Name: .....Random No.....

535/ 1
Physics
paper One
2 hours 15 minutes.

MOCK EXAMINATIONS 2019
UGANDA CERTIFICATE OF EDUCATION

Physics
Paper one
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 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 spaces provided on the question paper.
- Mathematical tables and silent non- programmable calculators may be used.
- Acceleration due t gravity, g = $10ms^{-2}$.
- Specific heat capacity f water = $4200Jkg^{-1}K^{-1}$
- Speed of light in air = $3 \times 10^{8} ms^{-2}$
- Density of water = $1000kgm^{-3}$.

SECTION A

1. Converting a.c voltage to d.c voltage is done by
   A. Diode valve B. Transformer
   C. Motor D. Dynamo

2. Tungsten is used in the target in an x-ray tube because it
   A. Produces x-rays easily
   B. Conducts heat easily
   C. Does not easily melt
   D. conducts electricity easily

3. A submarine will float on water whenever it
   A. has no passengers in it.
   B. is made up of a slightly less dense metal
   C. displaced its own weight of water
   D. displaces its own volume of water

4. The physical properties which change with temperature are:
   i. Colour
   ii. Resistance
   iii. Volume
   A. (i) only
   B. (ii) and (iii) only
   C. (ii) only
   D. (i), (ii) and (iii) only

5. In which of the devices is hooke's law applied.
   A. Pendulum clock
   B. Spring balance
   C. Beam balance
   D. Motor

6. The half life of a radioactive element is 8 weeks. Find the mass of the element that decays after 48 weeks if the initial mass is 96g.
   A. 16.0g
   B. 1.8g
   C. 1.5g
   D. 1.2g

7. Which set has the correct order of decreasing wavelength?
   A. Red, orange, Yellow, Green
   B. Blue, Green, Yellow, violet
   C. Violet, Red, Green, Orange
   D. Green, Yellow, Orange, Red.

8. A pond full of clear water appears shallow because of
   A. reflection

B. diffraction
C. dispersion
D. refraction

9. Different layers of an object tend to slide over one another when the object is under.
A. tension
B. compression
C. pressure
D. shearing

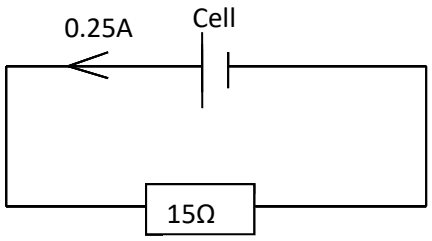
10. An electric iron rated at 1kw is connected to the 250V mains . Calculate the current taken by the electric iron.
A. 0.004A
B. 4A
C. 40A
D. 400A

11. 2200J of heat is needed to raise the temperature of a substance of mass 0.2kg from 40°C to 50°C. Find its specific heat capacity.
A. 2200 B. 2100
C. 1200 D. 1100

12. Find the time taken to raise a load of 1500N through 0.15m using a machine with a power output of 40w and 80% efficient.
A. 3.6seconds
B. 4.5 seconds
C. 5.6 seconds
D. 30.0 seconds.

13. A transparent substance has a refractive index of 2.4. Find its critical angle.
A. 18.0° B. 24.6°
C. 31.0o D. 48.0°

14.



A cell of internal resistance 1Ω is connected in the circuit above. Find its emf.
A. 0.25V
B. 4.00V
C. 25.00V
D. 250.0V

15. The main function of a step-down transformer is to
A. Decrease current

B. Decrease voltage
C. Change a.c to d.c
D. Change d.c to a.c.

16. A battery is made up of six identical cells each of emf 1.5V and internal resistance of 0.2 connected in series. The maximum current that can be obtained from the battery is
A. 0.3A
B. 1.3A
C. 1.5A
D. 7.5A

17. The rate at which a body gains heat energy depends on its
i. surface area
ii. temperature
iii. density
A. (i) only
B. (ii) only
C. (i) and (ii) only
D. (i),(ii) and (iii).

18. Find the power developed by a machine lifting a weigh of 300N through a height of 4m in 3 seconds.
A. $\frac{3000}{3}$
B. $\frac{300\times3}{4}$
C. $\frac{300\times4}{3}$
D. $4 \times 3 \times 300$

19. An element P has atomic mass of 239 and an atomic number of 92. P emits a beta particle to form a daughter element Q. Q can be presented by
A. ${}^{239}_{92}Q$
B. ${}^{239}_{91}Q$
C. ${}^{239}_{93}Q$
D. ${}^{238}_{92}Q$

20. The same sound note produced from a drum and a flute can be differentiated from each other due to the difference in
A. Pitch
B. Timbre
C. Loudness
D. amplitude

21. Light incident on a dense medium from a less dense medium is
(i) refracted towards the normal
(ii) faster in the dense medium
(iii) totally internally reflected
A. (i)only
B. (iii) only
C. (i) and (ii) only

D. (ii) and (iii) only.

22. The principle on which a bimetallic strip operates is that metals
    A. radiate heat at different rates
    B. absorbs heat at different rates
    C. expand at different rates
    D. reflect heat at different rates

23. The colour which is less deviated when white light passes through a glass prism is
    A. Red
    B. Yellow
    C. Violet
    D. Green

24. An experimenter positioned at a distance away from a wall makes a loud sound and hears an echo after 5 seconds. How far is the experimenter from the wall.(speed of sound in air is $320ms^{-1)}$
    A 32m
    B. 128m
    C. 800m
    D. 1600m

25. A material which undergoes a large amount of extension before it breaks is called
    A. Brittle
    B. Ductile
    C. Plastic
    D. Elastic

26. A galvanometer can be converted to an ammeter by connecting a resistor of
    A. high resistance in series
    B. high resistance in parallel
    C. low resistance in series
    D. low resistance in parallel

27. A mass of 5kg is given an acceleration of $2ms^{-2}$ by a forced of 10N. The same force would produce an acceleration of
    A. $5ms^{-2}$ when acting on a mass of 2kg.
    B. $5ms^{-2}$ when acting on a mass of 1kg
    C. $10ms^{-2}$ when acting on a mass of 10kg.
    D. $2ms^{-2}$ when acting on a mass of 10kg.

28. Water waves travel a distance of 72cm in 6 seconds if the separation of the successive Crests is 3.0cm. Find the frequency of the wave

A. 0.25Hz
B. 24.00Hz
C. 4.00Hz
D. 36.00Hz

29. Electromagnets are used in the following appliances except.
A. Telephone
B. Loud speaker
C. Electric bell.
D. Thermostat.

30. Both the human eye and the camera have
A. Iris
B. Lens
C. Diaphragm
D. Retina

31. In a machine, an effort of 10N just moves a load of 40N. If the same machine moves a load through 1m when the effort moves through 10m. Find the efficiency of the machine
A. 4%
B. 10%
C. 25%
D. 40%

32. Longitudinal waves and transverse waves can be distinguished by their
A. wave length
B. velocity
C. relative direction of oscillation and propagation
D. need for material medium

33. A lamp is marked 12V, 48w. This implied that when the bulb is working normally
i. Its resistance is 3
ii. The current which passes through it is 4A
iii. The energy used every seconds is 48J
A. (i) only
B. (i) and (ii) only
C. (ii) and (iii) only
D. (i),(ii) and (iii)

34. Magnification in optics may be defined as ratio of
A. object distance to image distance
B. object height to image distance

C. image distance to object distance
D. image height to object distance

35. The efficiency of a pulley system is 75% and the distance move by an effort is 4 times the distance moved by the load. Find the M.A of system.

A. $\frac{4\times100}{75}$

B. $\frac{4\times75}{100}$

C. $\frac{75}{4}$

D. $\frac{4}{75}$

36. Which of the following statements is/ or are true about the boiling and evaporation of water?

i. Boiling takes place throughout the body of the water
ii. Evaporation takes place only from the surface of water.
iii. With the same external condition, boiling takes place at one definite temperature but evaporation takes place at all temperatures.

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

37. Angle of dip can be defined as

A. angle between earth's magnetic pole and geographic meridian.
B. angle between magnetic meridian and geographic meridian
C. angle between the earth's axis of rotation and the horizontal
D. angle between the direction of the earth's magnetic field and the horizontal

38. A resistor is connected in series with bulb marked 24w. When ap.d of 48v is applied across them, the p.d across the resistor is 36v. Find the resistance of the bulb.

A. $\frac{144}{24}\Omega$ B. $\frac{48}{24}\Omega$

C. $\frac{36}{24}\Omega$ D. $\frac{24}{48}\Omega$

39.

In the diagram, an iron bar is place near magnet. A compass needle is brought in turn to ends A, B, N and S. Its North pole will point towards. A. both ends of the iron but only to the N pole of the magnet.

B. both ends of the iron but only to the S pole the magnet.

C. end B only of the iron and only to the N pole of the magnet.

D. end B only of the iron and only to the South pole of the magnet.

40. What is the cost of running six 100W lamps and three 75w lamps for 8 hours if the cost of one unit of electric power is shs. 700.

A. shs $\frac{825\times8\times700}{1000}$ B. shs $\frac{600\times8\times700}{1000}$

C. shs $\frac{225\times8\times700}{1000}$ D. shs $\frac{175\times8\times9}{1000}$

SECTION B

41. (a) State ohm's law. (1mark)

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(b) Three similar cells each of 1.5V and internal resistance of 0.5Ω are connected to give the lowest possible internal resistance. Calculate (i) the magnitude of the internal resistance. (1mark)

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(ii) the current that would flow in the above system.(2 marks)

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42. (a) What is refractive index (1mark)

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(b) Radio waves and light waves travel at a velocity of $3.0 \times 10^8 ms^{-1}$ in a vacuum. Calculate

(i) The wave length of radio waves when transmitted at a frequency of 150MH$_z$. (1½ marks)

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(ii) The velocity of light in glass of refractive index 1.5 (1½ marks)

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43. (a) Define velocity with reference to waves (1mark)

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(b) Sketch a graph showing how frequency of vibration of a light wire varies with length. 1 mark)

(c) Two men stand a distance apart besides a mental fence. One of them places his ear near the fence and the other gives a sharp knock on the fence. Two sounds separated by a time interval of 0.5s are heard. If the velocity of sound in air is 330ms^{-1} and 5280ms^{-1} in the metal, How far apart are the men.(2 marks)

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44. (a) What is a vector quantity. (1mark)

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(b) A wooden block pulled a long a rough surface by a string at 60° to the horizontal with a tension of 150N. If the friction force between the surface and block is 20N. Find the resultant force on the block. (3 marks)

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45. (a) Define potential energy (1 mark)

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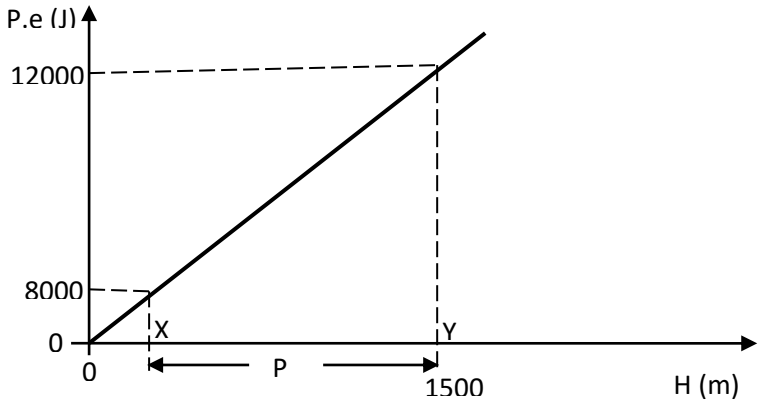
(b) The graph shows how potential energy experienced by a body varies with altitude.



Find the difference in height, P between points X and Y. (2marks)

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(c) State the energy transformations in an electric bell. (1 mark)

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46. (a) State the pressure law. (1mark)

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(b) Sketch a graph of volume against absolute temperature at constant pressure (1mark)

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(c) A fixed mass of a gas has a volume of $60cm^3$ at 53^oC with a pressure of 2 atmospheres. Find the new volume of the gas at a pressure of 3 atmospheres at 83^oC. (2 marks)

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47. (a) State Hooke's law. (1 mark)

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

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(c) A spring of natural length 10cm is stretched horizontally to a length of 18cm using an effort of 75N. Find the extension in metres when the same spring is acted on by a force of 90N. (2 marks)

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48. (a) Distinguish between **nuclear fusion** and **nuclear fission.** **(**1 mark)

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(b) State two similarities between nuclear **fusion** and **fission**. (1mark)

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(c) A radioactive substance of half-life 12 hours 56g of its mass decays after 36 hours. Find its original mass. (2 marks)

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49. (a) State the principle of moments (1mark)

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(b) Give two uses of the principle of moments. (1 mark)

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(c) A uniform metre rule pivoted at the 30cm balances horizontally when 600N is attached at the zero cm mark and 200N at the 90cm. Find the weight of the metre rule (2 marks)

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50. (a) Define angle of dip with reference magnets. (1mark)

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(b) Give a reason why a C-magnet is stronger than a bar magnet is terms of attraction. (1mark)

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(c) Explain what happens when a metallic wire carrying current is placed in a strong magnetic field. (2 marks)

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END