NAME:		INDEX NO:	
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535/1

PHYSICS

Paper 1

August, 2019

2 ¼ hrs

UNNASE MOCK EXAMINATIONS

Uganda Certificate of Education

PHYSICS

PAPER 1

TIME: 2HOURS 15MINUTES

INSTRUCTIONS TO CANDIDATES

- *Write your name, signature, centre and index number clearly in the space above.*
- ***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 are to be written in the spaces provided on the question paper.*
- *Where necessary use:*

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

  ii) Specific heat capacity of water = 4200 Jkg^{-1}K^{-1}

  iii) Specific heat capacity of cupper = 400 Jkg^{-1}K^{-1}

For Examiner's use only

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

1. The main function of a step-up transformer is to

   A. Increase current
   B. Increase voltage
   C. Change alternating current to direct current
   D. Change direct current to alternating current

2. A bimetallic strip operates on the principles that metals
   A. Radiate heat at different rates
   B. Absorb heat at different rates
   C. Expand at different rates
   D. Reflect heat at different rates

3. A galvanometer can be converted to an ammeter if its connected to a resistor of
   A. high resistance in series
   B. high resistance in parallel
   C. low resistance in series
   D. low resistance in parallel

4. A 1200 W kettle contains 2 kg of water at 25^0 C. How long would it take to heat the water to 85^0C if 80% of the electrical energy supplied is absorbed by the water?
   A. 7.0 minutes B. 8.75 minutes
   C.420 minutes D. 525 minutes

5. A converging lens acts as a magnifying glass when the object is……
   A. at the principal focus B. between F and 2F
   C. beyond 2F D. between the lens and F

6 . Air occupies a volume $V_1 m^3$ at a pressure P_1 pa. Calculate the new volume whenthe pressure changes to P_2 pa at constant temperature:
   A. $\frac{P_1P_2}{V_1}$ B. $\frac{V_1P_2}{P_1}$ C. $\frac{P_1V_1}{P_2}$ D. $P_1V_1P_2$

7. The force a body needs to move at a constant speed in circle is,
   A. centripetal force towards the centre
   B. centrifugal force towards the centre.
   C. centrifugal force away from the centre
   D. centripetal force away from the centre

8. An object is placed between two mirrors inclined at θ^0 to each other. If N images are formed. Calculate the value of θ.
   A. $360^0 + N + 1$ B. $\frac{360^0}{N+1}$
   C. $\frac{N+1}{360^0}$ D. $\frac{360^0}{N} - 1$

9. A body X moving at $6ms^{-1}$ hits a stationary body Y of the same mass and the two move together. What is their common velocity?
A. $1ms^{-1}$ B. $2ms^{-1}$ C. $3ms^{-1}$ D. $6ms^{-1}$

10. The mass of a sample of radioactive iodine-131 is 800g. If the half-life of iodine -131 is 8 days, find the mass remaining undecayed after 32 days.
A. 25g B. 50g C. 100g D. 200g

11. Mosquito larvae cling to water surfaces because
A. it's less dense than water.
B. of surface tension of water
C. of repulsion forces from water molecules
D. of attraction from molecules above the water surface

12. Which of the following statements are true about a longitudinal wave?
i) Particles in the medium vibrate parallel to the direction of the wave
ii) A rarefaction is a region where the particles are closely packed.
iii) Its wavelength is the distance between a compression and a rarefaction
A. (i) only B. (i) and (iii) only
C. (ii) and (iii) only D. (iii) only

13. A list of electrical appliances with their voltages and ratings is shown below:

Appliance	Power rating	Voltage
Car head lamp	48W	12V
Electric drill	260W	250V
Bedside lamp	50W	250V
Electric iron	1500W	250V

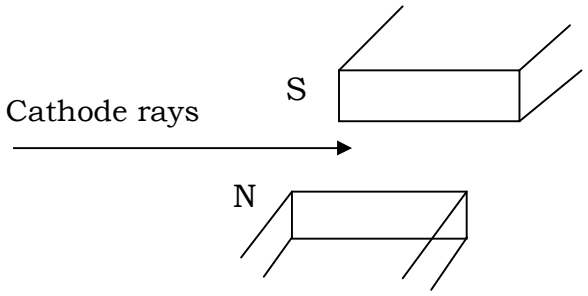
Which appliance has the highest resistance?
A. Electric drill B. car head lamp
C. Electric iron D. Bedside lamp

14. Total internal reflection occurs when
A. the angle of incidence is equal to critical angle
B. the angle of incidence is greater than critical angle
C. the angle of incidence is less than critical angle.
D. the angle of incidence is equal to the angle of refraction.

15. Afire alarm rated 240V, 1.5 kW runs for 10hrs a day. If the cost per unit of electricityis shs.380, find the daily cost of running the alarm.
A. shs 270 B. shs 2400
C. shs 3800 D. shs 5700

16. When the pressure of $8m^3$ of gas at -73^0C is increased to three times the original value, the temperature becomes 27^0C . Calculate the new volume of the gas.
A. $1.8m^3$ B. $4.0m^3$ C. $5.3m^3$ D. $12.1m^3$

17.

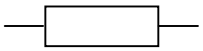


How will the rays be affected by the magnets?
A. They will be deflected into paper
B. They will not be deviated
C. They will be deflected out of paper
D. They will be repelled backwards

18. Moment of a couple is defined as the product of
A. the sum of clockwise moments and anticlockwise moments
B. one force and the perpendicular distance from the pivot.
C. forces and the perpendicular distance between the forces
D. one force and the perpendicular distance between the forces.

19. The refractive index of water is 1.33. The angle of refraction for a ray incident at 41.7^0 is?
A.30^0 B. 29.4^0 C. 19.5^0 D 18^0

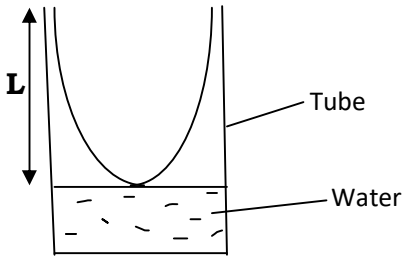
20.



The figure above shows an electrical symbol for a
A. cell B. resistor
C. rheostat D. resistance box

21.Which of the following actions does not cause an induced e.m.f to be set up in a coil of wire?
A. withdrawing a magnet from inside the coil
B. pushing a magnet into a stationary coil
C. moving a coil over a stationary magnet
D. a steady current flowing through the coil

22. The figure below shows sound produced in a resonance tube closed at one end.



If the frequency of the sound produced is 320Hz: Calculated the length, L of air column, if the speed of sound in air is $320ms^{-1}$.
A. 0.25m B. 0.5m C. 1.0m D. 2.5m

23. Which of the following statements is /are true?

i) when identical cells are in parallel, the total e.m.f is the sum of individual e.m.f$_s$

ii) In a lead-acid accumulator, the lead oxide acts as the positive terminal.

iii) thee.m.f of a cell is the total p.d across the external and internal resistance.

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

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

24. The direction of induced current in a conductor moving in a magnetic field can bepredicted by applying

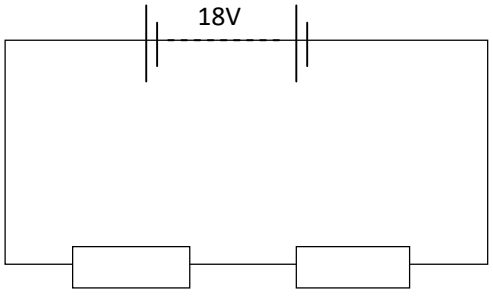
A. Faraday's law B. Fleming's left hand rule

C. Lenz's law D. Fleming's right hand rule

25. An elastic wire extending by 0.5cm when a load of 0.4N hangs from it. What additional load will be required to cause a further extension of 1.5cm?

A. 0.8N B. 1.0N C. 1.2N D. 8.0N

26. Two resistors of 3Ω and 6Ω are connected as shown in the figure below. Calculate the potential difference across the 3Ω resistor.



A. $\frac{9\times6}{18}\ V$ B. $\frac{18\times6}{9}\ V$ C. $\frac{9\times3}{18}\ V$ D. $\frac{18\times3}{9}\ V$

27. The bending of the waves round an obstacles is known as:

A. depression B. refraction

C. interference D. diffraction

28. During an inelastic collision;

A. momentum is conserved, but kinetic energy is lost

B. neither momentum nor kinetic energy is conserved

C. kinetic energy is conserved, but not momentum.

D. Momentum and kinetic energy are conserved.

29. If a bar magnet is broken into several pieces;

A. magnetism is lost

B. the pieces always repel each other.

C. each of the pieces becomes a magnet

D. half the number of pieces will be N-pole, the other half S-pole

30. The frequency of the third harmonic in an open pipe is 660Hz. Find the length of the air column if the speed of sound in air is 330ms^{-1}.

A. 0.75m B.1.2m C. 0.85m D. 1.0m

31. While shopping in a super market a student notices that a loaded trolley is difficult to start and difficult to stop. Which of the following accounts for these observations?

A. Friction B. density
C. inertia D. energy

32. A transformer is used to step down 240V to 12V for laboratory use. If the primary coil has 600 turns, determine the number of turns in the secondary coil.

A. 25turns B. 30 turns
C. 480 turns D. 12,000turns

33. In a hydraulic press, the area of the pistons on which the effort is applied is made smaller in order to.....

A. obtain pressure as large as possible.
B. transmit pressure throughout the liquid
C. transmit a force large enough to the load
D. facilitate the movement of the piston downward

34. An electro-magnet has a soft iron core, its strength will increase if...

i) the core is made of steel
ii) the current in the coil is increased
iii) the number of turns in the coil is increased

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

35. Which of the following makes a pair of complimentary colours?

A. blue and yellow B. yellow and magenta
C. green and yellow D. green and red

36. A milliammeter reads 0.05A at full scale deflection and has a coil resistance of 2Ω. Calculate the resistance that should be connected to the meter to convert it to voltmeter which reads 15V at full scale deflection.

A. 100 Ω B. 280 Ω
C. 298 Ω D.980 Ω

37. Power losses in a transformer are minimized by

i) laminating
ii) using thick copper wires in winding
iii) using wires with a high resistance in winding
iv) using different number of turns in primary and secondary coils

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

33. $^{235}_{92}U \longrightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 2x$

Identify x

A. proton B. neutron

C. beta particle D. alpha particle

39. Which of the following properties of a solid would change if it were transported from earth to the moon?

A. Mass B. Volume

C. Weight D. Density

40. A ticker timer makes 50 dots per second. When a body is pulled by a tape through the timer, the distance between the third and fourth dot is 3 cm and the distance between the fourth and fifth dot is 4 cm. What was the acceleration of the body?

A. 6.25 ms^{-2} B. 10 ms^{-2}

B. C. 12.5 ms^{-2} D. 25 ms^{-2}

SECTION B

41. (a) State what happens when a parallel beam of light is incident on a concave lens. (1mark)

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(b) Name two devices that use a convex lens. (1mark)

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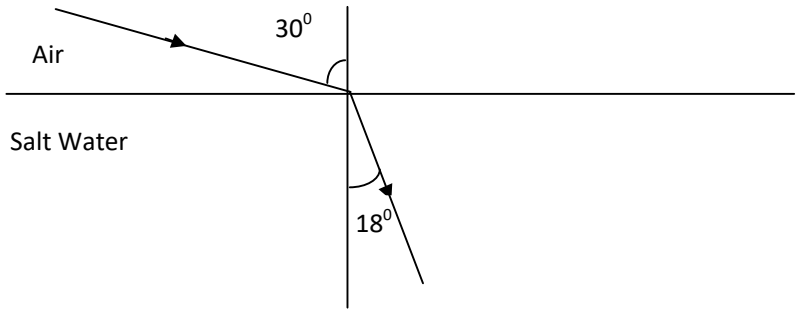
(c)



Use the diagram to find the refractive index of salt water.(2marks)

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42. (a) Define the term **momentum** and state its S1 unit. (2 marks)

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(b) Aglass marble of mass 20g moving at $5ms^{-1}$ collides with a steel ball of mass 50g at rest. The glass marble rebounds with a velocity of $2ms^{-1}$. Find the velocity of the steel ball after collision. (2 marks)

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43. (a) State the law of **electrostatics.** (1mark)

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(b) Name **two** uses of a gold-leaf electroscope? (1mark)

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(c) Explain what happens when a cap of a negatively charged gold leaf electroscope is earthed. (2 marks)

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44. (a) What are **x-rays**? (1mark)

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(b) Mention **one** medical useful property of x-rays. (1mark)

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(c) Describe what happens at the target in an x-ray tube as it works. (2 marks)

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45. (a) Define the term **yield point**. (1mark)

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(b) State**one** application of Hooke's law. (1mark)

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(c) A spring has one end fixed and a string attached to its free end. The string is pulled down by a force of 50N causing an extension of 10cm. Find the spring constant. (2 marks)

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46. (a) What is **heat.** (1mark)

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(b) Name **two** physical properties of a substance that change due to increase in temperature? (1mark)

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(c) Un calibrated thermometer reads -2cm when its bulb is placed in pure melting ice, 10cm when in stem from pure boiling water. Find its reading when in contact with a substance at 50^{o}C. (2 marks)

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47. (a) What is **a longitudinal wave**. (1mark)

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(b) (i) Draw a diagram of a closed tube producing a sound note of 1st harmonic. (1mark)

(ii) If the air column in (i) above is 30cm long, Find the wavelength of the sound note produced. (2 marks)

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48. (a) What is meant by **second class lever**? (1mark)

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(b) Why is the velocity ratio of a single moving pulley different from that of a single fixed pulley. (1mark)

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(c) A uniform beam 3m long is pivoted at a point 1 m from one end to be used as a craw bar to carry a load of 12ooN. Find the minimum effort needed to balance the bar horizontally. (2 marks)

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49. (a) What is a **volt?** (1mark)

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(b) Name **two** types of secondary cells. (1mark)

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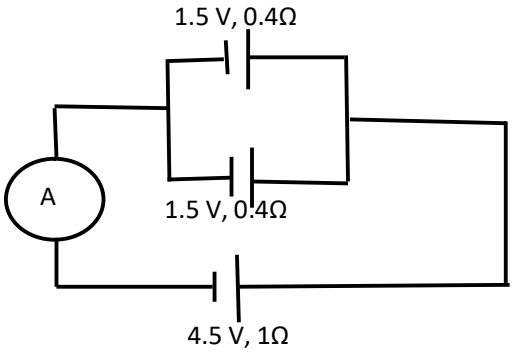
(c)



Two identical cells each e.m.f 1.5V and internal resistance of 0.4Ω are connected in series with another cell of e.m.f 4.5V and internal resistance 1Ω as in figure above.

Find the reading of the ammeter when switch s is closed. (2marks)

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50. (a) State the law of **flotation.** (1mark)

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(b) Give a reason why some objects float and others sink in water. (1mark)

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(c) A wooden cube 6cm long floats in water with $\frac{1}{3}$ of it out of water. Find the upthrust acting on the cube. (2marks)

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