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535/1

Physics

Paper 1

JAN./FEB. 2021

2 hours 15 minutes

KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate Of Education

PHYSICS

Paper 1

2 hours 15 minutes.

Instructions to candidates:

- ***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 each page.*
- *Section B contains 10 structured questions. Answers **are to be** written in the spaces provid ed on the question paper.*
- *Mathematical tables, slide rules and silent non programmable calculators may be used.*

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

-Specific heat capacity of water = $4200JKg^{-1}k^{-1}$

-Specific latent heat of fusion of ice = $3.36x10^{5}Jkg^{-1}$

FOR EXAMINER'S USE ONLY											
41	42	43	44	45	46	47	48	49	50	MCQ	TOTAL

SECTION A (40 marks)

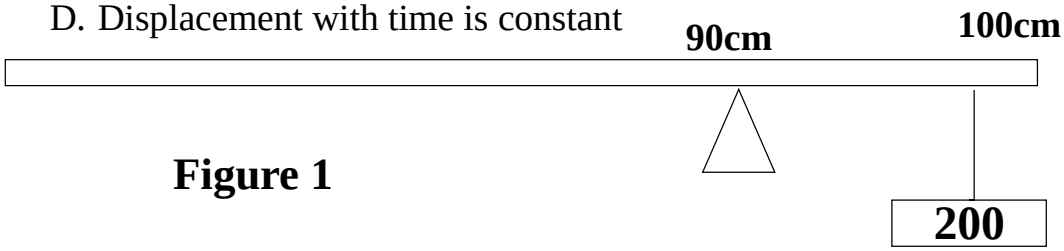
1. The S.I unit of volume of a liquid is
   A. liters
   B. Meter cubed
   C. Decimeter cubed
   D. Mill-liters
2. A body is said to be moving with uniform velocity when the rate of change of
   A. Acceleration with time is constant
   B. Velocity with time is constant
   C. Distance with time is constant
   D. Displacement with time is constant
3. 

Figure 1

A uniform rod 100cm long pivoted at the 90cm mark, balances horizontally when amass of 200g is suspended at 100cm mark as shown in figure. The mass of the rod is

A. 40g B. 50g C. 400g D. 800g

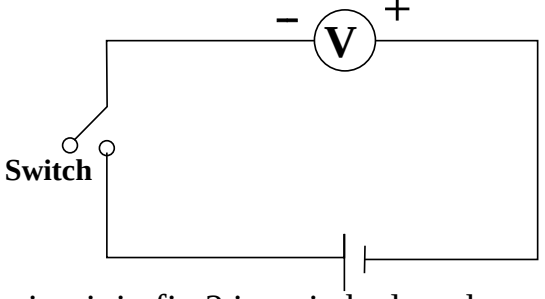
4. The effect produced when many echoes merge into one prolonged sound is known as
   A. Noise
   B. Harmonics
   C. Reverberation
   D. Pitch
5. In an atomic bomb, energy is produced by
   A. Fusion
   B. Fission
   C. Radiation
   D. Thermionic emission
6. In a wire supporting a load, stress is given by
   A. $\frac{Strain}{Area}$
   B. Force X Area
   C. $\frac{Area}{force}$
   D. $\frac{Force}{Area}$
7. A tight bottle top becomes easier to unscrew when hot water flows over it because the
   A. Cap expands more than the glass
   B. Glass in the neck of the bottle contracts
   C. Increased pressure of the air in the bottle causes the cap to expand.
   D. Hot water acts like oil between the glass and the bottle
8. 

Figure 2

When the circuit in fig 2 is switched on the voltmeter

   A. Shows no deflection.
   B. Deflects in the wrong direction.
   C. Reads the e.m.f of the cell.
   D. Reads the terminal potential difference a cross the cell.
9. Water waves travel a distance of 36cm in 6s and the separation of successive troughs is 3.0cm. Calculate the frequency of the waves
   A. 2Hz B. 12Hz C. 18Hz D. 72Hz

10. A load of 4N stretches a spring by 0.5cm. Calculate the extension when the load of 8N is applied

A. 4.0 cm B. 3.0cm C. 1.0cm D. 0.25cm

11. Which of the following can produce a cooling effect?

I. Compression of a gas
II. Evaporation of a liquid
III. Expansion of a gas

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

12. Calculate the specific heat capacity if 22000g of heat are required to raise the temperature of 2.0g of paraffin from 20°C to 30°C.

A. 1.1×10^6 Jkg^{-1} k^{-1}
B. 1.2×10^6 Jkg^{-1} k^{-1}
C. 2.2×10^6 Jkg^{-1} k^{-1}
D. 2.1×10^6 Jkg^{-1} k^{-1}

13. Which of the following statements is true of a wedge used as a simple machine?

A. There is no frictional force
B. Effort on the wedge is applied vertically
C. Work done is always so much
D. A very small force is required to lift a big load

14. An element X has atomic mass of 228 and atomic number of 90. It emits a β-particle forming an element Y. The symbol of Y is

A. $^{228}_{91}Y$ B. $^{228}_{90}Y$ C. $^{224}_{88}Y$ D. $^{228}_{89}Y$

15. All electromagnetic waves

A. Highly penetrate matter.
B. Cause heating effect when absorbed by matter.
C. Do not require any material medium for transmission.
D. Produce ionization I gasses.

16. The cost of running a lamp rated 72V, 30A for 5 hours is Shs 216. Find the cost per unit of electricity

A. Shs $\frac{216 \times 1000 \times 5}{30 \times 72}$
B. Shs $\frac{30 \times 5 \times 216 \times 72}{1000}$
C. Shs $\frac{1000 \times 216}{3.0 \times 7.2 \times 5}$
D. Shs $\frac{5\,x\,30\,x72}{1000 \times 2.16}$

17. A piece of metal of mass 120g is placed in a 100ml measuring cylinder containing 20ml of water. Find the density of the metal if the water level rises to 50ml mark

A. 6.0gcm^{-3} B. 4.0gcm^{-3} C. 2.4gcm^{-3} D. 1.2gcm^{-3}

18.

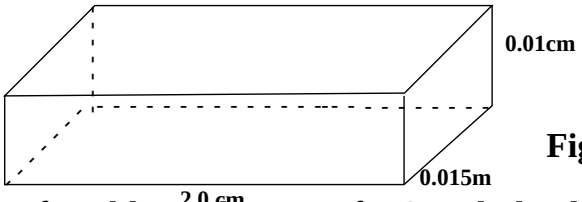


Figure 3

A box is placed on top of a table as shown in fig.3 with the dimensions indicated if the mass is 40kg. Find the pressure it exerts on the table.

A. $\frac{40 \times 10}{0.02 \times 0.010}$ B. $\frac{40 \times 10}{0.020 \times 0.015}$ C. $\frac{40}{0.015 \times 0.010}$ D. $\frac{40}{0.020 \times 0.015}$

19. Which one of the following is used to measure the diameter of a copper wire?

A. Micrometer screw gauge
B. Tape measure
C. Vernier calipers
D. Meter rule

20. A stone feels very cold to bare feet in cold weather but a carpet in the same room feels comfortably warm. Why is it so?
    A. A stone is a better conductor of heat than a carpet
    B. The carpet is a better conductor of heat than a stone
    C. The stone is a reflector of heat than the carpet
    D. The stone is a worse conductor of heat than a carpet.
21. A moving coil galvanometer can be used to
    A. Measure a direct current
    B. Convert direct current into alternating current
    C. Convert alternating current into direct current
    D. Measure the peak volume of an alternating current
22. The number of vibrations a wave makes in one second is the
    A. Period B. Amplitude C. Wave length D. Frequency
23. When a pin hole camera is moved nearer an object, the size of the image
    A. Remains the same C. Becomes diminished
    B. Becomes larger. D. Becomes smaller
24.

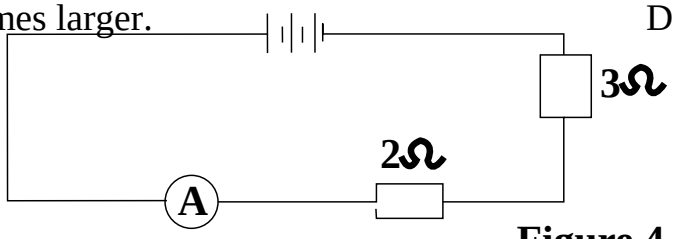
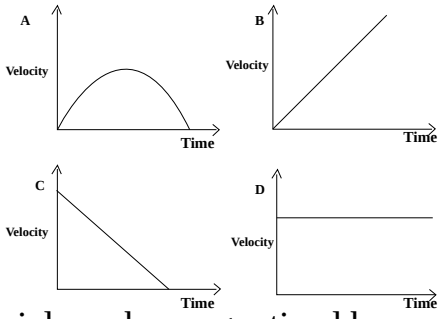


Figure 4

Three cells each of e.m.f. 2V and negligible internal resistance are connected to two resistors as shown in the circuit in figure 4. The reading of the ammeter is

    A. 7.20A B. 1.00A C. 0.83A D. 0.40A

25. Which of the following graphs represents uniform acceleration motion?



26. A magnetic material can be magnetized by
    (i) Stroking
    (ii) Using direct current
    (iii) Stroking with permanent magnet
    A. (iii) only C. (i) and (ii) only
    B. (ii) and (iii) only D. (i), (ii) and (iii)
27. Which of the following are secondary colours only?
    A. Red, green and magenta C. Yellow, cyan and magenta
    B. Red, green and blue D. Blue, yellow and magenta
28. An electric appliance having 4 heating elements each rated at 0.75KW is used on a 240V mains. What is the power rating of the appliance?
    A. 80KW B. 60KW C. 3KW D. 3W
29. Two coils of wire resistances 2Ω and 3Ω are connected in series to a 10V battery of negligible internal resistance. The current through the 2Ω resistor is
    A. 0.5A B. 2A C. 5A D. 50A

30. Back ground radiation is due to

(i) Cosmic rays from the sun
(ii) Micro waves
(iii) Radioactive fall out
(iv) Radiation from T.V set.

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

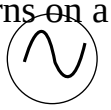
31. Which one of the following is an electrolyte in a wet cell?

A. Ammonium chloride paste
B. Manganese (iv) oxide
C. Zinc plate
D. Copper rod

32. A hollow glass sphere of mass 60g floats in water such that two thirds of its volume is under water of density $1gcm^{-3}$. Find the volume in cm^3 of the sphere.

A. 90 B. 60 C. 40 D. 20

33. Which of the following wave patterns on a C.R.O represents sound of highest pitch?

A 
B 
C 
D 

34. When oil of volume $6x10^{-3}cm$ is dropped on a clear water surface, it forms a circular patch of one molecule of diameter 2cm. Find the thickness of oil.

A. $5.24 \times 10^{2}cm$
B. $1.91 \times 10^{-3}cm$
C. $14.32 \times 10^{-4}cm$
D. $4.77 \times 10^{-4}cm$

35. A current of 6A flows for 2 hours in a circuit. Calculate the quantity of electricity that flows in this time.

A. 3C B. 12C C. 720C D. 43200C

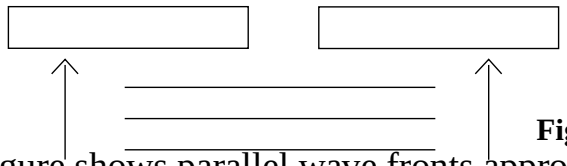
36. 

Fig 5

The diagram in figure shows parallel wave fronts approaching a narrow gap. Waves passing through the gap are likely to under go.

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

37. Which of the following only works with a direct current?

A. Electric lamp B. Electric bell C. Transformers D. Electroplating

38. Which of the following are transverse waves only?

A. Radio, sound, ultra-violet
B. Ultra-violet, x-rays, water waves
C. Infra-red, gamma ray, sound wave
D. Sound waves, ultra-violet, x-rays

39. Figure 8 shows white light passing through a glass prism. Which colour is bent most.

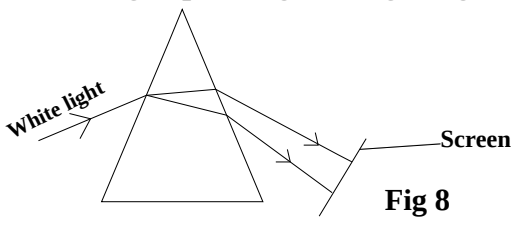


Fig 8

A. Green
B. Yellow
C. Red
D. Violet

40. A transformer is used to step down an alternating voltage from 240V to 12V. Calculate the number of turns on the secondary coil if the primary coil has 1200 turns.

A. 3 B. 5 C. 60 D. 100

SECTION B (40 MARKS)

41.(a) State two differences between a.c and d.c generators. *(02 marks)*

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(b)

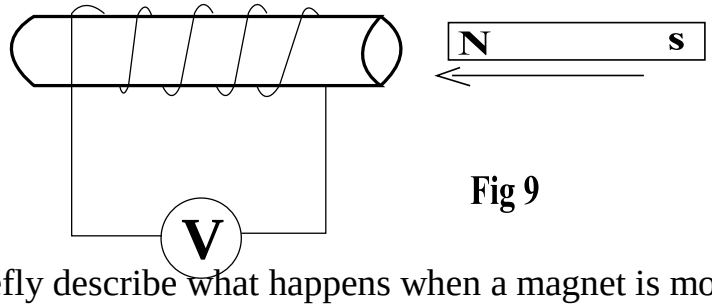

Fig 9

Briefly describe what happens when a magnet is moved into the coil as shown in figure 9. *(02 marks)*

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42.(a) (i) What is meant by nuclear fission. (01 mark)

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

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b(i) Account for the energy released in nuclear fission. *(01 mark)*

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(ii) State one use of nuclear energy. *(01 mark)*

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43.(a)(i) Define moment of a force. *(01 mark)*

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(ii) State the principle of moments. *(01 mark)*

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(b)

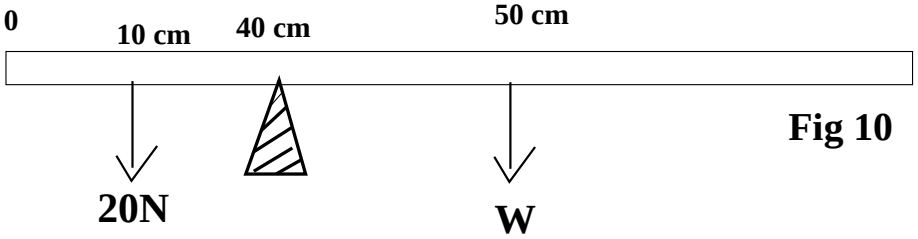

Fig 10

A uniform meter rule is pivoted at the 40cm mark as shown in figure 10. The metrerule is in equilibrium under its weight, W and a 20N force acting at the 10 cm mark. Calculate W *(02 marks)*

44.(a) What is meant by diffraction of waves? *(01 mark)*

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(b) Draw a diagram to show the path of plane water waves through a narrow gap *(02 marks)*

(c) State two factors that determine the intensity of sound. *(01 mark)*

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45.(a) The specific heat capacity of water is $4200Jkg^{-1}k^{-1}$. What is meant by the above Statement *(2marks)*

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(b) State two reasons why water is used in the cooling system of a car engine. *(2marks)*

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46.(a) State Bernoulli's principle. *(01 mark)*

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b(i) Distinguish between stream line and turbulent flow. *(02 marks)*

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(ii) Give any two application of Bernoulli's principle. *(01 mark)*

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47.(a) What is meant by boiling point of a liquid. *(01 mark)*

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(b) Why is cooking faster with a pressure cooker. *(02 marks)*

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(c) State one difference between boiling and evaporating. *(01 mark)*

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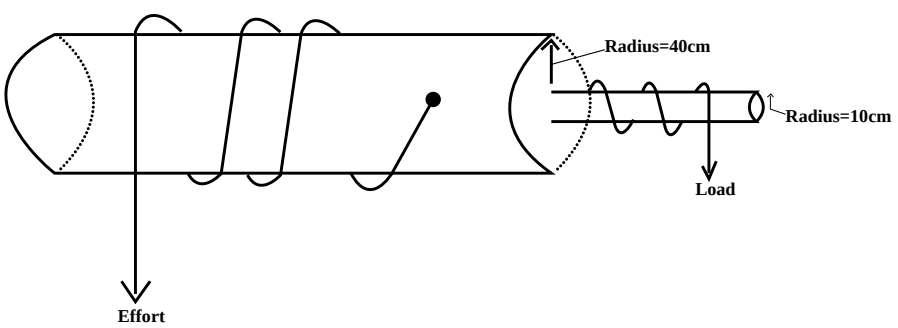
48.Figure 11 shows a wheel and axle system when an effort of 300N is applied to a load of 900N is raised through a distance of 10cm



Calculate

a) Velocity ratio

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b) The efficiency of the system. *(04 marks)*

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49. An object 4cm high is placed vertically on the principle axis of a converging lens of focal length 8cm. If the object is 32cm from the lens.

(a) Locate by graphical method, the position of the image. *(03 marks)*

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(b) Find the magnification. *(01 mark)*

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50. (a) The end Q of a rope is tied to a pole while the end P is moved up and down as shown in figure 12

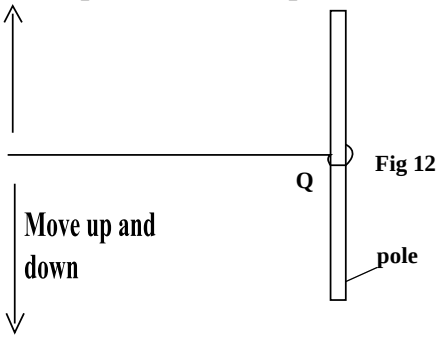

Fig 12

Sketch the resultant wave pattern between P and Q. *(02 marks)*

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b(i) Name the type of wave produced in (a) above. *(01 mark)*

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(ii) Name one musical instrument which produces this type of wave. *(01 mark)*

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END