which energy is dissipated is.....

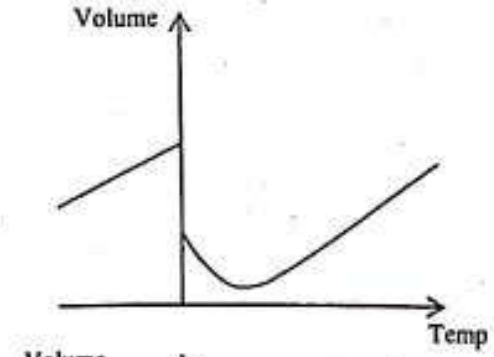
   A. Work done
   B. Impulse
   C. Power
   D. Strain

5. Which of the following graphs shows the variation of volume with temperature for water temperature changing from -5^0C to 20^0C?

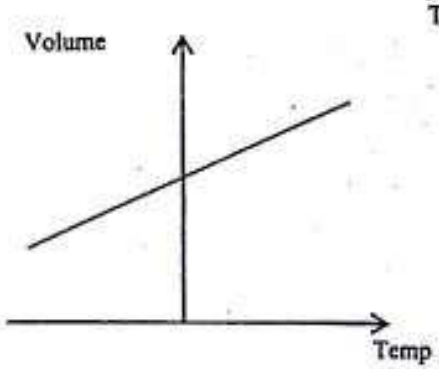
   A.

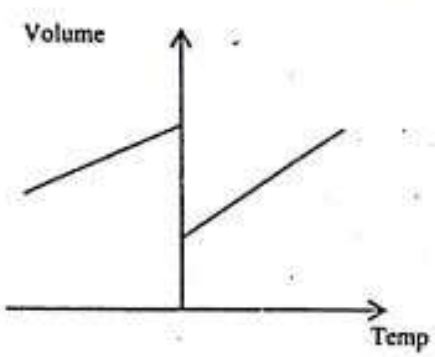


C.



D.





A spring extends by 3cm for every 2N of the force applied. What mass of a stone is required to extend a spring by 18cm within the elastic limit?

A. 1.2Kg
B. 3.0Kg
C. 10.8kg
D. 12.0kg

The point of maximum energy on a stationary wave is called?

A. Crest
B. Node
C. Antinode
D. Trough

A freshly made liquid in glass thermometer has got a fundamental interval of 92.0mm. When it is used to measure temperature, the mercury thread is observed to be 59.8mm below the steam point. The temperature reading at that point is....

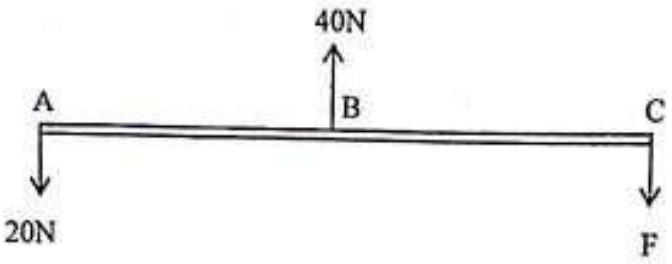
A. 32.2^0C
B. 33.1^0C
C. 34.0^0C
D. 35.0^0C

9. The slope of a distance time graph represents

A. Velocity of a body
B. Speed of a body
C. Acceleration of a body
D. Displacement of a body

10. Figure 2. Shows a light beam in which AB = BC.
Calculate the value of F required to keep the beam stationary.

Fig 2



A. 20N
B. 30N
C. 40N
D. 49

11. Which of the following are true about X-rays?
(i) They travel in straight lines
(ii) They ionize gases
(iii) They are deflected by electric fields
(iv) They diagonise stomach ulcers

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

12. A rod of an insulating material is given a positive charge by rubbing it with a piece of fabric and the fabric is then tested for electric charge. You would expect the fabric to have?

A. a positive charge greater than that on the rod.
B. a positive charge equal to that on the rod.
C. a negative charge equal to that on the rod.
D. a negative charge less than that on the rod.

13. A man standing at P, some distance from a vertical wall hits a drum and hears the echo after 4 seconds.
Find the time required by a cyclist moving at $60ms^{-1}$ to cover the distance from the wall to P.

A. 11seconds
B. 66seconds
C. 82.5 seconds
D. 660.0seconds

14. During constructive interference,
A. A crest of one wave falls on a trough of the other
B. There is no disturbance
C. There is increased disturbance
D. A trough of one wave falls on the crest of the other

15. Which is of the following is true for resistance of a voltmeter and the way in which it is connected in a circuit?

	Resistance	Connections
A.	Zero	Parallel
B.	Low	Series
C.	Low	Parallel
D.	High	Parallel

16. Under plastic deformation, a body can.....
A. Retain its original shape when a force is removed.
B. Not retain its original shape when a force is removed.
C. Not extend any more
D. Still be under its elastic limit.

17. During an inelastic collision,...
A. Momentum is conserved but not kinetic energy.
B. Neither momentum nor kinetic energy is conserved.
C. Kinetic energy is conserved but momentum is not.
D. Kinetic energy and momentum are conserved.

18. An object is placed at a distance Xcm from a convex lens of focal length, f. A virtual image is formed when,
A. X is equal to f
B. X is twice f
C. X is less than f
D. X is greater than f

19. Ssali lives in a single room with one bulb rated 100W as a source of light. He switches on the buld for 3hours everyday for one month. What will be the amount on his bill if the month has 30days? And the unit cost of electricity is 500/=
A. 4,500,000/=
B. 900,000/=
C. 50,000/=
D. 4,500/=

20. An unmagnetised bar of soft iron is tested at both ends by the south pole of a permanent magnet. Which of the following is observed?

A. Repulsion from both ends
B. Attraction from one end and repulsion from another end
C. Attraction from both ends
D. Repulsion from one end and no effect from the other end.

21. A piece of metal weighs 1N in air and 0.60N in water what will it weigh in alcohol of relative density 0.8?

A. 1.20N
B. 0.48N
C. 0.68N
D. 0.80N

22.

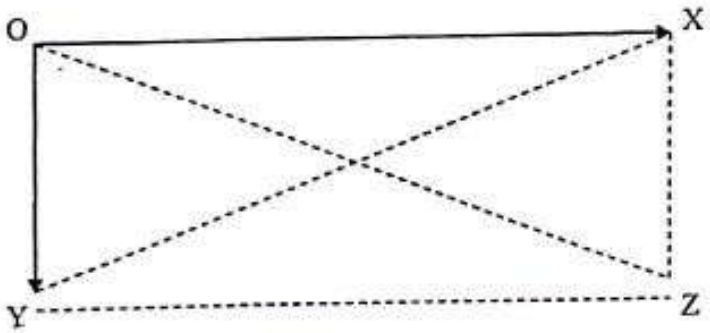


Fig.3

Figure 3. above shows two forces acting at a point O represented by OX, and OY. The third force required to maintain equilibrium is represented by:

A. OZ
B. YX
C. YZ
D. XZ

23. Which of the following does not use a bimetallic strip thermostat?

A. Car flasher unit
B. Electric Flat iron
C. Refrigerator
D. Gas oven

24. What kind of rays do solar cells depend on for their effective function?

A. Solor rays
B. Ultra-violet rays
C. Cathode rays
D. X-rays

25. A sphere of diameter 20cm was cut into two equal parts to form 2 converging mirrors. Determine the focal length of each of the mirrors.

A. 1.0cm
B. 4.0cm
C. 5.0cm
D. 10.0cm

26. 100g of water at 24^0C is added to 50g of water at 36^0C. the final temperature of the mixture is

A. 28^0C
B. 32^0C
C. 30^0C
D. 34^0C

27. A given radio station broad casts at 97.3MHZ. Determine the wave length of the signal

A. 0.31m
B. 3.08m
C. 3.24m
D. 32.43m

28. A radioactive substance has a half life of 2days.
After 14days, 127g had decayed. What was the initial mass of the substance?

A. 2g
B. 32g
C. 64g
D., 128g

29.

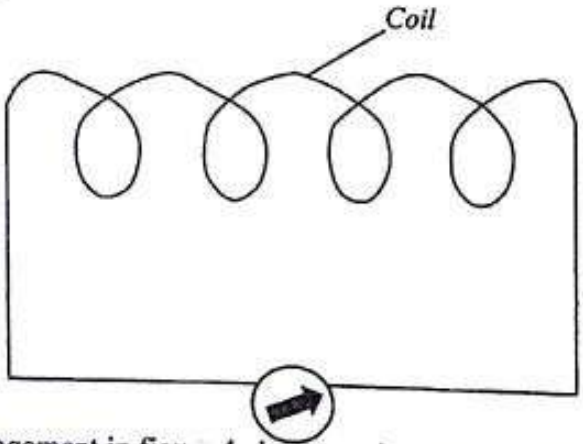
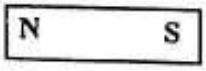


Fig.4



Magnet

The arrangement in figure 4 above can be used to produced an emf. Which of the following causes the emf?

A. The attraction between the coil and the magnet
B. The vertical movement of the magnet.
C. The relative horizontal motion of the coil and the magnet.
D. Keeping the magnet and the coil stationary.

30. The melting point of a substance is

A. the latent heat given out when a solid melts
B. the temperature at which evaporation starts
C. affected by changes in pressure
D. not affected by adding impurities.

31. An a.c input voltage of 250V is connected to a transformer with 100turns in the primary coil. Calculate the number of turns in the secondary coil if an output of 15V is required.

A. $\frac{100}{250-15}$ turns

B. $\frac{100 \times 15}{250}$ turns

C. $\frac{100}{250+15}$ turns

D. $\frac{100 \times 250}{15}$ turns

32.

Fig.5

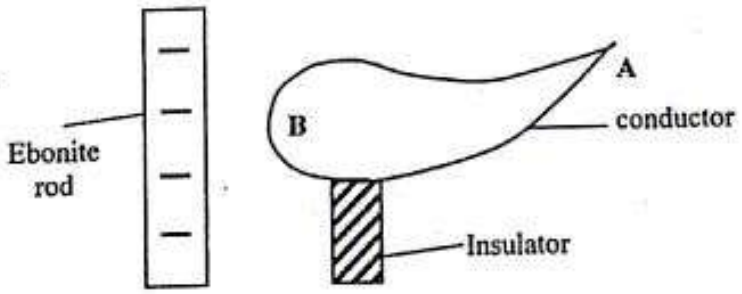


Figure 5 shows a negatively charged ebonite rod brought closer to a spear shaped conductor on an insulated stand. This results in;

A. Induction of positive charges at the near side B and negative charges at the far side A.
B. Concentration of more charge at A than at B
C. Concentration of more charge at B than at A
D. Concentration of all the negative charges at A

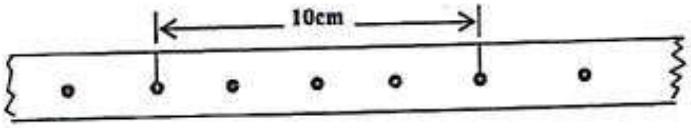
33. Which of the following statements is false for a body changing from solid to liquid?
A. Temperature of the body remains constant
B. Temperature of the body changes
C. Intermolecular forces of attraction are broken
D. Average kinetic energy of molecules remains constant.

34. Accommodation of the eye refers to…
A. Nearest position for which the normal eye can see the object in greatest detail.
B. Adjustment of the size of the pupil.
C. Ability of the eye lens to vary its focal length
D. Ability of the eye to focus nearby objects.

35. Which of the following devices can be used to measure internal diameter of a water pipe.
A. Engineers caliper
B. Tape measure
C. Micrometer screw gauge
D. Vernier caliper

36. A ticker tape in figure 6 below was pulled through a ticker timer which makes 50dots per second.

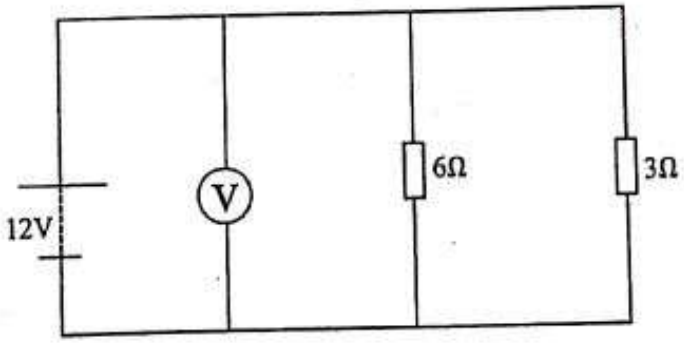
Fig.6



The speed at which the tape was pulled is
A. $80cms^{-1}$
B. $1.25cms^{-1}$
C. $32.0cms^{-1}$
D. $34.0cms^{-1}$

37.

Fig.7



A battery of emf 12V is connected across two resistors of 6Ω and 3Ω as shown in figure 7. Which one of the following statements is true about the circuit?
A. P.d across 6Ω is half the p.d across 3Ω
B. P.d across 6Ω is the same as the p.d across 3Ω
C. P.d across 6Ω is the same as the p.d across 3Ω
D. Reading of voltmeter V is greater than 12V.

Turn Ov

38. If the forces on a moving train along a leveled straight truck are equal and opposite, the train will.

A. move with a faster speed
B. accelerate uniformly
C. come to a stop
D. move with a constant velocity

39. A pin is placed infront of a convex lens at a distance more than the focal length of the lens.
The image formed is…
A. Real and inverted
B. Virtual and inverted
C. Real and upright
D. Virtual and upright.

40.

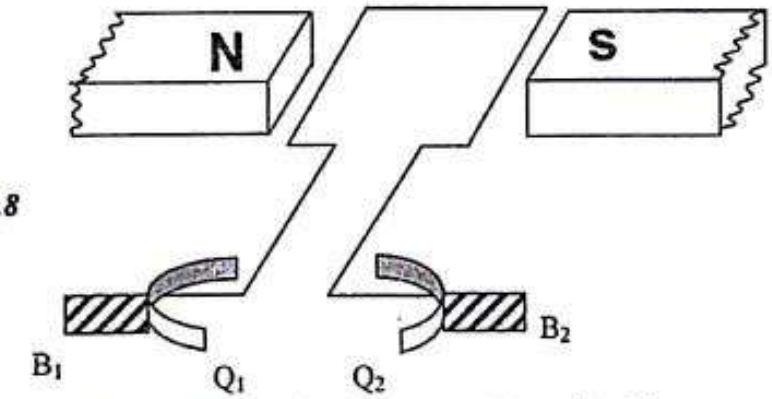


Fig.8

Figure 8 shows a simple electric motor. The coil of the motor continues to turn in the same direction because the commutators Q_1 and Q_2 and the brushes B_1 and B_2 …

A. reverse current in the coil every half of a revolution of the coil.
B. reverse polarity of the magnet every half a revolution of the coil.
C. contract and expand every half a revolution of the coil.
D. become magnetized.

SECTION B

41. a) State the principle of transmission of pressure in fluids. *(01mk)*

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b) A barometer reads 76cmHg at the bottom of a mountain of height 272m. when the barometer is transferred to the top of the mountain, it reads a new value X cm Hg. Determine the value of X if the density of air is $1.25kgm^{-3}$, and density of mercury is $13600kgm^{-3}$ *(03mk)*

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42. a) Define

(i) Stress *(01mk)*

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(ii) Strain *(01mk)*

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b) A material is acted upon by a force of 1540N. The material acquires a stress of $1000Nm^{-2}$. Calculate the cross section area of the material. *(02mk)*

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43. a) What is an ideal gas? *(01mk)*

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b) Write down an equation that combines all the gas laws. *(01mk)*

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c) A gas of volume $200cm^3$ at 27^0C is heated to 427^0C at constant pressure. What is the new volume? *(02mks)*

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44. a) Differentiate with aid of sketch diagrams, between diffuse and regular reflection *(02mks)*

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b) Two plane mirrors are inclined at 90^0 to each other as shown in fig. 9 below

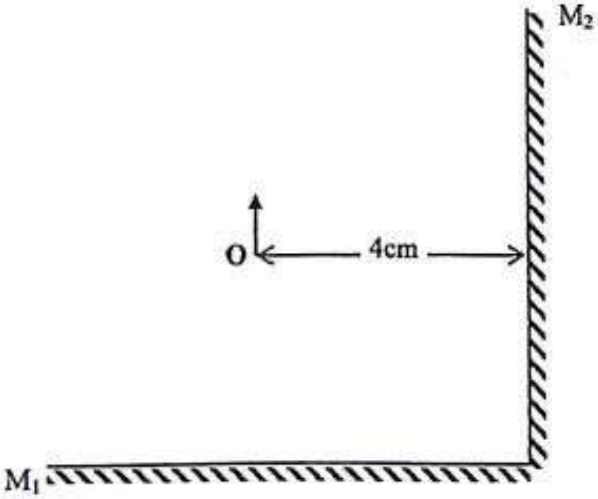

Fig. 9

An object O is positioned at 4cm from M_2. If the shortest distance between the two images produced by the object before mirrors M_1 and M_2 is 10cm. Calculate the distance between the object O and mirror M_1. *(02mks)*

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45. a) Define electric current *(01mk)*

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b) State two factors affecting the quantity of current flowing through a conductor. *(01mk)*

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c) A heating element of resistance 15.0Ω is connected across a p.d of 12.0V. If the element is used to heat water for half a minute, calculate the quantity of heat absorbed by water. *(02mk)*

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46. a) Define the following as applied to wave motion

(i) Reveberation *(01mk)*

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(ii) Wave front *(01mk)*

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b) Water waves are produced in a ripple tank during an experiment using a clipper moving up and down 4 times every second. If the velocity of the waves is $20ms^{-1}$, determine the wavelength of the wave. *(02mks)*

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Turn Over

47. a) Differentiate between half wave and full wave rectification. *(02mks)*

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b) With aid of a diagram, sketch a p.d against time graph to show output from

(i) Full wave rectification *(01mk)*

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(iii) Half wave rectification *(01mk)*

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48. a) Define magnetic field. *(01mk)*

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b)

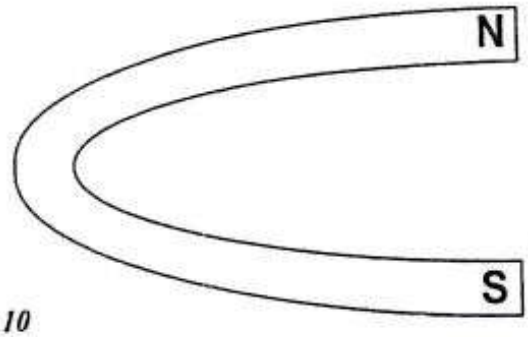

Fig.10

Figure 10 shows a horse shoe magnet. Sketch the magnetic field pattern formed by the magnet *(01mk)*

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c) Distinguish between hard magnetic material and soft magnetic material. *(02mks).*

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49. a) Define the following terms

(i) Work input of a machine *(01mk)*

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(ii) Work output of a machine *(01mk)*

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b)

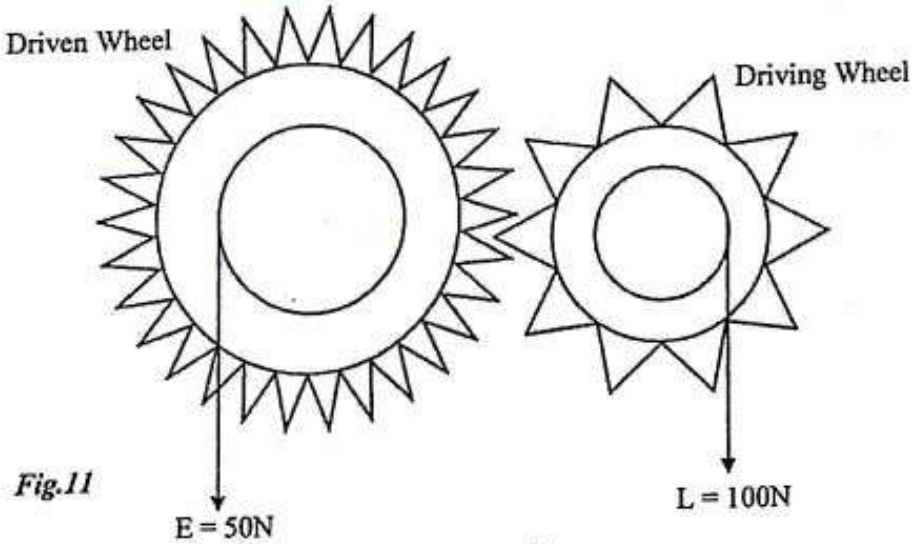

Fig.11

Figure II shows a set of gears used as a machine.

What is the efficiency of the machine? *(02mks)*

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Turn Over

50. a) State Faraday's law of electromagnetic induction *(01mk)*

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b) State two ways of increasing the sensitivity of a moving coil galvanometer. *(01mk)*

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c) A galvanometer of resistance 40Ω reads up to 0.1A. It is converted into a voltmeter which can read up to 100V by connecting it in series with a multiplier. Calculate the resistance of the multiplier. *(2mks)*

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END

Name..... Index No .....

School..... Signature .....

535/1
PHYSICS
PAPER 1
July/August 2010
$2^1/_4$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

Paper 1

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- This paper has **two** sections **A** and **B**.
- Section A contains 40 objective type questions. You are required to write the correct answer A, B, C or D in the box on the right hand side of the question.
- Section B contains 10 structured questions. Answers to this section are to be written in the spaces provided on the question paper.
- Assume where necessary:

- *Acceleration due to gravity ,g*	$= 10ms^{-2}$
- *specific heat capacity of water*	$= 4200\ J\ kg^{-1}k^{-1}$
- *specific heat capacity of copper*	$= 400\ J\ kg^{-1}k^{-1}$
- *density of water*	$= 1000kgm^{-3}$
- *density of mercury*	$= 13600kgm^{-3}$
- *speed of sound in air*	$= 330ms^{-1}$
- *specific latent heat of vaporization of water*	$= 2.3 \times 10^6 J\ kg^{-1}$

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 most suitable instrument for measuring the internal diameter of a test tube is.
   A. A ruler
   B. Vernier scale
   C. Micrometer screw gauge
   D. Engineers calipers

2)

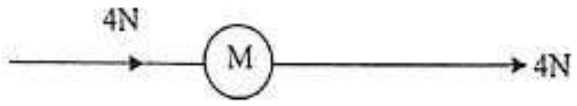


Fig. 1

Two forces act on a particle M as shown in figure 1. Find the acceleration of the particle, if it weighs 1300N
   A. $0.01ms^{-2}$
   B. $10ms^{-2}$
   C. $0.10ms^{-2}$
   D. $100ms^{-2}$

3) Cotton clothes keep the body warm because
   A. They are usually dull coloured
   B. They are usually thicker than other materials
   C. They stick to the body and prevent heat loss from the body
   D. They contain good air pockets which provide good heat insulation.

4) A concave mirror produces an image of unit magnification when the object is placed at
   A. The centre of curvature
   B. The principle focus
   C. Infinity
   D. The pole

5) In a stationary wave formed in a pipe the distance between two successive antinodes is 2cm. If the wave frequency is 800Hz. Find its velocity
   A. $16\ ms^{-1}$
   B. $32\ ms^{-2}$
   C. $1600\ ms^{-1}$
   D. $3200\ ms^{-1}$

6) The periodic time of a simple pendulum can be significantly reduced by;
   A. Increasing the mass of the pendulum bob
   B. Increasing the volume of the pendulum bob
   C. Decreasing the amplitude of the swing of the pendulum bob
   D. Decreasing the length of the pendulum

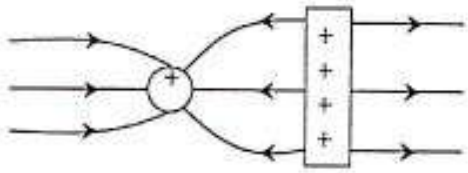
7) Which of the following radiations are emitted by a radioactive substance?
   A. Alpha particles, gamma rays and X- rays
   B. Cathode rays, X – rays and beta particles
   C. Gamma rays, alpha particles and beta particles
   D. Cathode rays, X – rays and alpha particles

8) The heat supplied to a gas may do all these except
A. Increase the size of its molecules
B. Increase its temperature
C. Increase the speed of its molecules
D Cause expansion of the gas

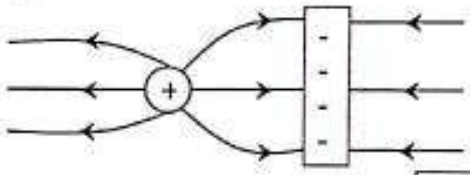
9) A galvanometer has a resistance of 50Ω and full scale deflection of 40mA. It can be designed to measure current up to 2A by connecting a
A. Shunt of 0.98Ω in series with it
B. Shunt of 1.02Ω in parallel with it
C. Multiplier of 1.02Ω in series with it
D. Multiplier of 0.98Ω in parallel with it

10) Which of the following diagrams in figure 2 represent the correct electric field pattern between a charged sphere and a charged plate at a small distance apart?

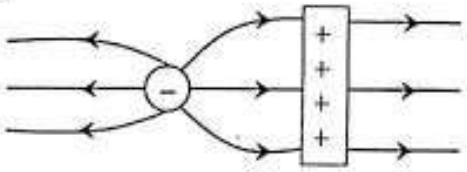
A.



B.



C.



D.

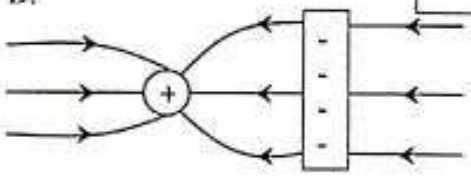


Fig.2

11) The following chemicals cannot be used to minimize polarization in a simple cell except
A. Zinc amalgam
B. Potassium dichromate
C. Carbon powder
D. Concentrated sulphuric acid

12) A Newton second is
A. A unit of moment of force
B. A unit of gravitational force
C. Equivalent to $kgms^{-1}$
D. A unit of force per unit time

13) What mass of cold water at 30^0 must be added to 80kg of hot water at 60^0C in order to take a bath with water of 50^0C?
A. 20kg B. 40kg C. 45kg D 80kg

14) Which of the following colours are arranged in order of increasing frequency?

A.	Yellow	Green	Indigo	Violent
B.	Green	Yellow	Indigo	Violent
C.	Violent	Indigo	Green	Yellow
D	Indigo	violent	Yellow	Green

15) In figure 3, XY is a solenoid of insulated wire wound on a cardboard tube PQ is a soft iron cylinder.

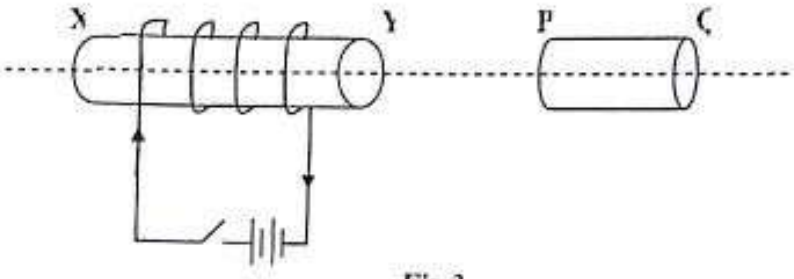


Fig.3

The current is switched on and is in the direction indicated by the arrows.
Which of the following pairs is correct?

A. X is a north pole and P is a south pole
B. X is a north pole and P is a north pole
C. Y is a south pole P is a north pole
D. Y is a south pole and P is a south pole

16) In an experiment to determine the volume of an oil drop, the level of oil from burette fell from $25cm^3$ to $27cm^3$ mark. If 50 drops were run out of the burette. Find the volume of one drop

A. $4 \times 10^{-8} cm^3$
B. $4 \times 10^{-6} cm^3$
C. $4 \times 10^{-2} cm^3$
D. $4 \times 10^{2} cm^3$

17) The formation of a caustic curve in curved mirror is due to

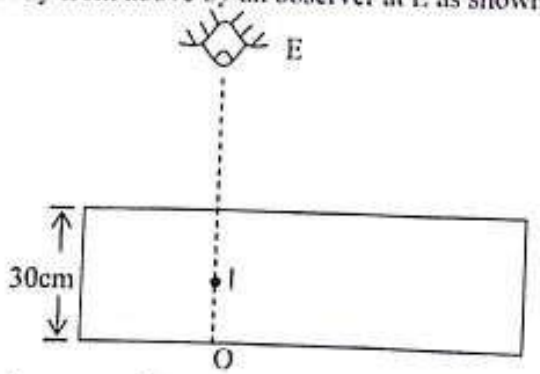
A. Mirrors having long focal length.
B. Mirrors having highly polished surface
C. Mirrors having large apertures
D. Diffuse reflection in mirrors

18) When the pressure applied on the surface of water is reduced;

A. Its boiling point increases.
B. Its boiling point remains constant.
C. Its boiling point is reduced.
D. Its saturated vapour pressure is increased.

19) A glass block of thickness 10cm and refractive index 1.5 is placed on top of an object O viewed directly from above by an observer at E as shown in the figure below.

Fig 4



Find the displacement of the image OI

A. 1.5 cm B. 1.0cm C. 0.033cm D. 2.0 cm

20) In a gear wheel system the velocity ratio is given by
A. Number of teeth on driving wheel divided by the number of teeth on driven wheel
B. Number of teeth on driving wheel multiplied by number of teeth on driven wheel
C. Number of teeth on driving wheel added to number of teeth on driven wheel
D. Number of teeth on driven wheel divided by the number of teeth on driving wheel

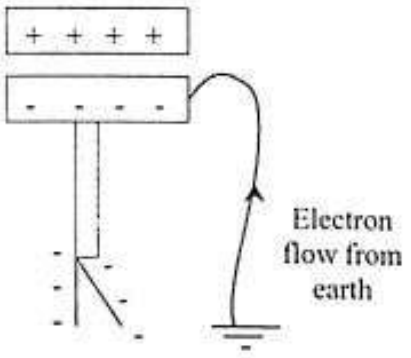
21) Handles on a door are normally fitted at a distance far from the hinges. This is in order to
A. Use little force on the door and increase the moment of force
B. Use little force on the door and decrease the moment of force
C. Use much force and decrease moments of force
D. Use much force and increase moment of force.

22) One of the statements is true about a radioactive sample
A. Its half life reduces with reduction in mass
B. Its activity remains constant
C. Its rate of decay increases with increase in temperature
D. The mass decay increases with time

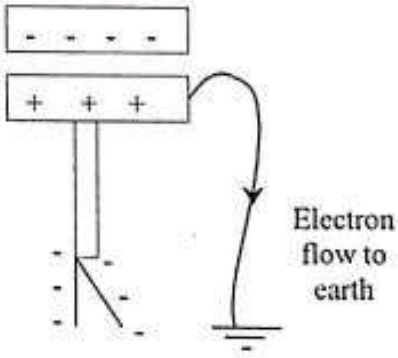
23) Which of the following sets contains only magnetic substance?
A. Steel, copper, iron
B. Cobalt, ion, nickel
C. Brass, steel, glass
D. Nickel, steel, aluminium

24) Which of the following diagrams in figure 5 below represents the correct flow of electrons during the charging process of an electroscope?

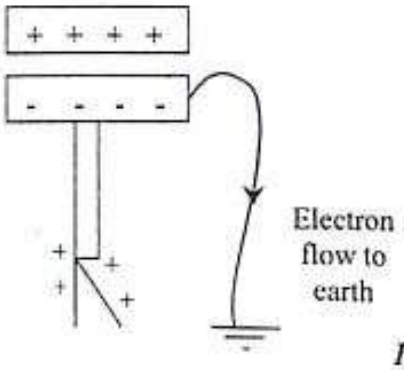
A.



C.



B.



D.

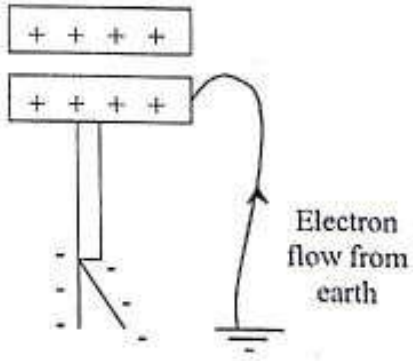
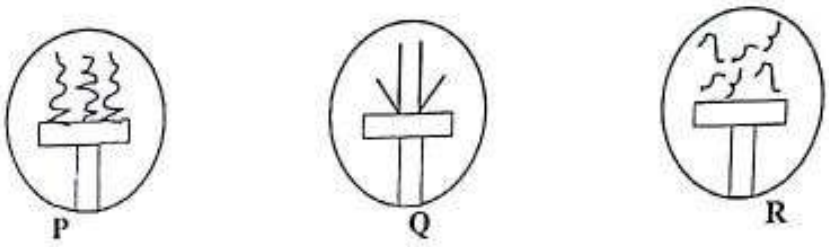


Fig. 5

25)

Fig 6



The figure 6 above shows cloud chamber trails of radioactive particles. Identify P, Q and R

	P	Q	R
A	∝ - Particles	β - particles	ɣ - rays
B	ɣ - rays	∝ - Particles	β - particles
C	β - particles	∝ - Particles	ɣ - rays
D	ɣ - rays	β - particles	∝ - Particles

26)

If the effective resistance. of the arrangement shown figure 7 below is 4Ω. Find the value of R.

A. 1.0Ω B. 1.5Ω C. 4.5Ω D. 15.0Ω

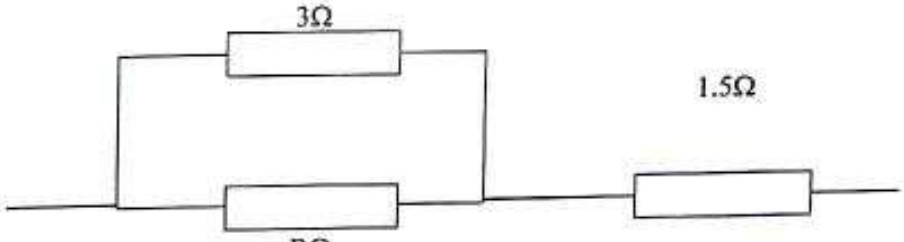
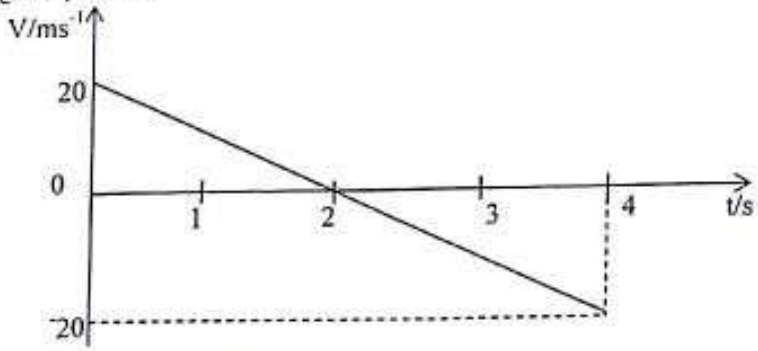


Fig.7

27) In an experiment to determine the speed of sound in air, two experimenters stand at a known distance from each other. One clapped while the other started the stop clock simultaneously. Below are the likely sources of error in the experiment except

A. Poor timing.
B. Effect of the wind
C. Effect of temperature differences.
D. Distance from experimenters.

28) The graph below represents the motion of a ball thrown vertically upwards and finally returns to the its original position



The total displacement of the ball is

A 0m B 20m C. 40m D. 80m

29) The retina in the human eye and the film in a lens camera are

A. Similar because both regulate the amount of light entering them.
B. Different because retina forms the image while a film is where the image is formed
C. Similar because both are light sensitive parts where the image is formed
D. Similar because they both control the contraction of lens as it focuses light.

30)

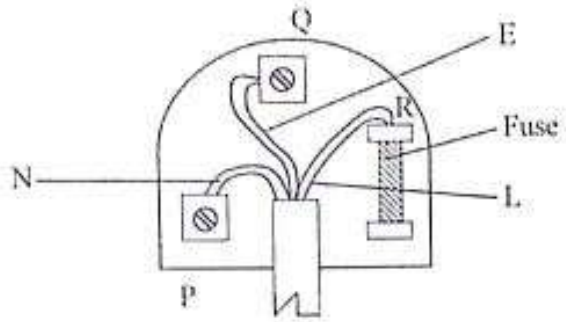


Fig. 8

The figure above shows a plug. Which contains three wires neutral – N, earth – E, live – L? Identify the correct colour code

	P	Q	R
A	Blue	Green	Brown
B	Green	Blue	Brown
C	Brown	Blue	Green
D	Brown	green	Black

31) A fixed mass of gas has a volume of $12cm^3$ when the pressure is 3.6×10^5pa. If the volume becomes $8cm^3$, the pressure at the same temperature will be

A. 1.8×10^5 Pa
B. 2.4×10^5 Pa
C. 5.4×10^5 Pa
D. 5.4×10^6 Pa

32) Plane water waves incident on a concave reflector are reflected

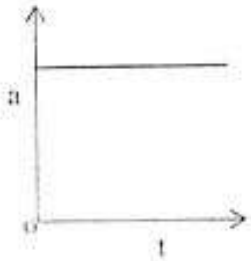
A. As plane waves
B. To converge at its center of curvature
C. To appear to come from infinity
D. To converge at its focal point

33) In a hydroelectric power station

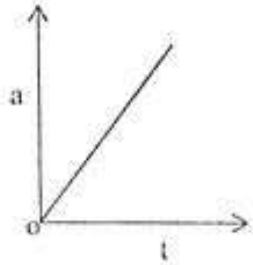
A. The wider the reservoir the more the power generated
B. The water runs the transformer to generate power
C. The potential energy of the water is turned into electrical energy.
D. Water turns into steam to run the turbines

34) Which one of the following graph below shows the variation of acceleration of a body falling through a viscous fluid with time.

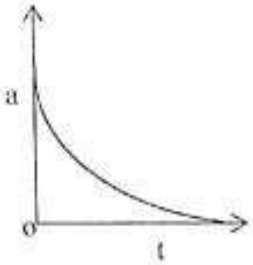
A.



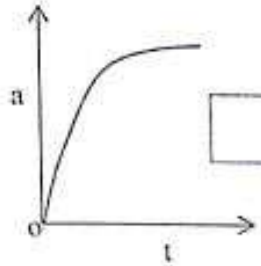
B.



C.



D.



35) The temperature at which objects have minimum internal energy is

A. Thermodynamic temperature
B. Final steady temperature
C. Optimum temperature
D. Absolute zero

36) A car moving too fast along a circular path skids off the road because
A. The wheels stop moving
B. The friction does not provide sufficient centripetal force
C The steering wheel is too slow
D. All the three above.

37)

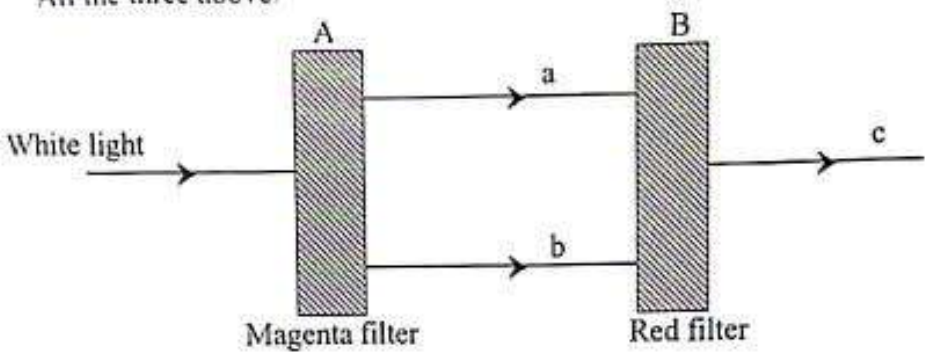


Fig. 9

In the figure 9 above, A and B are two filters whose colours are magenta and red respectively. When white light is incident on filter A, what colour of white light will be represented by a, b and c.

	a	b	c
A	Green	Red	Blue
B	Red	Cyan	Red
C	Blue	Red	White
D	Red	Blue	Red

38)

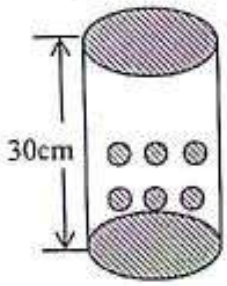


Fig. 10

The figure 10 above shows a cylindrical tube of length 30cm, containing lead shots at a temperature of 10^0C. The tube is inverted 50 times and the temperature of the lead shots is found to rise to 70^0C. Find the specific heat capacity of the lead shots

A $0.25\ J\ kg^{-1}K^{-1}$ B. $2.50\ J\ kg^{-1}\ K^{-1}$
C $25.0\ J\ kg^{-1}K^{-1}$ D. $50.0\ J\ kg^{-1}K^{-1}$

39) The following statements illustrate the law of inertia except
A. A coin on a piece of paper placed on top of a cup falls into the cup when the piece of paper is suddenly pulled
B. Passengers in a car jerk backwards when a car suddenly accelerates at a high rate from rest
C. A bullet fired from a gun moves forward while the gun moves backwards
D. A boy in a fast moving vehicle jerks forward when it suddenly brakes

40)

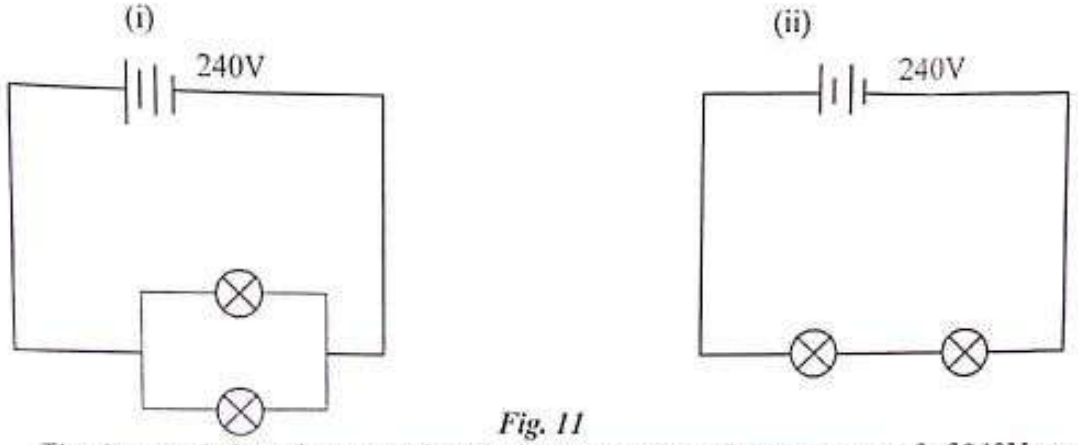


Fig. 11

The diagram below shows two identical lamps connected across an e.m.f of 240V as shown in (i) and (ii)

Which of the following statements is true about the above arrangement?

A. In (i) the lamps produce more light than the lamps in (ii)
B. In (ii) the lamps produce more light than the lamps in (i)
C. the effective resistance in (i) is more than the effective resistance in (ii)
D. The p.d across the lamps in (i) is different while the p.d across the lamps in (ii) is the same

SECTION B

41) (a) What is meant by ***atmospheric pressure***? (1mk)

.....

.....

.....

(b) State any two applications of atmospheric pressure (1mk)

.....

.....

(c)

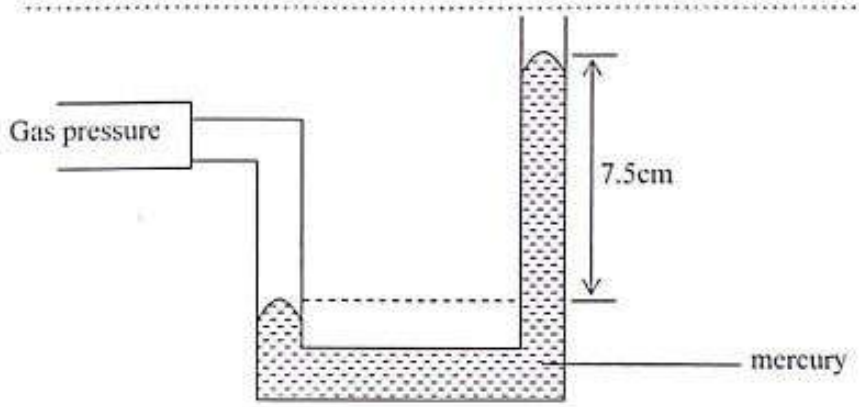


Fig. 12

The figure above is a manometer with mercury connected to a gas supply as shown. Given that atmospheric pressure = 76cmHg. Calculate the pressure of the gas supply in Nm^{-2}. (2mks)

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42) (a) Define the term "Average speed" (1mk)

.....

.....

(b) The diagram below shows a tape obtained from a ticker tape operating at a frequency of 50Hz

(c)

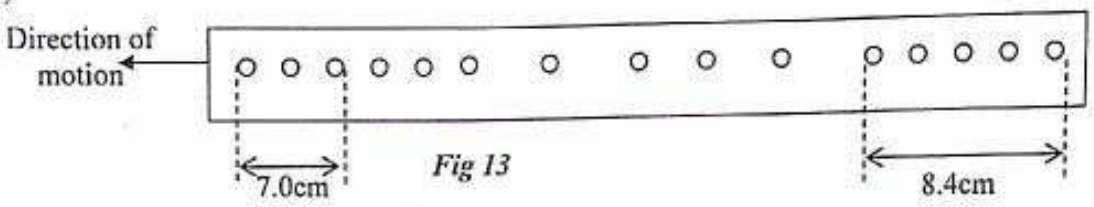

Fig 13

Determine

i) The initial velocity (01 mk)

.....

.....

.....

ii) The final velocity ($0^1/_2$mk)

.....

.....

.....

iii) The acceleration ($1^1/2$ mks)

.....

.....

.....

43) (a) i) What is meant by the statement that the specific heat capacity of copper is 400 J $kg^{-1}k^{-1}$ (1mk)

.....

.....

ii) State two reasons why mercury is a good thermometric liquid (1mk)

.....

.....

.....

.....

(b) In an uncalibrated thermometer the length of the mercury thread is 40mm at the ice point and 120mm at the steam point.
Find the temperature when the mercury thread length is 50mm. (2mks)

.....

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44) (a) What is meant by the term ***kilowatt-hour*** as a unit of electrical energy used (1mk)

.....

.....

(b) The figure below shows a filament bulb

Fig 14

Name the parts labelled

Q .....

P ..... (1mk)

(c) The readings on an electricity meter for the month of August are shown.

	Previous reading				
kwh	1	7	3	1	3

	Current reading				
kwh	1	8	0	2	2

Find the cost of electricity used if the cost ***per unit*** is Shs 380= (2 mks)

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45) (a)

i) Sketch a ray diagram to show the formation of an image of an object placed at infinity from a convex lens. (2mks)

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(b) State two effects of increasing the size of the hole of a pinhole camera on the image formed and give a reason for each effect. (½mk)

i) Effect

.....

.....

(½mk)

Reason

.....

.....

(½mk)

ii) Effect

.....

.....

(½mk)

Reason

.....

.....

(c) State one advantage of a ***pinhole camera*** over a ***lens camera***. (½mk)

.....

.....

46) (a) State the law of ***floatation*** (01mk)

.....

.....

(b)

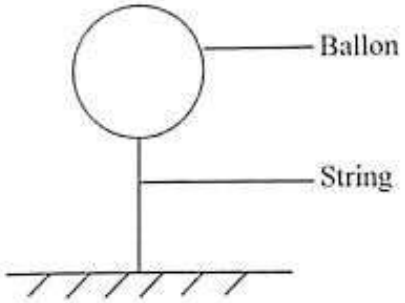

Fig. 15

The figure 15 above shows a balloon with a total weight of 1800N and volume 400m^3. Given that the density of air is 1.25kgm^{-3}, determine

i) The upthrust on the balloon (2mks)

.....

.....

ii) The tension in the string (01mk)

.....

.....

47) (a) Define *resonance* (01mk)

.....

.....

(b) An open pipe is inserted into water and a tuning fork of frequency 160Hz sounded on top of the open end. Find the length of the air column when the first loud sound is heard. (3mks)

.....

.....

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48) (a) Define the term "*Latent heat of vaporization*" (01mk)

.....

.....

(b) Calculate the quantity of heat given out when 12.0g of steam at 100^0C changes to water at 70^0C (3mks)

.....

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49) (a) What is an *electromagnet*? (01mk)

.....

.....

(b)

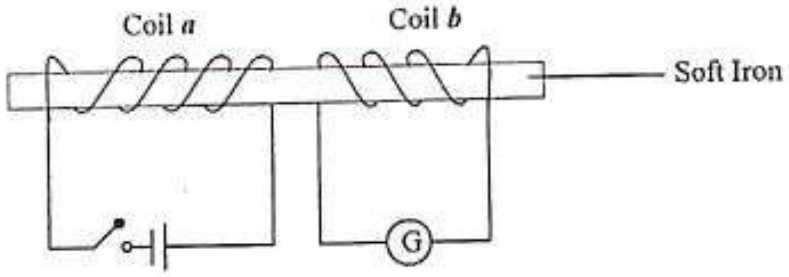


Fig. 16

In the figure 16 above suggest *two* ways of increasing the **emf** induced in coil b

i) .....

.....

(01mk)

Turn Over

ii) .....

.....

(01mk)

(c) Identify one way in which electromagnetic induction can cause transformer inefficiency

.....

.....

(01mk)

50)

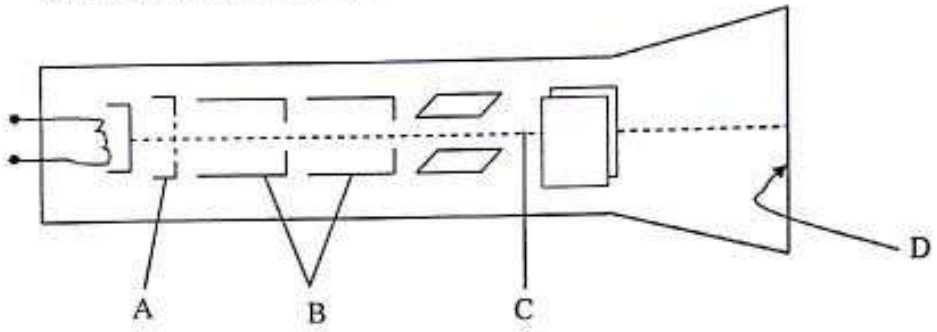


Fig. 17

a) Name the parts labelled (01mk)

C .....

D .....

b) State the functions of the parts labelled

A .....

.....

(01mk)

B .....

.....

(01mk)

b) An alternating current is applied across the Y plates with the time base on. Draw a diagram to show pattern that will be displayed on the screen of the CRO.

.....

.....

.....

(01mk)

END

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

Signature: ..... SCHOOL:
.....

535/1
PHYSICS
Paper 1
July/August 2009
2 ¼ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education
PHYSICS
Paper 1
2 hours 15 minutes.

INSTRUCTIONS

- *This paper has two sections A and B 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 – programmanble calculators may be used.*

Assume where necessary:

Acceleration due to gravity, g = 10 ms^{-2}

Specific heat capacity of water = 4200 $Jkg^{-1} K^{-1}$

Specific heat capacity of copper = 400 $Jkg^{-1}K^{-1}$

For Examiner's use only

Q.41	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. Which of the following quantities is a scalar?
   A. Force
   B. Impulse
   C. Momentum
   D. Kinetic energy

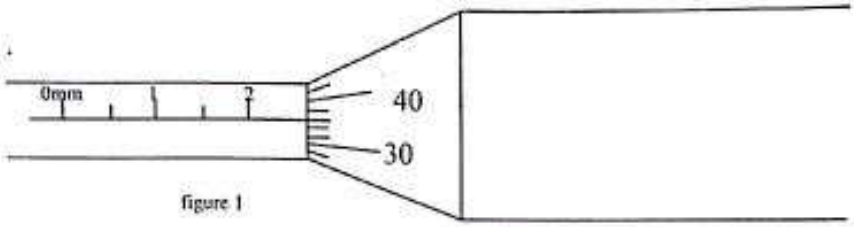
2. 

figure 1

The diagram in figure 1 shows part of a micrometer screw gauge. What is its correct reading?
   A. 32.00 mm
   B. 2.36 mm
   C. 2.33 mm

3. The heat required to raise the temperature of 20g of water from 30°C to 60°C is
   A. 2.52 KJ
   B. 2.52×10^3 KJ
   C. 6.30KJ
   D. 6.30×10^3KJ

4. When a pin hole camera is moved closer to the object, the image becomes:-
   (i) bigger in size
   (ii) Smaller in size
   (iii) Less brighter
   (iv) Blurred
   A. (i) only
   B. (i) and (iii) only
   C. (i) and (iv) only
   D. (i) , (iii) and (iv) only

5. A body starts from rest, accelerates at 2 ms^{-2} for 6 seconds, travel at a constant speed for 10 seconds and then decelerates to rest in 4 seconds. How far has it traveled
   A. 600m
   B. 180 m
   C. 80 m
   D. 36 m

6. A sensitive thermometer is one which
   A. is sensitive to heat.
   B. Can record big changes in temperature.
   C. Can record small changes in temperature.
   D. Has a large bore.

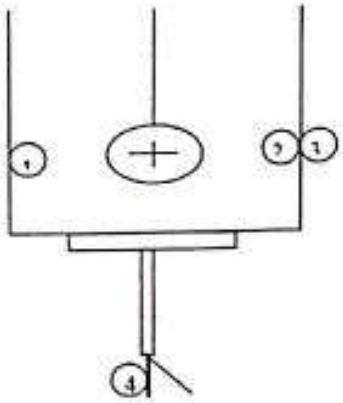
7. 

Fig 2

A conductor bearing a positive charge is lowered into a hallow conductor placed on an electroscope. What charge will be in the four regions marked?

	1	2	3	4
A.	positive	positive	negative	positive
B.	negative	negative	positive	positive
C.	positive	negative	positive	negative
D.	negative	negative	positive	negative

8. Three – quarters of radioactive atoms of a given samples undergo a radioactive decay in 24 hours. What is the half – life of the sample?
   A. 6 hours
   B. 12 hours
   C. 16 hours
   D. 24 hours

9. The relative density of a liquid can be measured using an instrument called.
   A. Hydrometer
   B. Hygrometer
   C. Barometer
   D. Manometer

10. Water at 0°C is heated to 10°C. Which of the following statements is true?
   A. The density of water decreases up to 4°C and then after it increases
   B. The density increases up to 4°C and then decreases.
   C. The volume of the water will decrease as the mass is increasing.
   D. The volume of the water will increase as the mass remains constant.

11. A coin is placed at the bottom of a tall glass cylinder containing a liquid of refractive index 1.25. if the depth of the liquid is 25.0 cm what is the apparent depth of the coin?

A. 31.25 cm
B. 26.25 cm
C. 20.00 cm
D. 0.05 cm

12.

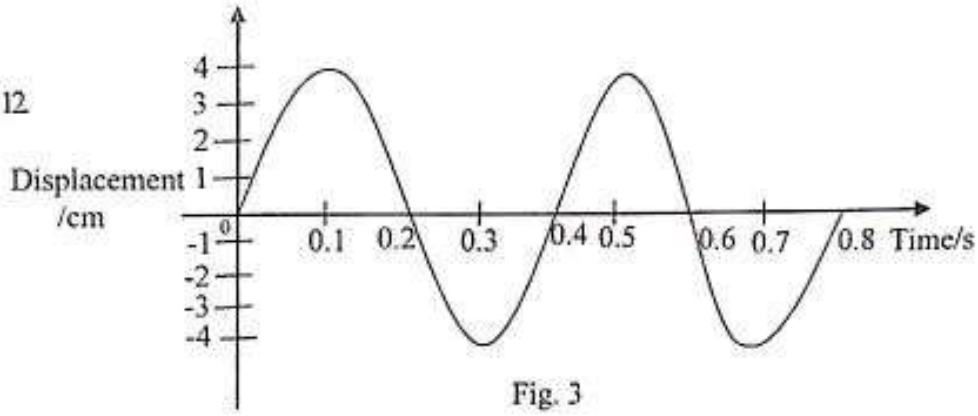


Fig. 3

If the speed of the wave in Fig 3 is $30ms^{-1}$, what is its wave length?

A. 0.04 m
B. 0.4 m
C. 12 m
D. 75 m

13. What is the cost of running four 40 W lamps and three 60W lamps for five hours of electric energy costs shs. 200/= per unit?

A. shs 100/=
B. shs 340/=
C. shs 34/=
D. shs 68/=

14. A force of 16 N is applied to a 4kg block that is at rest on a smooth horizontal surface. What is the velocity of the block in 5 seconds?

A. $50\ ms^{-1}$
B. $20\ ms^{-1}$
C. $10\ ms^{-1}$
D. $4\ ms^{-1}$

15. On which of the following factors does pitch of a note depend?

A. intensity
B. Frequency
C. Amplitude.
D. Velocity.

16. Three identical cells each of emf. 2.0 V are corrected to a resistance of 4 Ω as shown in figure 4. The resistance of the cells, the ammeter and the connecting wires are negligible.

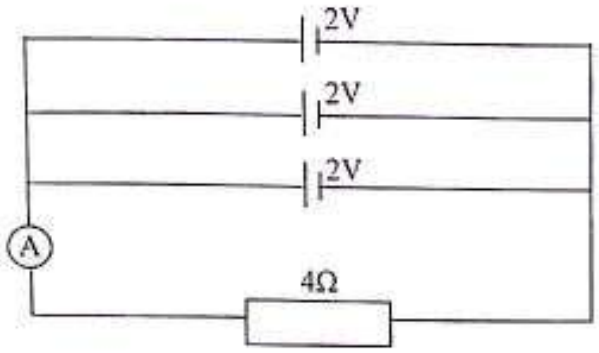


Fig 4.

The ammeter reaching is:

A. 0.17 A
B. 0.5 A
C. 1.5A
D. 2.0A

17.

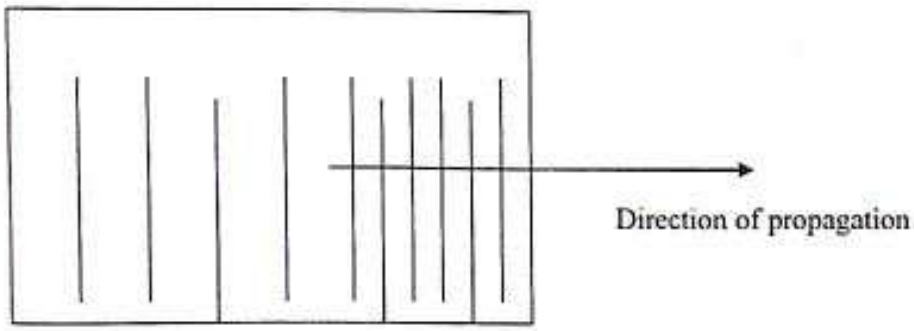
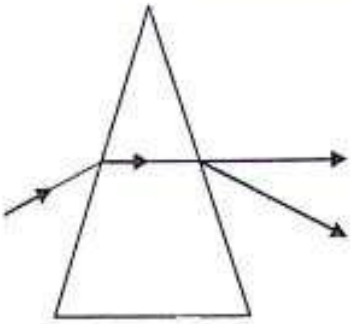


Fig. 5

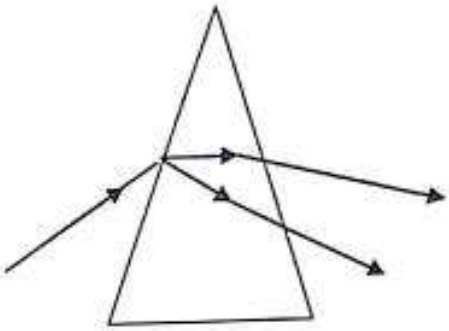
The diagram represents wares on a ripple tank traveling from P towards R. From the positions of the ware front in sections PQ and QR, it can be said that:

A. Velocity of the wares is greater in section PQ than in section QR.
B. Frequently of the waves is greater in section QR than in section PQ.
C. Ripple tank is deeper in section QR than in section PQ.
D. Wavelength and frequency of the waves change at position Q

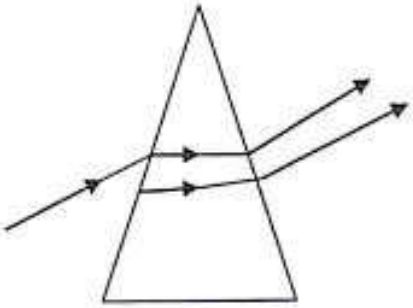
18. Which of the following diagrams correctly shows the path of white light through a glass prism?



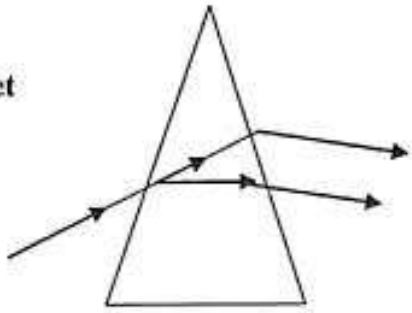
A



B



C



D

19. In which of the following are the radiations listed in order of increasing penetration?

A. α, β, ϒ.
B. ϒ β, α,
C. ϒ,α, β
D. β , α, ϒ.

20.

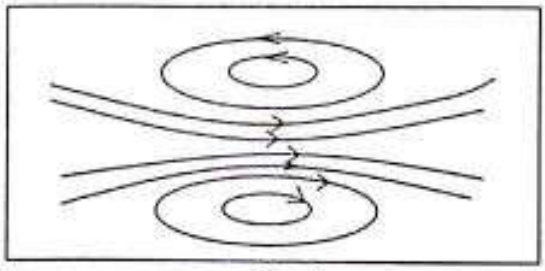


Fig. 6

The diagram represents a magnetic filed pattern caused by a,

A. horse – shoe magret.
B. Thin bar magnet.
C. Circular coil carrying a current.
D. Long solenoid carrying a current.

21. A rectangular box weighing 1600N floats is a liquid of density 2000 kgm^{-3}. the volume of the liquid displaced is ,
A. 0.08 m^3
B. 0.80 m^3
C. 1.25 m^3
D. 12.50 m^3

22. In a simple cell,
A. Potassium dichromate is used to minimize polarization.
B. Polarisation is caused by impure zinc.
C. The formation of hydrogen bubbles on the copper plate causes local action.
D. Hydrogen is produced on the zinc plate and causes polarization.

23. The quantity of charge which flows between two points when a current of 1.5A passes for 5s is
A. 0.5 C
B. 1.5 C
C. 2.25 C
D. 7.5 C

24. A conductor carrying a current placed in a negative field experience a force. Which one of the following works on this principle?
A. an electric bell
B. an electric motor.
C. An electromagnetic relay.
D. A generator.

25. When a body is set in oscillation at its own natural frequency as a result of impulses from another body, this is called.
A. force vibration.
B. Beats
C. Resonance
D. Displacement.

26. An observer hears the echo of a gun he fired 4 seconds later as it is reflected from a wall 700 away. The velocity of sound in air is
A. 175 ms^{-1}
B. 35ms^{-1}
C. 1400 ms^{-1}
D. 2800ms^{-1}

27.

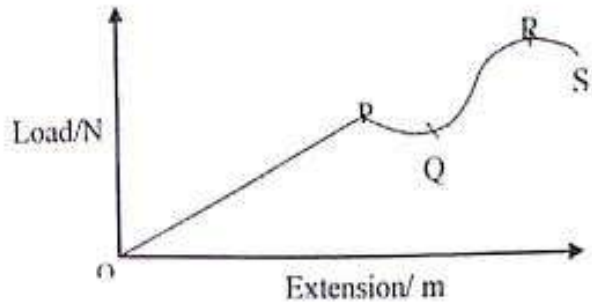


Fig. 7

The graph shows how the load varies with extension produced in a material stretched when connected to the load. Hooke's law applies.

A. between O and P
B. between P and Q
C. at P.
D. at S.

28. Frictional force between two solid surfaces in contact.
(i) is maximum just before motion begins.
(ii) is independent of the speed of the surfaces.
(iii)increase when the area of contract increases.
A. (i) and (iii) are correct.
B. (i) and (ii) are correct.
C. (i) ,(ii) , (iii), are correct
D. (iii) is correct

29. The main source of energy from a nuclear power station is,
A. fusion of hydrogen
B. fission of hydrogen
C. fusion of uranium
D. Fission of uranium.

30. Sodium – 24 decays into magnesium – 24 according to :

$$^{24}_{11}\mathrm{Na} \longrightarrow {}^{24}_{12}\mathrm{Mg}.$$

This decay is caused by the emission of
A. a beta particles.
B. An alpha particle.
C. A neutron.
D. A proton.

31. A compass needle is placed inside a soft iron
A. with its North pole pointing North – west.
B. With its North pole pointing North.
C. With its North pole pointing south.
D. In any direction

32. When a conductor is charged positively by induction it means that it has.
A. lost proteins
B. gained protons.
C. Lost elections
D. Gained electrons.

33. When a metal sphere is dropped in a viscous liquid, it
A. first accelerates and then decelerates..
B. Decelerates until it stops moving.
C. First acceleration until its velocity is constant.
D. It decelerates until its velocity is constant.

34. When a yellow dress is placed in a room lit with pure red light, it will appear,
A. red
B. green
C. yellow.
D. Black.

35 Calculate the final steady temperature obtained when 0.8kg of glycerin at 25°C is poured into a copper colorimeter of mass 0.5 kg at 0°C(specific heat capacity of glycerin is 250 Jkg $^{-1}$ K $^{-1}$)
A. 0.0°C
B. 12.5°C.
C. 20.0°C.
D. 25.00C.

36.

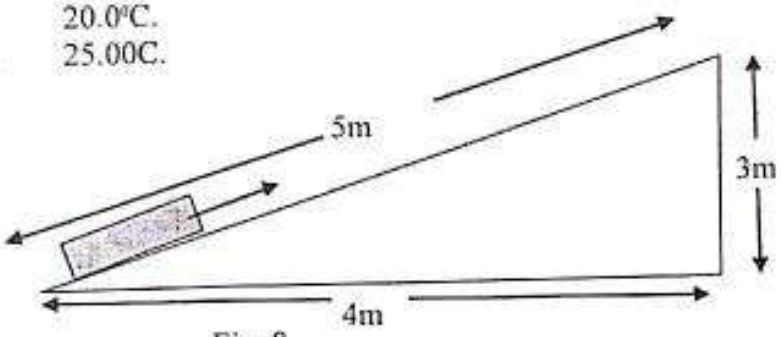


Fig. 8

The figure shows an inclined plane used to lift a load L by pulling using an effort F. The velocity ration of the inclined plane is.
A. 1.33
B. 1.25
C. 1.67
D. 0.60

37 When viewing Brownian motion in a smoke cell experiment the observer sees moving specks of light which are:-
A. molecules of air moving in random motion.
B. Molecules of air colliding with one another.
C. Smoke particle colliding into air molecules.
D. Smoke particles moving randomly.

38. Air in a 3 litre vessel at 27°C exerts at a pressure of 2 Nm^{-2}. Calculate the pressure that the same mass of air would exert if it was contained in a 2 litre vessel at -33°C.

A. 3.7 NM^{-2}
B. 2.4NM^{-2}
C. 2.0 NM^{-2}
D. 1.1 NM^{-2}

39. The leaf of a charged gold leaf electroscope gradually collapses with time due to :

A. leakage of charge to the surroundings.
B. Magnetic field of the surroundings.
C. Pressure vanation from the surroundings.
D. Similar charge from the surroundings.

40.

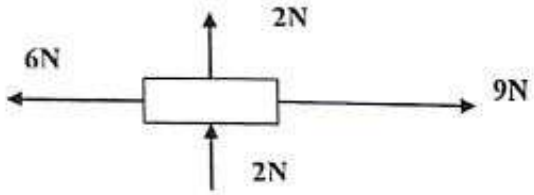


Fig 9.

Four forces of 2N, 2N, 6N and 9N act on a body of mass 2.5kg as shown in fig 9. Calculate the acceleration of the body.

A. 2.0 ms^{-2}
B. 4.4 ms^{-2}
C. 6.0 ms^{-2}
D. 6.8 ms^{-2}

SECTION B (40 MARKS)

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

41. (a) What is meant by a uniformly accelerated motion?

.....(1 mark)

.....

(b) A trolley moving with a velocity of 10 ms^{-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.

(1 mark)

(ii) Find the total distance traveled by the trolley.

42. (a) (i) State the principal of moments.

.....

.....

..... (1 mark)

(ii) State one condition for a body to be in equilibrium.

.....

.....

..... (1 mark)

(b) A uniform half- meter rule is pivoted at the 40cm mark and kept horizontal by a mass of 90 g hung from the 50 cm – mark.
Find the mass of the metre- rule.

(2 marks)

43 (a) Define potential energy.

.....

..... (1 mark)

(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.

(2 marks)

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

.....

.....

.....(1 marks)

44 (a) Define the term heat capacity

.....

.....(1 mark)

(b) A metal sphere of mass 250g is heated to a temperature of 100°C and then transferred into a copper calorimeter of mass 100g containing 400g of water at 20°C. If the temperature of the mixture after stirring is 50°C, calculate the specific heat capacity of the metal sphere.

(3marks)

45. (a)(i)State the principle of transmission of pressure in fluid.

.....

.....

.....(1 mark)

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

.....

.....(1 mark)

(b) The piston of a motor car brake system has an area of 2.0×10^{2} cm ^{2}. Calculate the force that will transmit a pressure of 4.2×10^{2} NM^{-2} to the wheels of the car.

.....

.....

.....(2 marks)

46. (a)(i) Define the term wave front as applied to wave motion.

.....

.....

.....(1 mark)

(ii) State two properties of electro magnetic waves.

.....

.....

.....(1 mark)

(b) The wave length of a television wave is 0.3 km. calculate its frequency.

.....

.....

..... (2 marks)

47. (a) What is meant by half life of a radioactive nuclide?

.....

.....

.....(1 marks)

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

(i) What fraction remains after 4800 years?

.....

..... (2 marks)

(ii) Give any two uses of radioactivity.

.....

..... (1 mark)

48. (a) What is meant by the term critical angle?

.....

.....(1 mark)

(b)(i)

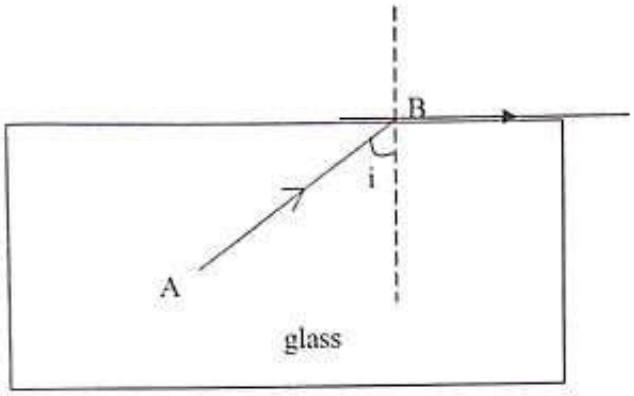


Fig. 10

The figure above shows a ray AB of light traveling through glass and is incident at B. if it emerges grazing the air- glass boundary, find angle of incidence , take refractive index of glass = 1.50.

.....

..... (2 marks)

(ii) State one application of total internal reflection.

.....

.....(1 mark)

49. (a)(i) What is a neutral point?

.....

.....(1 mark)

(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.

(2marks)

Fig. 11

(b) List two ways by which a magnet may lose its magnetic properties.

.....

.....

.(1 mark)

50. (a) Define the volt.

.....

.....

(1 mark)

(b).

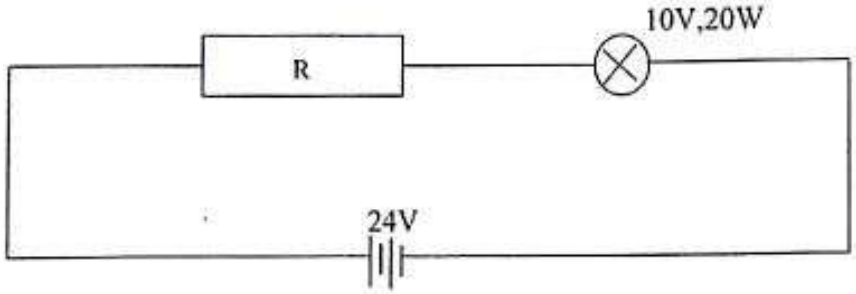


Fig. 12

The figure above shows a battery of emf 24 V and negligible internal resistance connected in series with resistor R and a lamp rated "10V, 20W as shown. If the bulb is operating normally,

(i) What is meant by the term "lamp rated 10V, 20 W"?

.....

.....

(1 mark)

(ii) Calculate the value of R

(2marks)

END