NAME: .....

INDEX NO .....SIGNATURE.....

535/1
PHYSICS
PAPER 1
Nov 2020
2 ½ hours

ST. MARYS' KITENDE

Uganda Certificate of Education

RESOURCEFUL MOCK EXAMINATION 2020

PHYSICS

PAPER 1

2 HOURS 15 MINUTES

INSTRUCTIONS TO CANDIDATES:

- 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 to this section are to be written in the space provided on the question paper.

- Mathematical tables, slide rulers and silent non programmable calculators may be used

    - *Acceleration due to gravity* = $10ms^{-2}$.
    - *Specific heat capacity of water* = $4200Jkg^{-1}\ k^{-1}$.
    - *Speed of light in air* = $3 \times 10^{8}ms^{-1}$.
    - *Density of water* = $1000kgm^{-3}$

FOR EXAMINERS USE ONLY

MCQ	Q.41	Q.42	Q.43	Q.44	Q.45	Q.46	Q.47	Q.48	Q.49	Q.50	TOTAL

SECTION A

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

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

3. Which of the following changes when a body moves around a horizontal circular path.
   A. Inertia
   B. Speed
   C. Weight
   D. Velocity

4. The sharpness of an image formed in a pin hole camera may be increased by:
   A. Illuminating the object more strongly
   B. Making the pin-hole smaller
   C. Placing the camera near the object
   D. Increasing the distance between the pin hole and the screen.

5. Which of the following properties of musical notes is determined by presence of overtones?
   A. Timber
   B. Loudness
   C. Pitch
   D. Intensity

6. A nucleus ${}^{144}_{90}x$ emitts two beta particles followed by an alpha particle. It changes to Y having;-
   A. 85 protons and 140 nucleons
   B. 90 protons and 140 nucleons
   C. 90 protons and 142 nucleons
   D. 96 protons and 142 nucleons

7. A constant horizontal force is applied to a body at rest on a smooth surface which of the following will not change during the application of force?
   A. The K.e of the body
   B. The momentum of the body
   C. The position of the body
   D. The acceleration of the body

8. A measuring cylinder contains $20cm^3$ of water. A piece of brass of mass 24g and density $8gcm^{-3}$ is submerged in water in the cylinder. The new reading of water level in the cylinder is
   A. $13cm^3$
   B. $18\frac{1}{3}cm^3$
   C. $123cm^3$
   D. $50cm^3$

9. A ball falls from rest through a height of 92.5cm in 0.45 seconds. Find the acceleration due to gravity.
   A. $\frac{0.45^2 x100}{2x92.5} ms^{-2}$
   B. $\frac{0.45^2 x100}{92.5} ms^{-2}$
   C. $\frac{92.5}{0.45^2 X100} ms^{-2}$
   D. $\frac{2x92.5}{0.45^2 x100} ms^{-2}$

10. Two progressive waves each of amplitude 5m and frequency 200Hz travelling in opposite direction with a velocity of 100ms^{-1} meet when out of phase. Find the distance between successive nodes.
A. 0.25 B. 0.5 C. 1.0 D. 2.5

11. When a resistor of 6Ω is connected across the terminals of a battery of 12V and negligible internal resistance, the number of coulombs passing through the resistor per second is
A. 0.5 B. 2 C. 24 D. 72

12. Which of the following instruments is used to determine the purity of milk?
A. Hydrometer C. Hypsometer
B. Hygrometer D. Pyrometer

13. A force of 40N produces an extension of a spring by 20mm. Calculate the extension of the same spring when a body of mass 0.5kg is attached to its lower end.
A. 0.2mm B. 1.0mm C. 2.5mm D. 5mm

14. If an object is placed 21cm from a converging lens, the image formed is slightly smaller than the object. If the object is placed 19cm from the lens, the image formed is slightly larger than the object. The approximate focal length of the is?
A. 10cm B. 18cm C. 20cm D. 22cm

15. A pendulum bob completes 50 oscillation in 2 minutes. The frequency of the bob is;
A. 0.02Hz C. 2.5Hz
B. 0.42Hz D. 25Hz

16. The resultant force of two forces acting perpendicular to each other on a body of mass 3kg is 13N. The two possible forces are
A. 3N and 10N C. 13N and 17N
B. 5N and 12N D. 13N and 30N

17. Which of the following would cause the production of hard x-rays?
A. Increasing current through ting sten filament
B. Increasing the distance between the cathode and target
C. Using heavy metal as a target
D. Increasing the p.d across the tube

18. A filament lamp is connected to a constant p.d of 240V. As the filament heats up, its resistance;
A. Decreases and current through it increases
B. Decreases and current through it decreases
C. Increases and current through it increases
D. Increases and current through it decreases

19. A cyclist travelling at a constant acceleration of $2ms^{-1}$ passes through two points A and B in a straight line. If the speed at A is $10ms^{-1}$ and the points are 75m apart, find the speed at B

A. $15.8ms^{-1}$ C. $20.0ms^{-1}$
B. $17.3m^{-1}$ D. $400.0ms^{-1}$

20. A ticker timer is connected to the main supply of frequency 40Hz. Find the time taken to point 5 consecutive dots.

A. 0.05s C. 0.10s
B. 0.08s D. 0.125s

21. The engine of a car of mass 1000kg provides a driving force of 1500N at a speed of $40ms^{-1}$. Find the power developed.

A. 1500Kw C. 40Kw
B. 60Kw D. 37.5Kw

22. The slope of a velocity time graph is the

A. Speed of the body
B. Velocity of the body
C. Acceleration of the body
D. Distance travelled by the body

23. The emf induced in a coil of wire rotating in the magnetic field depends on:

i. Speed of rotation of the coil
ii. Number of turns in the coil
iii. Strength of the magnetic field

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

24. A bird flying above water is seen by the fish, the position of the fish as seen by bird is

A. Slightly displaced upwards
B. Slightly displaced downwards
C. Slightly displaced side ways
D. Within the water

25. An electric bell is connected to a sealed gas jar and switch on what happens as air is removed from the jar?

A. The electric circuit stops working
B. The pitch of the bell decreases
C. The loudness of the bell decreases
D. The loudness of the bell increases

26. Which of the following affects the velocity ratio of an inclined plane.

A. Increase in the angle of inclination of the plane
B. Increase in the load being drawn up the plane
C. Increase in the effort applied to the load
D. Increase the length of the plane

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

28. The length of a mercury column in a thermometer is 7.5cm in pure melting ice and 27.5cm in steam at 100^0C. What does it read when the temperature is 40^0C.
A. 0.5cm B. 15.5cm C. 20.0cm D. 43.0cm

29. Two resistors of resistance 5Ω and 10Ω are connected in parallel. When current is passed through them, the power dissipated in a resistor of 5Ω is 40W. What is the power dissipated in a resistor of 10Ω?
A. 10W B. 20W C. 40W D. 80W

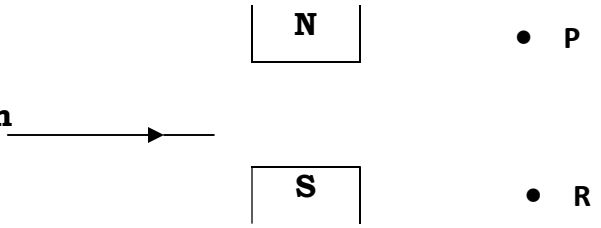
30. In an oil experiment to estimate the size of a molecule, $0.005cm^3$ of oil was dropped on lycopodium powder on a water surface. The mean diameter of the oil patch was 5cm. The thickness of a molecule of oil in;
A. $\frac{0.005}{2.5\Pi}$ B. $\frac{0.005x3}{4\Pi(2.5)^3}$ C. $\frac{2.5\Pi}{0.005x4}$ D. $\frac{2.5\Pi}{0.005}$

31. When a body is brought near the cap of a negatively charged electroscope a decrease in divergence is observed. This may mean that the body is
(i) Positively charged
(ii) Negatively charged
(iii) A conductor
A. (i) ad (ii) only C. (i) only
B. (i) and (iii) only D. (iii) only

32. When a force of 30N is applied to a stationary ball, the ball moves through a distance of 10m in 20 seconds in the direction of the force. The average power developed by the ball is
A. 6.67W B. 7.5W C. 15W D. 60W

33. In a dry cell, the carbon powder
A. Acts as an electrolyte
B. Prevents polarization
C. Connects the carbon rod to zinc plate
D. Increases the conducting surface of the carbon rod

34. An electron beam is directed into a magnetic field as shown below



The beam will be directed
A. Downwards towards R
B. Upwards towards P
C. Into the paper
D. Out of the paper

35. The stability of a passenger bus is increased when the heave load in placed below the seats because the
A. Pressure on the types is increased
B. Total friction between the tyres and road is increased
C. Centre of gravity is raised
D. Centre of gravity is lowered

36. A convex mirror may be used as a
A. Driving mirror
B. Shaving mirror
C. Magnifying glass
D. Security mirror

37. Paints and dyes are regarded as impure because they;
A. absorb only one colour of light
B. reflect more than one colour of light
C. are produced by mixing many colours
D. are in form of solutions and powder.

38. A rectifier
A. Converts a.c to d.c
B. Converts d.c to a.c
C. Steps down a.c voltage
D. Steps down a.c voltage

39. A bullet of mass 80g is fired from a gun of mass 5kg with a velocity of $400ms^{-1}$. Calculate the recoil velocity of the gun.
A. $\frac{80x1000}{400x5}$
B. $\frac{1000x5x80}{4000}$
C. $\frac{1000x400}{80x5}$
D. $\frac{80x400}{1000x5}$

40. The temperature of an ideal gas at which its molecules exertno pressure on the walls of the container is called.
A. Kelvin temperature
B. Thermodynamic scale
C. Absolute zero
D. Saturated temperature

SECTION B

41. (a) Define the term **evaporation** (1 mark)

.....

.....

.....

(b) Explain what happens to the temperature of a body when it sweats?(1 mark)

.....

.....

.....

(c) 80cm^3 of hydrogen is collected at 15^{0}C and 75 cm of mercury. What is its volume at s.t.p (2 marks)

.....

.....

.....

42. (a) Define the term a **couple** with reference to forces (1 mark)

.....

.....

.....

(b) Nam two practical applications of the principle of moments. (1 mark)

.....

.....

.....

(c) A uniform half metre rule pivoted at the 10cm mark balances horizontally when 150N is placed at the zero mark. Find the mass of the half metre rule. (2 marks)

.....

.....

.....

43. (a) What is a **wave?** (1 mark)

.....

.....

.....

(b) How is the frequency of vibration of an object related to the pitch of the sound note produced. (1 mark)

.....

.....

.....

(c) A man standing 99m from the foot of tall wall claps his hands and hears the echo 0.6 seconds later. Calculate the speed of sound in air. (2 marks)

.....

.....

.....

44. (a) What is meant by **terminal velocity.** (1 mark)

.....

.....

.....

(b) Draw a sketch of a velocity –line graph for a spherical body moving freely in a column of oil (1 mark)

.....

.....

.....

(c) A piece of wax with iron embedded in it weighs 1.51N in air and 0.43N when in water. Calculate the mass of the iron. (Density of iron 7.0g/cm^3, Density of wax 20.95gcm^{-3}) (2 marks)

.....

.....

.....

45. (a) Differentiate between ammeters and voltmeters in terms of their construction. (1 mark)

.....

.....

.....

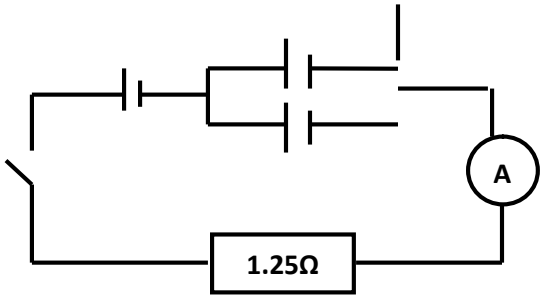
(b) Write down one advantage of wiring all circuits I a house in parallel.(1 mark)

.....

.....

.....

(c)Three identical cells of emf 1.5V and internal resistance of 0.5Ω are connected as shown to a 1.25Ω fixed resistor.



Find the ammeter reading when K is closed? (2 marks)

.....

.....

.....

.....

46. (a) Give two reasons why a practical transformer cannot be ideal (1 mark)

.....

.....

.....

(b) Why is electricity transmitted at high voltages to distant places. (1 mark)

.....

.....

.....

(c) A transformer connected to 240V a.c supply delivers 9.0A at 80V to run a motor. If 10% of the energy taken from the supply is lost in the transformer.Find the current in primary coil. (2 mark)

.....

.....

.....

.....

47. (a) State **one** application of a convex lens with an object between the optical centre and focal point. (1 mark)

.....

.....

.....

(b) A transparent material has a refractive index of 1.333. Find its critical angle? (2 marks)

.....

.....

.....

.....

(c) State the nature of images formed in a pin-hole camera. (1 mark)

.....

.....

.....

.....

48. (a) Define **tensile strain** (1 mark)

.....

.....

.....

(b) Why is a hollow pipe preffered to a solid rod to support a heavy load? (1 mark)

.....

.....

.....

(c) A wire of length 2m extends by 4mm when a load of 1500N is applied on it. Find the strain in the wire (2 marks)

.....

.....

.....

49. (a) State the principle of conservation of energy? (1 mark)

.....

.....

.....

(b) Name **one** device used to transform mechanical energy to electrical energy. (1 mark)

.....

.....

.....

(c) A water pump raises 5kg of water per second through a height of 20m. Find its power rating. (2 marks)

.....

.....

.....

50. (a) What is a **radioactive** substance? (1 mark)

.....

.....

.....

(b) Name **two** medical uses of radio isotopes? (1 mark)

.....

.....

.....

(c) 80g of a radio isotope has a half-life of 6 days. Find the mass that decays after 30 days. (2 marks)

.....

.....

.....

.....

.....

END