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

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

535/1
PHYSICS
PAPER 1
August
$2^{1}/_{4}$ 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* = $10ms^{-2}$
  - *density of water* = $1000kgm^{-3}$
  - *density of mercury* = $13600kgm^{-3}$
  - *density of hydrogen* = $0.089kgm^{-3}$
  - *density of air* = $1.29kgm^{-3}$
  - *speed of sound in air* = $320ms^{-1}$
  - *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 (40 Marks)

Answer **all** questions in this section

1. The relative density of a liquid can be measured by an instrument called
   A. hydrometer.
   B. hygrometer.
   C. barometer.
   D. manometer.

2. The effect of change in speed for light travelling from one medium to another is called;
   A. dispersion.
   B. reflection.
   C. refraction.
   D. diffraction.

3. The type of electromagnetic wave system used in a Television-remote control tool is
   A. ultraviolet radiation.
   B. gamma radiation.
   C. visible radiation.
   D. infra-red radiation.

4. Soft sound is produced by a source which has
   A. high frequency.
   B. low frequency.
   C. large amplitude.
   D. small amplitude.

5. Modern metallic-shinny tea flasks minimize heat loss by a process called
   A. conduction.
   B. evaporation.
   C. radiation.
   D. convection.

6. Liquid A of density $3kgm^{-3}$ and volume $4m^3$ is mixed with liquid B of density equal to one-third that of liquid A. If the mass of liquid B is half that of liquid A. Calculate the density of the mixture.
   A. $2.0kgm^{-3}$
   B. $2.5kgm^{-3}$
   C. $3.0kgm^{-3}$
   D. $3.5kgm^{-3}$

7. What main electrical components are found in a 3-pin plug or 2-pin plug phone charger?
   A. relay and a starter.
   B. rectifier and transformer.
   C. motor and battery.
   D. dynamo and amplifier.

8. Which of the following is true?
   A. Copper is the best conductor of heat, the best conductor of electricity and the best magnetic material.
   B. Copper is the best conductor of heat, the best conductor of electricity and a poor magnetic material.
   C. Steel is the best conductor of heat, the best conductor of electricity and the best magnetic material.
   D. Steel is the best conductor of heat, the best conductos of electricity and a poor magnetic material.

9. Which of the following home tools operates by Fleming's right hand rule?
   A. Generator.
   B. Fan.
   C. Juice blender.
   D. Speaker.

10. A uniform meter rule is pivoted at 20cm mark. It 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 1 below. Find the mass of the metre rule.

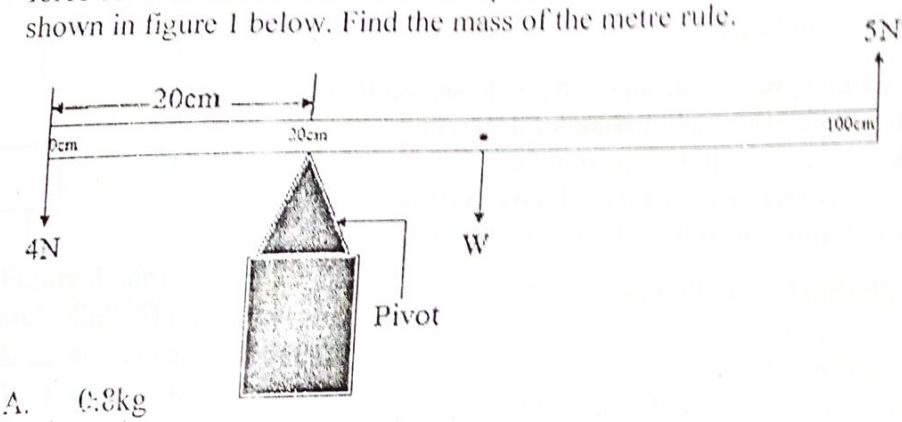


Fig. 1

   A. 0.8kg
   B. 1.0kg
   C. 1.5kg
   D. 1.6kg

11. The sketch graph in figure 2 below represents motion of a motor cycle of mass 75kg moving towards a road junction. Calculate the breaking force the rider exerts on it.

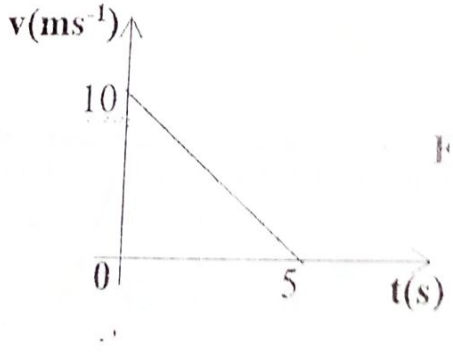


Fig. 2

   A. 100N
   B. 150N
   C. 200N
   D. 250N

12. A nuclide of polonium $^{210}_{84}Po$ decays by emission of two alpha particles and a beta particle to produce nuclide Y. Which of the nuclides below is its final product?

A. $^{202}_{80}Y$

B. $^{202}_{81}Y$

C. $^{203}_{80}Y$

D. $^{207}_{82}Y$

13. Which of the following are true about U.V light?

(i) Has shorter wave length than visible light.
(ii) Has same speed as normal light.
(iii) Cannot be diffracted or refracted.
(iv) Is radiated by the sun and harmful to humans.

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

14. When a metal sphere is dropped in a viscous liquid, it

A. first accelerates and then later decelerates.
B. decelerates until it stops moving.
C. first accelerates until its velocity becomes constant.
D. decelerates until its velocity becomes constant.

15. An upright image can be produced by a convex mirror when the object is

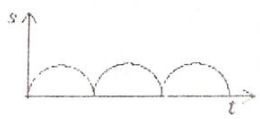
A. close to the mirror.
B. at the focal point.
C. between focal point and centre of curvature.
D. at any position along the principal axis in front of the mirror.

16. An uncalibrated thermometer is used to detect the temperature of a sick student having a temperature 40^0C and its mercury thread corresponds to a length of 15cm. If the upper fixed point corresponds to a length of 30 cm, what length corresponds to the lower fixed point.

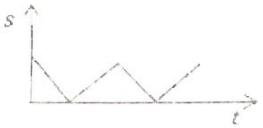
A. 5cm
B. 10cm
C. 15cm
D. 20cm

17. Which of the following speed-time graphs represent the motion of a jumping frog.

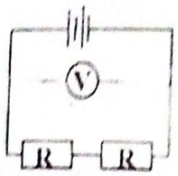
A. 

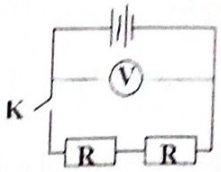
B. 

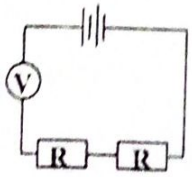
C. 

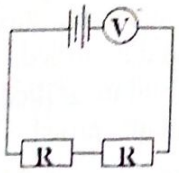
D. 

18. Which of the following circuit connections will show highest voltmeter reading?

A. 

B. 

C. 

D. 

19. Which of the following are units of quantities related by Ohms' law?
A. I, Ω and V
B. K, I and V
C. m, I and V
D. I, Ω and K

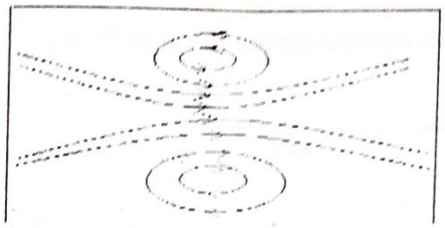
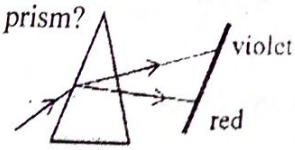
20. 

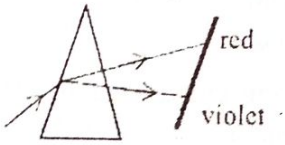
Fig. 3

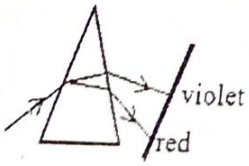
Figure 3 above shows magnetic fields produced by 2 currents close to each other. The currents will;
A. attract each other with currents flowing in the same direction.
B. attract each other with currents flowing in opposite directions.
C. repel each other with currents flowing in the same directions.
D. stop flowing.

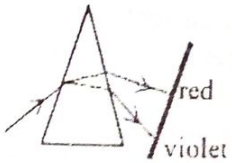
21. At what height above the ground must a mass of 5kg be to have a potential energy of equal value to the kinetic energy possessed by a mass of 15kg moving with a velocity of $10ms^{-1}$?
A. 3m
B. 10m
C. 15m
D. 20m

22. Which of the following diagrams shows the correct path of white light through a glass prism?

A. 

B. 

C. 

D. 

23. The distance between the first rare faction and the fifth compression of a longitudinal wave is 350cm. Calculate its wave length.
A. 5cm
B. 10cm
C. 15cm
D. 20cm

24. When an object is placed at a distance 1.5 times that of the focal length of a concave mirror, the image is
A. virtual and diminished.
B. real and diminished.
C. virtual and magnified.
D. real and magnified.

25. Water at 10^0C is cooled to 0^0C. What happens to the trend in mass, volume and density during this change in temperature?
A. The density of water decreases up to 4^0C and then increases later.
B. The density of water increases up to 4^0C and then decreases later.
C. The volume of water increases up to 4^0C and then decreases later.
D. The mass of water increases up to 4^0C and then decreases later.

26. The properties of liquids which make them suitable for use in car hydraulic brakes are....
(i) having uniform expansion.
(ii) being wear resistant.
(iii) having higher densities.
(iv) being almost incompressible.
A. (i) and (ii)
B. (i), ii) and iii)
C. (ii), iii) and iv)
D. (i), ii) and iv)

27. What was the cost of running four 40W lamps and three 60W lamps for 2 hours every night for 60 days, if the electric energy costed 800/= per unit?
A. 32,600 /=
B. 32,640/=
C. 32,800/=
D. 32,840/=

28. A body of volume $0.002m^3$ and density $600kgm^{-3}$ floats in a given liquid with 25% of it exposed. Calculate the density of the liquid.
A. 700 kgm^{-3}
B. 800 kgm^{-3}
C. 900 kgm^{-3}
D. 1000 kgm^{-3}

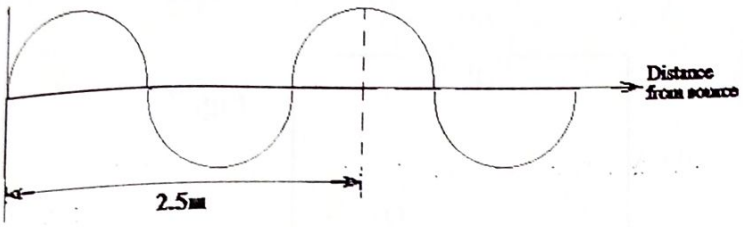
29. The type of current utilized, by electronic circuit boards inside radio receivers is
A. alternating current.
B. direct current.
C. digital current.
D. analogue current.

30. The type of collision that leads to the conservation of both kinetic and potential energy is
A. uniform collision.
B. non-linear collision.
C. elastic collision.
D. inelastic collision.

31. A floating body sinks deeper in water than in a given liquid, L. From this it can be deduced that;
(i) the density of L is greater than that of water.
(ii) the density of L is less than that of water.
(iii) the hydrometer displaces a greater mass of water than that of L.
A. (i), ii) and iii)
B. (i) and ii) only
C. (i) only
D. (i) and iii) only

32. Calculate the frequency of the wave represented in **figure 4** below if its speed is $80ms^{-1}$:

Fig. 4



A. 30Hz
B. 40Hz
C. 50Hz
D. 60Hz

33. A body moves according to the velocity-time graph shown in in **figure 5**. Calculate the displacement covered by the same body?

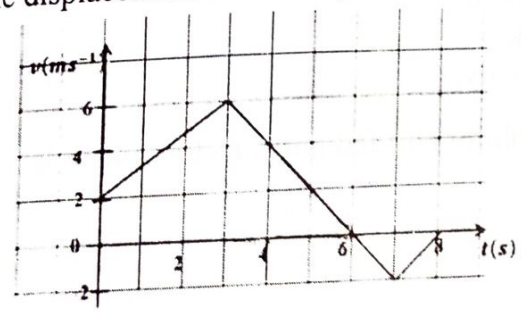


Fig. 5

A. 17m
B. 19m
C. 21m
D. 23m

34. Calculate the glancing angle in **figure 6** for a ray of light incident onto a smooth glass surface.

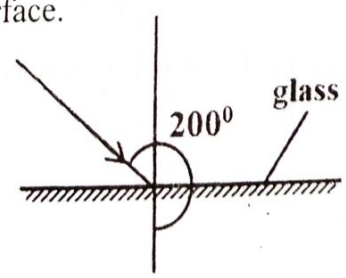


Fig. 6

A. 30^0
B. 40^0
C. 45^0
D. 50^0

Turn Over

35. Land breeze occurs …
A. by conduction when cold air flows from sea to land.
B. by convection when hot air flows from land to sea.
C. by convection when cold air flows from land to sea.
D. during the night when hot air flows from sea to land.

36. Which of the following is true about a body moving with uniform velocity?
(i) Its resultant force is zero.
(ii) Its momentum is constant.
(iii) Its acceleration is zero.
(iv) Its resultant force is increasing.
A. (i) and (ii)
B. (i), ii) and (iii)
C. (ii), iii) and (iv)
D. (i), (ii), (iii) and (iv)

37. In the **figure 7** ; A battery P of e.m.f 6V and internal resistance 0.5Ω is connected facing another battery Q of e.m.f 3V and internal resistance ***r*** in series with a 3Ω resistor. If the current flowing is 0.6A, find the value of **r** in ohms.

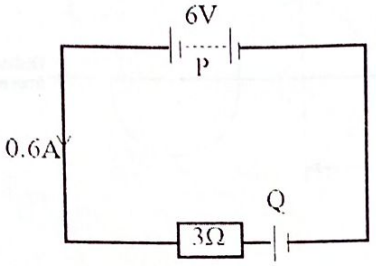
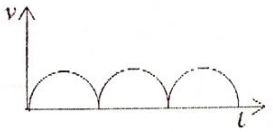


Fig. 7

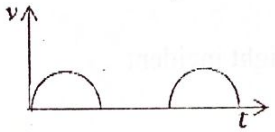
A. 1.0 Ω
B. 1.5 Ω
C. 2.0 Ω
D. 2.5 Ω

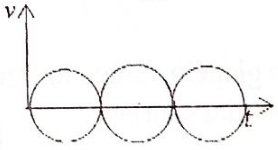
38. Which of the following quantities are defined by only magnitude?
A. mass, length and time.
B. displacement, weight and time.
C. energy, power and work.
D. pressure, work and velocity.

39. The correct voltage/time graph for emf fed into a factory motor is:

A. 

B. 

C. 

D. 

40. A given radioactive material takes 12 decades for its mass to reduce by 93.75% of the original value. Find its half-life.
A. 10yrs
B. 20yrs
C. 30yrs
D. 40yrs

SECTION B (40 Marks)

*Answer **all** questions in this section.*

41. (a) Define the apparent weight of a body. *(01 mark)*

.....

.....

(b) A metal cube of side 2cm weighs 22.4N in air. Calculate the apparent weight of the cube when completely immersed in a liquid of density $800kgm^{-3}$ *(03 marks)*

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42. (a) Define velocity ratio. *(01 mark)*

.....

.....

(b) In a pulley system made of 5 wheels, an effort of 250N is used to move a load of 1000N. Calculate:

(i) The mechanical advantage of the system. *(01 marks)*

.....

.....

(ii) The efficiency of the system. *(01½ marks)*

.....

.....

(iii) How can the efficiency of the pulley in part (b) above be increased. *(½ marks)*

.....

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43. (a) Define;

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

.....

.....

.....

(ii) Frequency. *(01 mark)*

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Turn Over

(b) A wave source produces waves of frequency 500Hz and velocity 340ms^{-1}. Calculate:

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

.....

.....

(ii) The periodic time *(01 mark)*

.....

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44. (a) What is meant by the term refractive index of a medium. *(01 mark)*

.....

.....

(b) A ray of light is incident from air to a layer of water placed on the surface of glass block of uniform thickness as shown in **figure 8** below. Given that the refractive index of water is 1.33 and that for glass is 1.50. calculate the angle of incidence i from air to water and angle of refraction for this ray travelling from water to glass. *(03 marks)*

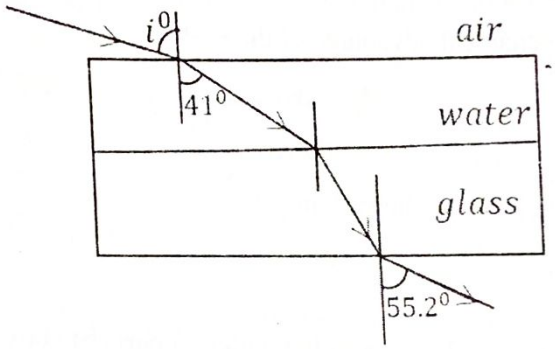

Fig. 8

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45. (a) What is half-life of a radioactive nuclide? *(01 mark)*

.....

.....

.....

(b) A radioactive nuclide $^{226}_{88}X$ changes to nuclide Y by emitting an alpha particle and two beta particles. Write a balanced equation to represent these changes. *(01 mark)*

.....

.....

(c) A Carbon atom initially contains 8×10^6 atoms. Calculate the time taken for 7.75×10^6 atoms to decay. (Half-life of carbon is 5,600 years) *(02 marks)*

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46. (a) Distinguish between potential and kinetic energy. *(02 mark)*

.....

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(b) A block of mass 2kg falls freely from rest through a height of 3.2m. Find the kinetic energy of the block before it hits the ground and hence its velocity at that point. *(02 marks)*

.....

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

.....

.....

(ii) State one physical property that affects resistance of a solid conductor. *(0½ mark)*

.....

(b)

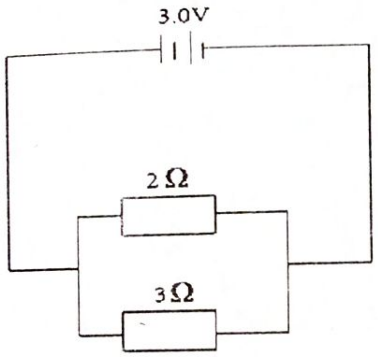

Fig. 9

Two cells each of E.M.F 1.5V and internal resistance of 0.15Ω are connected in series across two resistors of 2Ω and 3Ω respectively as shown in figure 9 above. Calculate the current that is passing through the 2Ω resistor. *(02½ marks)*

.....

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48. (a) What is a step-down transformer? *(01 mark)*

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.....

(b) A transformer has an input of 12V and an output of 240V and 60W. If it is 80% efficient, calculate; *(01½ marks)*

(i) The output current.

.....

.....

(ii) The input current. *(01½ marks)*

.....

.....

49. (a) (i) What is meant by a neutral point in relation to magnetism? *(01 mark)*

.....

.....

(ii) A north pole of a magnet is placed close to a wire carrying current into the paper as shown in figure 10 below;

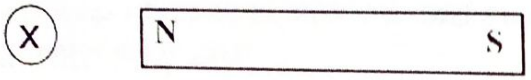

Fig. 10

Sketch the magnetic field pattern formed by this process. *(01 mark)*

(b) List two ways by which a magnet may lose its magnetism. *(02 marks)*

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50. (a) Define fundamental interval. *(01 mark)*

.....

.....

(b) Why is a manometer always fixed besides the upper parts of a hypsometer when determining the upper fixed point? *(01 mark)*

.....

.....

(c) A mercury in glass thermometer reads 2cm when inserted in pure melting ice and when inserted in pure boiling water, the mercury expands by 5 times. Calculate how many times the mercury will expand when it is inserted in a liquid of temperature 50^0C . *(02 marks)*

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END