Name……

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PHYSICS
PAPER ONE
2 hours 15 minutes

ACEITEKA JOINT MOCK EXAMINATIONS 2018

UGANDA CERTIFICATE OF EDUCATION
PHYSICS
PAPER 1
TIME: 2 HOURS 15 MINUTES

Instructions to candidates:

Write your name, signature, and personal number clearly in the space above.
Section A contains 40 objective type questions. You are required to write the correct answer A,B,C, and D against each question in the box on the right hand side of each question.
Section B contains 10 structured questions. Answers are to be written in the space provided, on the question paper.

The following physical quantities may be useful to you.
Acceleration due to gravity = $10ms^{-2}$
Specific heat capacity of water = $4200Jkg^{-1}K^{-1}$ Speed of light in a vacuum = $3.0 \times 10^{8} ms^{-1}$

For Examiners use only

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

SECTION A

1. Which of the following objects can be charged by induction?
   A. glass
   B. plastic
   C. copper
   D. rubber

2. Which of the following is the best insulator of heat?
   A. air
   B. iron
   C. aluminum
   D. wood.

3. A possible isotope of $^{13}_{6}C$ has
   A. 7 protons and 6 neutrons
   B. 6 protons and 7 neutrons
   C. 6 protons and 6 neutrons
   D. 13 protons and 6 neutrons

4. The image formed in a plane mirror is
   i. virtual and magnified
   ii. laterally inverted
   iii. same size and same distance behind as object is in front.
   A. (i) and (ii) only
   B. (i) abd (iii) only
   C. (ii) and (iii) only
   D. (i),(ii) and (iii)

5. A swinging bob makes 40 complete oscillations in 3 minutes. Calculate the frequency of the swing in seconds.

A. 0.075
B. 0.222
C. 4.5
D. 13.33

6. Which wave travel at the speed of light
A. radio waves
B. sound waves
C. water waves
D. longitudinal waves

7. 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 acceleration upwards is positive.
iv. It moves with uniform velocity
A. (i) and (iii)
B. (i) and (iv)
C. (i) and (ii)
D. (iii) and (iv)

8. When a substance is boiling, its saturated vapour pressure is
A. maximum
B. minimum
C. above the atmospheric pressure D. equal to the atmospheric pressure.

9. Which of the following statements is correct about hard ferromagnetic materials.
i. they are easily and strongly magnetized. ii. they are used to make permanent magnets
iii. they don't lose their magnetism easily
A. (i) and (ii) only
B. (ii) and (iii) only
C. (ii) only D. (iii) only.

10. When the amplitude of vibration of the cone of a loud speaker increases, the sound produced becomes A. High pitched
B. Louder
C. Low pitched
D. Softer

11. Which one of the following colours is used for the neutral wire in three core cables?
A. red
B. blue

C. yellow
D. brown

12. Which of the following is not a vector quantity.
A. Weight
B. Momentum
C. Pressure
D. Magnetic flux

13. Calculate the amount of heat to raise the temperature of 2kg of copper by 32°C (s.h.c. of copper = $400Jkg^{-1}K^{-1}$)
A. 64J
B. 800J
C. 12800J
D. 25600J

14. Which of the following are properties of x-rays.
i. They are electrically neutral ii. They travel in a straight line
iii. They are deflected by magnetic fields
A. (i) and (ii) only
B. (i) and (iii) only
C. (ii) and (iii) only
D. (i) ,(ii) and (iii)

15. Light moving in air is incident on a medium at an angle of 60°. Find the refractive index, if the angle of refraction is 80°
A. 0.50 B. 0.58 C. 1.73
D. 2.00

16. A body has a constant acceleration when
i. Velocity is increasing
ii. It is moving in a straight line
iii. The net force on the body is zero
A. (i), (ii) and (iii)
B. (i) and (ii) only
C. (i) and(iii) only
D. (i) only

17. The recoil velocity of a gun will depend on
i. Mass of the bullet
ii. Muzzle velocity of bullet
iii. Mass of gun
A.(i),(ii) and (iii)

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

18. In a ripple tank, constructive interference occurs when
A. the wave is stationary
B. a crest overlaps with a trough C. a trough overlaps with a trough
D. the wave strikes a barrier.

19. A converging lens produces a virtual, magnified and erect image when A. the object is between the optical centre and the principal focus.
B. the object is between the focal point and centre of curvature
C. the object is beyond the centre of curvature
D. the object is at infinity

20. A boy takes one minute to lift 4 sacks of rice each of mass 5kg through a heights of 1.5m. Calculate the power expended.
A. 1.25W
B. 5.00W
C. 75.00W D. 300.0W

21. The principle of conservation of energy states that A. energy is the ability to do work.
B. energy is composed of kinetic and potential energy
C. energy will always be converted from one form to another
D. energy can neither be created nor destroyed but can be converted from one form to another.

22. Which of the following represents an ohm? A. joules per coulomb
B. joules per second
C. volts per second D. coulombs per second.

23. A wave of frequency 1000Hz travels between two points 600m a part in 2 second. How many wave lengths are between the two points?
A. 0.60
B. 300
C. 500
D. 2000

24. A strong material is one with the ability to resist
i. compression
ii. shearing force
iii. change in size or shape.
A. (i) only
B. (ii) only C. (i) and (ii) only
D. (i),(ii) and (iii).

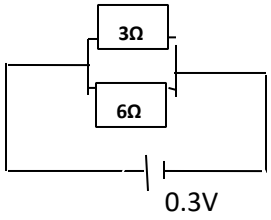
25. Three basic quantities of measurements are

A. area. volume, density
B. mass, temperature, and length
C. time density and pressure
D. length, mass and density

26. A water heater connected to 240V supply draws a current of 5A per second. How long will it take to heat 2kg of water from 30°C to 90°C.
A. 120s
B. 420s
C. 2700s
D. 7200s

27. A rectangular block of soft wood 0.3m by 0.1 by 0.5m has a mass of 60g. Find its density in Kgm^{-3}. A. 0.004
B. 0.4
C. 4.0
D. 400

28. Two resistors are connected in a circuit as shown below



The current through the 6Ω resistor is A.
0.05A
B. 0.3A C. 0.2A
D. 2.0A

29. Which of the following statements are true?
i Surface, which reflects all colours of light, appear white. ii Red surface absorbs all colours of light and reflects only red light.
iii. Black surface appear black because they absorb all colours and reflect black.
A. (ii) and (iii) only

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

30. Electromagnets are used in all the following appliances except
A. telephone
B. loud speaker
C. electric bell
D. thermostat

31. The equation below represents a radioactive decay in which a particle Y is emitted.

$^{288}_{90}Th \longrightarrow {}^{A}_{Z}X + Y$

If A = 284 and Z=88. Identify particle Y
A. Beta particle
B. Alpha particle
C. Gamma rays
D. Neutron

32. Isotopes of an element
i. Have same chemical properties
ii. Have same physical properties
iii. Have equal number of protons.
A. (i) only
B. (i) and (ii) only
C. (ii) and (iii) only
D. (i) and (iii) only

33. A body accelerates uniformly from rest and acquires a velocity of $60ms^{-1}$ after 30 seconds. Find the distance covered by the body
A. 15m
B. 30m
C. 1800m
D. 900m

34. Which one of the following ports of the eye is compared with the film in a lens camera.
A. pupil
B. iris
C. cornea
D. retina

35. The lead-acid cell is called a secondary cell because
A: It's output voltage is 2 volts

B: It can be recharged C: It has two lead electrodes D: It can’t be recharged.

36. A material which undergoes large extensions before it breaks is called.
    A. plastic
    B. brittle
    C. ductile
    D. elastic

37. The amount of heat absorbed by a body of mass 5kg at constant temperature is called
    A. specific latent heat
    B. specific heat capacity
    C. latent heat
    D. heat capacity

38. Oil of volume $6 \times 10^{-3} cm^{-3}$ is dropped on a clean water surface and it forms a pitch of diameter 20mm.Find the thickness of oil.
    A. $4.77 \times 10^{-4} cm$ B: $14.32 \times 10^{-4} cm$
    C. $1.91 \times 10^{-3} cm$ D: $5.24 \times 10^{2} cm$

39. The power of a lens is 25 Dioptre. Find the focal length of this lens in cm.
    A. 4.0 B: 2.5 C: 0.25 D: 0.04

40. A 60W and a 120W domestic lamps used on the 240v mains are used for five hours a night for 10 days. What is the cost of a unit of electrical energy given that the bill for 10 days is shs. 5400.
    A. 0.6
    B. 22.5
    C. 30.0
    D. 600.0

SECTION B

41. a) Distinguish between **work output** and **work in put** with reference to simple machines.

(2 marks)

b) An engine with a working power of 40W is used to run a machine which is 80% efficient to raise a load of 1500N through 15cm. How long does it take to do this? (2 marks)

42. a) (i) What is a **resistor** with reference to electricity. (1 mark)

(ii) In the space below, sketch a graph of current (I) flowing through a wire against its length L given that other factors do not remain constant. (1 mark)

b) Figure

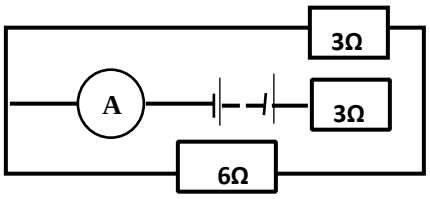


Figure shows a network of resistors with a battery of internal resistance IΩ. Find the ammeter reading. (2 marks)

43. a) (i) Define the term **atmospheric pressure** (1 mark)

ii) State **two** practical applications of atmospheric pressure. (1 mark)

b) A rectangular block of weight 50N rests on a face of area $2m^2$. A boy of mass 30kg stands on the block. Find the total pressure the block exerts on its support. (2 marks)

44. a) What property of a beam of fast moving elections is demonstrated in a Maltese – cross tube. (1 mark)

b) Sketch a voltage (v) – time (t) graph displayed on the screen of a C.R.O. when the time base is on with alternating voltage source connected to the Y-plates. (1 mark)

c) How can the brightness of the spot be reduced using the P.d between cathode and anode of a C.R.O? (2 marks)

45. a) Name **two** properties that are common to all electromagnetic radiations. (2 marks)

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___ b) Find the frequency of microwaves of wavelength 3.0×10^{-4}m. (2 marks)

46. (i) State **Archimedes' principle** (1 mark)

(ii) Name **one** practical application of Archimedes principle. (1 mark)

46. b) A hollow cylindrical tube with a flat bottom has an area of cross section $3cm^2$ and mass of 20g. What weight must be put inside it in order to make it float vertically with 16cm of its length immersed in water? (2 marks)

47. a) What is meant by **magnetic induction.** (1 mark)

b) Metallic magnetic materials can either be soft or hard magnetic materials. What metal would be used to:

i) Make the core of an electromagnet (1½ mark)

ii) Make a compass needle. Give a reason in each case. (1½ mark)

48. Give a reason why a body in unstable equilibrium topples when slightly displaced. (1mark)

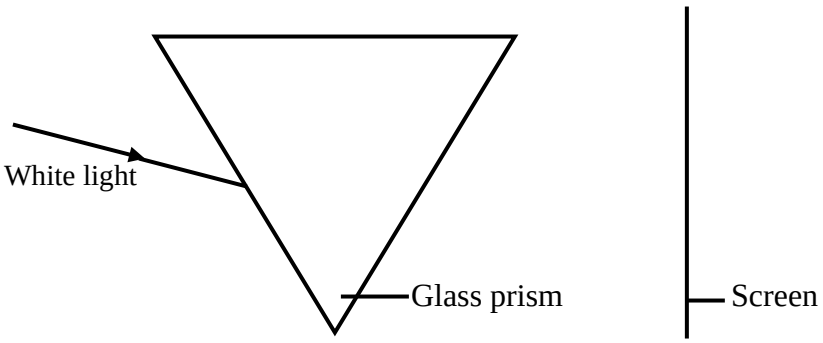
b) State **one** condition for a body to be in mechanical equilibrium. (1 mark)

c) A half-metre of mass 60g balances horizontally on a knife-edge placed at the 30cm mark when a load Q is placed at the 40cm mark. Find the magnitude of Q in newtons. (2 marks)

49. a) What causes refraction of light. (1 mark)

b) State snells law (1 mark)

c) Complete the diagram to show how the ray is refracted and dispersed naming the colours formed. (2 marks)



50. a) Define the term **Latent heat** (1 mark)

b) (i) A 500W heater is used to boil off 5kg of water boiling at 100^0c to steam. How long does it take? (Specific latent heat of steam is 2260,000JKg^{-1}) (2 marks)

(ii) If each unit of electricity costs shs. 600. Find the cost of energy after boiling off all the water.

END