NAME...INDEX NO......................\...........
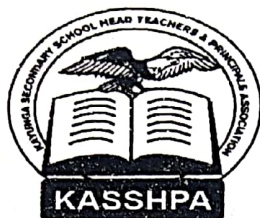
SIGNATURE...................................

535/1
PHYSICS
PAPER 1
July/August 2022
TIME: 2¼ HOURS

KASSHPA

**KAYUNGA SECONDARY SCHOOLS HEAD TEACHERS AND PRINCIPALS
ASSOCIATION (KASSHPA)
UGANDA CERTIFICATE OF EDUCATION
JOINT MOCK EXAMS 2022
UGANDA CERTIFICATE OF EDUCATION
PHYSICS
PAPER 1
2HOURS 15MINUTES**

INSTRUCTIONS TO CANDIDATES

➢ Section A contains 40 objective 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 and silent non-programmable calculators may be used

➢ Where necessary assume the following constants.

➢ Acceleration due to gravity $= 10 MS^{-2}$

➢ Speed of light in a vacuum $= 3.0 \times 10^8 ms^{-1}$

➢ Specific heat capacity of water $= 4,200 jkg^{-1}k^{-1}$

➢ Specific latent heat of fusion of ice $= 3.36 \times 10^5 jkg^{-1}$

➢ Specific latent heat of vaporization of water. $= 2.25 \times 10^6 jkg^{-1}$

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]

1. The basic difference between transverse and longitudinal waves is in
   A. Amplitude
   B. Direction of vibration
   C. Wavelength
   D. Medium through which the waves travel

2. In a ripple tank constructive interference occurs when a
   A. Crest overlaps with a trough
   B. Wave is stationary
   C. Crest overlaps with a crest
   D. Wave strikes a barrier

3. A vibrator produces a sound wave that travels a distance of 900m in 3s. If the wavelength of the wave is 10m, find the frequency of the vibrator
   A. 30Hz
   B. 270Hz
   C. 300Hz
   D. 3000Hz.

4. The electromagnetic radiation which causes the body temperature to rise is called
   A. X-rays
   B. Gamma rays
   C. Infrared
   D. Ultraviolet

5. Which of the following are longitudinal waves?
   A. Water waves
   B. Light waves
   C. Sound waves
   D. Radio waves

6. A graph of pressure against temperature of a fixed mass of a gas is as shown in the figure below
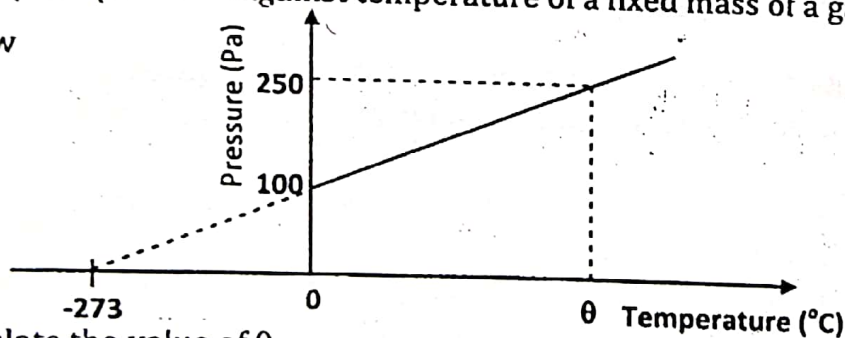
   Calculate the value of θ
   A. 682.5°C
   B. 409.5°C
   C. 109.2°C
   D. 0.0°C

7. The radiations from a radioactive source are made to pass through a postcard and then at right angles to a strong magnetic field. A detector shows the presence of radiations straight through and to one side only of the original direction. Which types of radiations are being detected?
   A. α particles and β particles
   B. α particles and γ particles
   C. β particles and γ particles
   D. α particles and neutrons

8. Which of the following materials would be suitable to use in the construction of a transformer core?
   A. Lead
   B. Copper
   C. Soft iron
   D. Aluminium

9. Given a nuclear equation;

$$^{235}_{92}U + ^{1}_{0}n \longrightarrow ^{148}_{57}Br + ^{85}_{35}Br + 3^{1}_{0}n$$
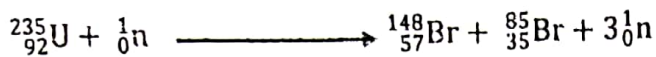
The nuclear equation above shows a process called

A. Nuclear fusion   B. Nuclear fission   C. Radioactivity   D. Half-life reaction .

10. The magnitude of a force on a conductor carrying electric current in a magnetic field does NOT depend on the

A. Length of the conductor   C. Magnetic field

B. Magnitude of the current   D. Direction of the current

11. If a bar magnet is pushed into a coil of wire, a voltage will be induced across the ends of the coil. The voltage can be made larger by

A. Using a coil of low resistance wire   B. Moving the magnet more quickly

C. Having a voltmeter across the coil   D. Using a bar of iron instead of a magnet

12. Radioactive elements emit radiations from

A. Outer space   B. Atomic nuclei   C. Orbiting electron   D. X-rays

13. The figure below is of a mercury barometer
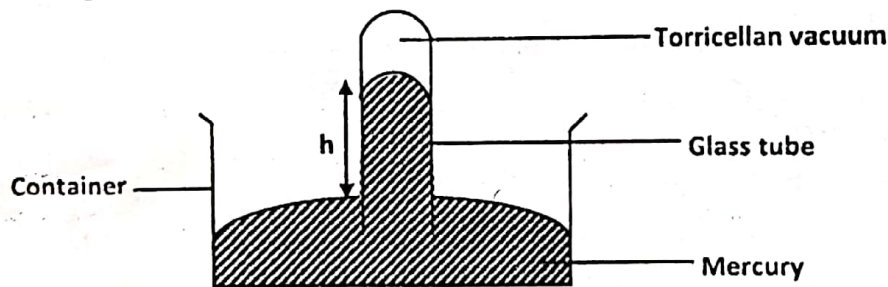
The height h will be decreased if the

A. Glass tube is lowered further into the container

B. Atmospheric pressure decreases

C. Quantity of mercury in the container is decreased

D. Quantity of mercury in the container is increased

14. A 12 V bulb is connected to a coil of 100 turns wound on an iron rod. The bulb lights when a second coil wound on the same iron rod is connected to a 240 V mains supply. Calculate the number of turns of the second coil.

A. 2000   B. 288   C. 5   D. 2

15. A notch on a material spreads more rapidly when the material is

A. In compression   B. Pre-stressed   C. In tension   D. Reinforced

16. Illuminated smoke particles, suspended in air, are viewed with a microscope and are seen to randomly move continuously. This is because the smoke particles are:

A. Bombarded continually by air molecules

B. Supplied with energy by the light illuminating them

C. Agitated by sound waves from the surrounding room

D. Shaken by the vibration of the molecules within them.

17. A spring has a length of 15.0cm and a length of 15.6cm when a load of 3N is put at the bottom of the spring. The load on the spring when the stretched length is 15.8cm is

A. 10N   B. 8N   C. 4N   D. 6N

18. The ray of light is incident on a convex lens as shown in the figure below;
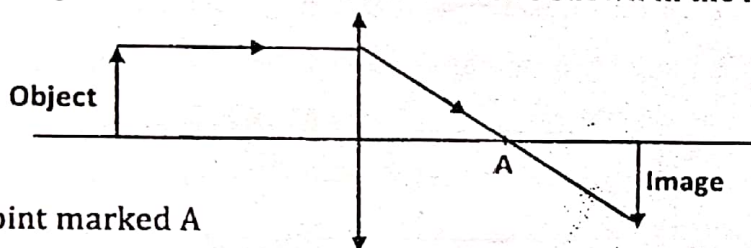
Name point marked A

A. Principal axis   B. Principal focus   C. Centre of curvature   D. Optical centre

19. A uniform half metre rule is freely pivoted at the 15cm mark and balances horizontally when a body of mass 40g is hung at 2cm mark. Calculate the mass of half metre rule

A. 0.52g   B. 5.2g   C. 52g   D. 520g

20. A 5kg mass is travelling with a speed of $5ms^{-1}$. It is brought to rest in 0.5s. The average force acting on the body to bring to rest is;

A. 50   B. 25   C. 10   D. 2.5

21. A ticker-timer vibrates at a frequency of 40Hz. The distance between two consecutive dots is 2cm. Calculate the average speed of the tape

A. $0.025ms^{-1}$ B. $0.250ms^{-1}$ C: $0.800ms^{-1}$ D: $80.00ms^{-1}$

22. An object in unstable equilibrium continues to fall when slightly displaced because its

(i) Centre of gravity is lowered   (iii) Potential energy is reduced

(ii) Center of gravity is raised.   (iv) Potential energy is increased.

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

23. Find the velocity ratio of an inclined plane of length 12m, given that the height from the ground is 3m.

A. 6   B. 2   C. 4   D. 3

24. The figure below shows four forces 5N, 6N, 2N and 2N out on a block of mass 0.5kg.
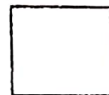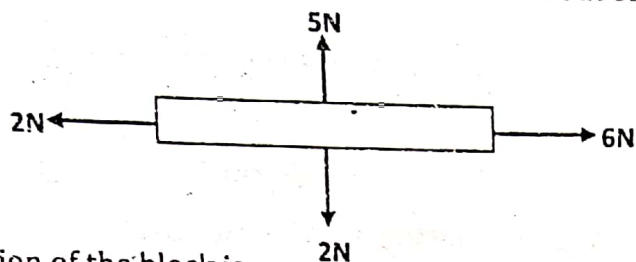
The acceleration of the block is

A. 2ms^{-2} B. 4ms^{-2} C. 5ms^{-2} D.10ms^{-2}

25. When a sheet of paper is placed between a radioactive source and a detector, the count reduces. When the sheet of paper is placed with aluminum sheet, the count rate goes to zero. The source is emitting

A. Beta and gamma radiations only   B. Gamma radiation only

C. Alpha and gamma radiations only   D. Alpha and beta radiations only

26. A container has 2.4 litres of water at 20°C. Calculate the heat required to boil water in the container

A. 6,206,400JJ   B. 5,400,000J   C. 806,400J   D. 201,600J

27. Which of the following pairs of variables are inversely proportional for an ideal gas, if other variables are kept constant?

A. Pressure and temperature   B. Pressure and volume

C. Volume and temperature   D. Pressure and mass

28. 100g of ice at 0°C is mixed with 250g of water at 80°C. Calculate the final temperature of the mixture

A. 20.0°C   B. 34.3°C   C. 48.0°C   D. 100.0°C

29. The sky appears blue because

A. That is its natural colour

B. The earth's atmosphere scatters more blue light than red light

C. The earth's atmosphere emits blue

D. The air away from the sun cools down and turns blue

30. In a photographic camera, the location of the image is adjusted to appear on the film by changing the

A. Position of the lens   B. Diameter of the diaphragm

C. Shape of the lens   D. Focal length of the lens

31. A body weighs 3.6N in air and 2.4N when fully immersed in water. Calculate the density of the body

A. 3.0gcm^{-3} B. 1.4gcm^{-3} C. 0.8gcm^{-3} D. 0.4gcm^{-3}

32. Which of the following is/are not part(s) of an X –ray tube?

(i) Deflecting system   (ii) Cooling fins   (iii) Tungsten target

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

33. The figure below shows an electric field pattern between a point charge, Q and a charged plate, P
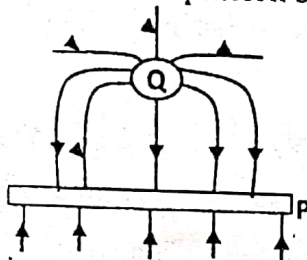
Which one of the following is correct about the charges on P and Q

A. Q has a positive charge and P has a negative charge

B. Q has a negative charge and P has a negative charge

C. Q has a positive charge and P has a positive charge

D. Q has a negative charge and P has a positive charge

34. Which one of the following actions will cause the leaf of a negatively charged electroscope to fall?

(i) Bringing a positively charged rod near the cap

(ii) Bringing a negatively charged rod near the cap

(iii) Connecting the cap to the earth

A. (i) and (ii) only correct   B. (i) and (iii) only correct

C. (ii) and (iii) only correct   D. (i), (ii) and (iii) correct

35. In the circuit below cell P has internal resistance of 0.5Ω and e.m.f of 6.0V while cell Q has an e.m.f of 2.5V and internal resistance 1.5Ω
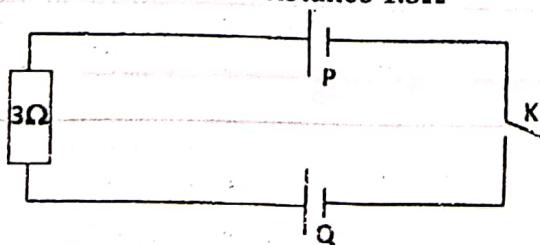
When switch K is closed, calculate the current flowing

A. 1.7A   B. 1.2A   C. 0.7A   D. 0.5A

36. An electric kettle draws a current of 13A when connected to a 100V supply. Calculate the cost of running the kettle for 2 ½ hours if the cost of electricity is shs. 400

    A. shs. 208   B. Shs. 1,300   C. Shs. 208,000   D. Shs.1,300,000

37. A ray of light travelling in air is incident on water of refractive index 1.33 as shown in the figure below
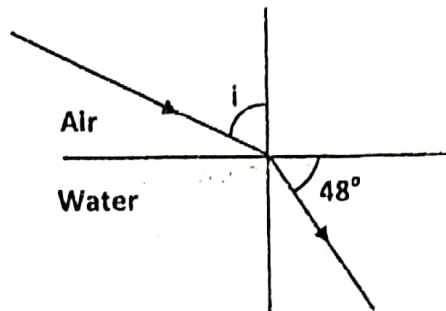
    Calculate the angle i

    A. 81.3°   B. 62.9°   C. 42.0°   D. 48.0°

38. The rate at which an electric charge flows past a point in a circuit is measured in

    A. watts   B. volts   C. amperes   D. coulombs

39. A boy of mass 45kg develops an average power of 250W when running up a flight of stairs. How long does he take to climb a vertical height of 400cm?

    A. 720s   B. 72s   C. 7.2s   D. 0.72s

40. Electromagnets are used in the following except

    A. moving coil loud speaker   C. Electric bell

    B. moving coil galvanometer   D. Telephone receiver

SECTION B [40 Marks]

41. a) i)What are eddy currents   [1 mark]

    ....

    ....

    ....

    ii) How are eddy currents minimized   [1 mark]

    ....

    b) A transformer connected to a 240Va.c main supply is used to light a 12V, 36W lamp. What is the current taken from the mains if the transformer is 75% efficient?   [2 marks]

    ....

    ....

    ....

    ....

42. a) Define the term echo [1 mark]

....

....

b) A ship sends out an ultra sound whose echo is received after 10 seconds. If the wavelength of the ultra sound in water is 5m and the frequency of the transmitter is 50 Hz, calculate the depth of the ocean [3 marks]

....

....

....

....

43. a) Define the term pascal [1 mark]

....

....

b) The figure below shows a U - tube containing mercury of density $13600 kgm^{-3}$ connected to a gas supply.
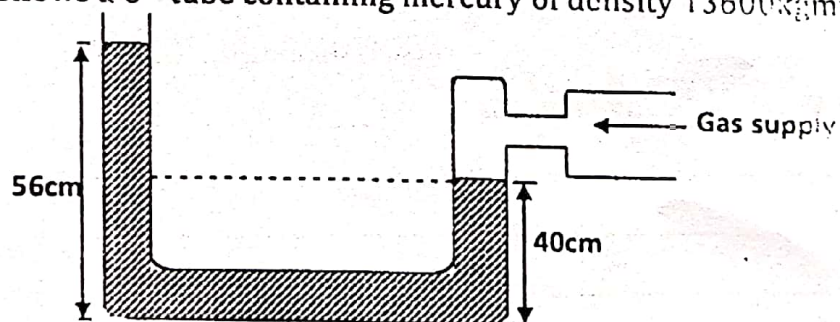
Given that the atmospheric pressure is equal to 76cmHg. Calculate the total pressure of the gas in Nm^{-2} [2 marks]

....

....

....

....

c) Give a reason why it may not be possible to suck a liquid into your mouth using a drinking straw while on the surface of the moon [1 mark]

....

....

44. a) What are cathode rays [1 mark]

....

....

b). The diagram below shows a cathode ray oscilloscope (C.R.O)
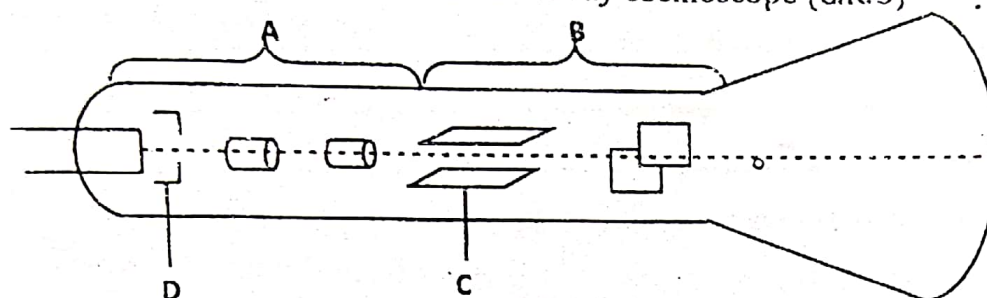
Name the parts labelled A, B, C and D [2marks]

A... C...

B... D...

c) Give two uses of a C.R.O [1 mark]

....

....

45. a) State pressure law [1 marks]

....

....

....

b) A fixed mass of a gas is heated at constant temperature. Draw a graph of pressure against volume for the gas [1 mark]

c) A fixed mass of a gas occupies a volume of 40litres at a temperature of 27°C. Calculate the volume of the gas at -153°C. [2 marks]

....

....

....

....

46. a) What is meant by thermionic emission [1 mark]

....

....

....

b) The diagram above shows a thermionic diode;
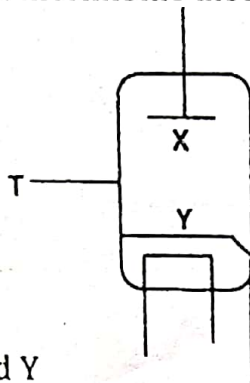
Name the parts labelled X and Y [2 marks]

X... Y...

c) i) Explain briefly how electrons are made to move across the tube T [1 mark]

....

....

ii) Why is the thermionic diode highly evacuated [1 mark]

....

....

47. a) State kinetic theory of matter [1 mark]

....

....

....

b) State two factors that affect the rate of diffusion [1 mark]

....

....

c) An oil drop of volume 4.68×10^{-5} cm^3 forms an oil film of area 160cm^2. Calculate the size of the oil molecule [2 marks]

....

....

....

....

48. a) What is meant by the term pitch as applied to sound wave [1 mark]

....

....

....

b) State 2 factors affecting speed of sound produced from a vibrating string [1 mark]

....

....

....

c) A wire of length 48cm vibrates with a frequency of 256Hz. Calculate the frequency when the length of the wire is increased to 150cm [2 marks]

....

....

....

49. a) Define the term internal resistance of a cell [1 mark]

....

....

b) In the circuit below a resistor of resistance 11.5Ω is connected to a cell of e.m.f 1.5V and internal resistance, r
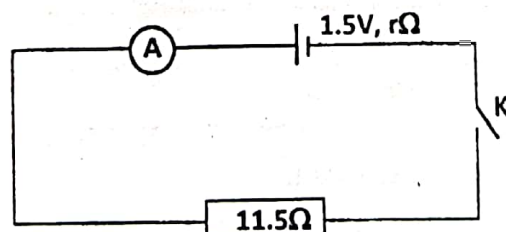
When the switch K is closed, the ammeter reads 0.12A. Find the value of r [2 marks]

....

....

....

....

c) A car battery requires topping up with distilled water occasionally. Explain why distilled water is used [1 mark]

....

....

50.   a) Define the term refractive index of a material   [1 mark]

....

....

....
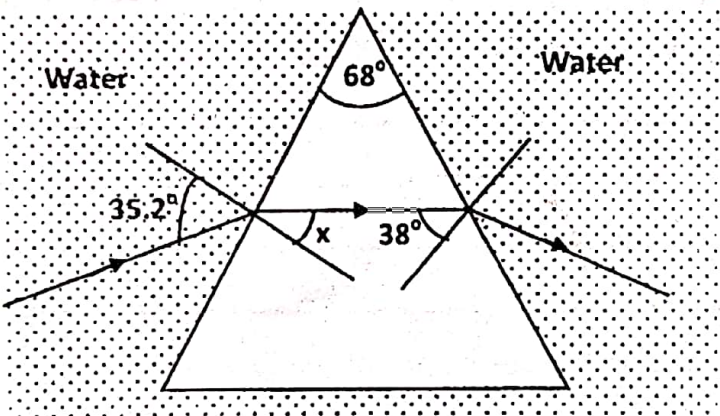
b) The diagram below shows a glass prism completely immersed in water of refractive index 1.33. A ray of light is incident on the glass prism at an angle of 35.2° as shown below;

Find the

i) Value of angle x   [1 mark]

....

....

....

ii) Refractive index of the glass prism   [2 marks]

....

....

....

....

....

....

END