Name:..... Centre & Index No. ..... / .....

Name of school: …… Signature: .....

535/1

PHYSICS

Paper 1

2¼ hrs

STANDARD HIGH SCHOOL ZZANA

Uganda Certificate of Education

PHYSICS

Paper 1

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Answer **all** *questions in section* **A** *and* **B**.

Section **A** *consists of* **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 of each question.*

Section **B** *contains* **10** *structured questions. Answers to these questions should be written in the spaces provided.*

Mathematical tables and silent non programmable calculators may be used.

Assume where necessary:

Specific heat capacity of water = $4200Jkg^{-1}K^{-1}$.

Acceleration due to gravity, g = $10ms^{-2}$.

Speed of light in air = $3.0 \times 10^{8}ms^{-1}$.

For Examiner's 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 density of a material of mass, m, grams and volume $10cm^3$ is

   A. $m \times 10^{-1}kgm^{-3}$.

   B. $m \times 10^{2}kgm^{-3}$.

   C. $m \times 10^{-4}kgm^{-3}$.

   D. $m \times 10^{3}kgm^{-3}$.

2. Which one of the following instruments can deliver a definite volume of a liquid?

   A. Pipette.

   B. Burette.

   C. Measuring cylinder.

   D. Beaker.

3. Which of the following gives a list of colours of increasing frequency?

   A. Red, Green, Blue.

   B. Green, Blue, Red.

   C. Blue, Green, Red.

   D. Red, Blue, Green.

4. Which of these is a natural magent?

   A. Horse shoe.

   B. Bar magnet.

   C. Diamagnet.

   D. Lodestone.

5. The quantity of heat required to raise the temperature of 0.1kg of water by 1^oC is;

   A. $4200J$.

   B. $420J$.

   C. $42{,}000J$.

   D. $42J$.

6. The alternative unit to an ampere is;

A. Cs^{-1}.

B. JC^{-1}.

C. Js^{-1}.

D. VA^{-1}.

7. A wave makes 960 complete cycles in two minutes. Determine its frequency

A. $480\ Hz$.

B. $120\ Hz$.

C. $8\ Hz$.

D. $1920\ Hz$.

8. At what height above the ground must a mass of $5kg$ be to have a potential energy equal in value to the kinetic energy possessed by a mass of $15kg$ moving with a velocity of $10ms^{-1}$

A. $3\ m$.

B. $15\ m$.

C. $30\ m$.

D. $10\ m$.

9. How much heat is needed to change $20g$ of ice at 0^oC to steam at 100^oC? (Take specific latent heat of ice and steam to be $3.4 \times 10^5 Jkg^{-1}$ and $2.3 \times 10^6 Jkg^{-1}$ respectively).

A. $6{,}800J$.

B. $8{,}400J$.

C. $54{,}400J$.

D. $61{,}200J$.

10. The frequency of a vibrating string;

A. increases with increase in it's length.

B. increases with increase in it's diameter.

C. increases with increase in tension.

D. is independent of it's size.

Turn Over

11. The following demonstrate rectilinear propagation of light except;

A. formation of shadow.

B. occurrence of an eclipse.

C. working of a pin hole camera.

D. refraction.

12. The quantity of charge delivered by a steady current of 2mA for one hour is;

A. $2.0C$.

B. $720C$.

C. $12C$.

D. $7.2C$

13. Soft X-rays are used to detect bone fractures because of the following reasons except;

A. they are not very highly penetrative.

B. they affect photographic plates.

C. they are electromagnetic radiations.

D. they travel in straight lines.

14. The bulb in a projector is placed.

A. at the focal point of the reflector.

B. at the centre of curvature of the reflector.

C. between the focal point and the centre of curvature of the reflector.

D. between the pole and the centre of curvature of the reflector.

15. Figure 1 below shows a graph of extension against load for an elastic material.

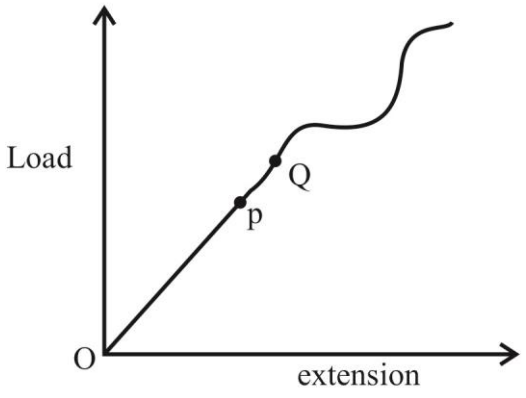

Fig.

In the region OP, the material is;

A. elastic and obeys Hooke's law.

B. elastic but does not obey Hooke's law.

C. plastic but obeys Hooke's law.

D. plastic but does not obey Hooke's law.

16. A hot air balloon rises in air because;

A. weight of balloon equals to weight of displaced air.

B. weight of balloon is less than weight of displaced air.

C. weight of balloon is greater than weight of displaced air.

D. weight of balloon is zero.

17. The earth behaves as if it contains a short but a powerful bar magnet with;

A. it's north pole in the southern hemisphere.

B. it's north pole in the northern hemisphere.

C. it's north pole in east – west direction.

D. no poles.

18. Figure 2 below shows that the current I, through the 2Ω resistor is $7.5A$.

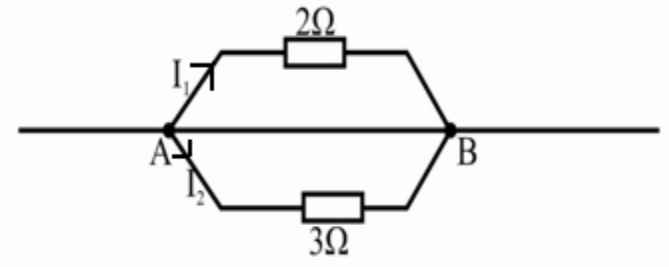

Fig. 2

The current I_2 through the 3Ω resistor is

A. $\frac{2 \times 7.5}{3} A$.

B. $\frac{3 \times 7.5}{2} A$.

C. $\frac{3}{2 \times 7.5} A$.

D. $\frac{3 \times 2}{7.5} A$.

Turn over

19. When a student is wearing a red skirt with a blue blouse under a green street light, her skirt and blouse will respectively appear

A. yellow and cyan.

B. red and black.

C. green and blue.

D. both black.

20. The particles of the medium through which radio waves travel

A. remain stationary.

B. move along with the wave.

C. move faster than the wave.

D. vibrate perpendicularly to the direction of the waves.

21. To test whether a piece of metal is a magnet or not, one would see if it

A. attracts steel and iron fillings.

B. attracts a magnet.

C. repels a known magnet.

D . repels a metal bar.

22. The image in a plane mirror is

A. upright, virtual with a magnification of 1.

B. upright, real with a magnification of 1.

C. inverted, virtual with a magnification of 1.

D. inverted, real with a magnification of 1.

23. Figure 3 shows a primary and secondary coils wound on a soft iron core.

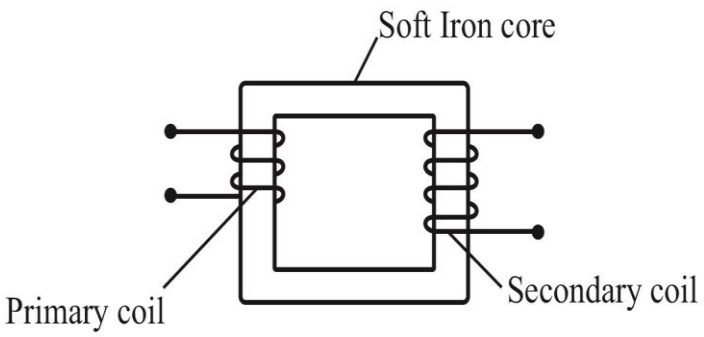

Fig. 3

The p.d across the secondary will increase if the

A. secondary coil has more turns than the primary coil.

B. primary coil has more turns than the secondary coil.

C. p.d across the primary coil is reduced.

D. frequency of the primary voltage is reduced.

24. A galvanometer reads $0.05A$ at full scale deflection and has a coil of resistance 1.0Ω. Find the value of the resistance that must be connected in series with it to convert it into a voltmeter which reads $3V$ at full scale deflection.

A. $59\ \Omega$.

B. $60\ \Omega$.

C. $3600\ \Omega$.

D. $180\ \Omega$.

25. Air in a $3m^3$ vessel at 27^oC exerts pressure of $2Pa$. Calculate the pressure that the same mass of air would exert if it was contained in $2m^3$ vessel at 10^oC.

A. $1.11\ Pa$.

B. $2.83\ Pa$.

C. $3.18\ Pa$.

D. $8.10\ Pa$.

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

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

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

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

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

27. In a simple cell, the effect of local action on the cell is to;

A. surround the cathode with hydrogen bubbles stopping the cell action.

B. waste the zinc even when the cell is not in action.

C. dilute the electrolyte.

D. heat the load.

Turn over

28. In which of the following devices is kinetic energy converted into electrical energy?

A. An accumulator.

B. Dynamo.

C. An electric motor.

D. A combustion engine.

29. A see breeze occurs

A. when cool air blows towards the land.

B. warm air blows towards the land.

C. during the night.

D. when cool air blows towards the sea.

30. Which one of the following statements is true of a wedge used as a simple machine?

A. A very small force is required to lift a big load.

B. Work done is always so much.

C. Effect on the wedge is applied vertically.

D. There is no frictional force.

31. Liquid Y of volume $0.45m^3$ and density $900Kgm^{-3}$ is mixed with liquid Z of volume $0.35m^3$ and density $800Kgm^{-3}$. Calculate the density of the mixture.

A. $800Kgm^{-3}$.

B. $840Kgm^{-3}$.

C. $850Kgm^{-3}$.

D. $900Kgm^{-3}$.

32. The distance between the lower and upper fixed points on the celcius scale of an unmarked mercury in – glass thermometer is $25cm$. If the mercury is $5cm$ below the upper fixed point, then the temperature is

A. 5^oC.

B. 20^oC.

C. 80^oC.

D. 95^oC.

33. Calculate the effort required to raise a load of $72N$ using a block system of five pulleys and efficiency 80.

A. $11.52\ N$.

B. $18\ N$.

C. $57.6\ N$.

D. $228\ N$.

34. A needle floats on the surface of water even when it's density is greater than that of water because of

A. capillarity.

B. tension.

C. surface tension.

D. Brownian motion.

35. Calculate the angle of incline of two plane mirrors in order to produce 8 images.

A. 45^o.

B. 51^o.

C. 40^o.

D. 60^o.

36. Which one of the following is the mode of heat transfer from fire to a person seated besides it?

A. conduction.

B. radiation.

C. convection.

D. evaporation.

37. A transformer has 3000 turns on the primary coil. If the primary voltage is $600V$ and the voltage across the secondary is $200V$, the number of turns on the secondary coil is

A. $\frac{3000 \times 200}{600}$.

B. $\frac{3000 \times 600}{200}$.

Turn over

C. $\frac{600 \times 200}{3000}$.

D. $\frac{600}{3000 \times 200}$.

38. The following are factors affecting pressure in fluids except;

A. depth below the surface of the fluid.

B. density of the liquid.

C. pressure exerted on the liquid surface.

D. surface area of the liquid.

39. A thermometer is said to be sensitive when

A. it can record big changes in temperature.

B. it can record small changes in temperature.

C. it has a large capillary bore in it's stem.

D. it is sensitive to heat.

40. Cathode rays consists of

A. fluorescent particles.

B. beams of fast moving particles.

C. light rays from a hot filament.

D. beams of fast moving electrons.

SECTION B: (40 marks)

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

All working **must** *be clearly shown in the spaces provided.*

41. (a) Define the term electric potential difference. (01 mark)

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(b) A current of $10A$ flows through a heater for an hour and converts $8.64MJ$ of electrical energy into heat energy. Calculate the;

(i) total charge circulated through the heater. (1½ marks)

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(ii) p.d across the heater. (1½ marks)

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42. (a) Distinguish between stationary and progressive waves. (02 marks)

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(b) Microwaves from a radar station are reflected by a plane and received back in a total time of $2.0 \times 10^{-4} S$. Calculate the distance of the plane from the station. (02 marks)

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43.

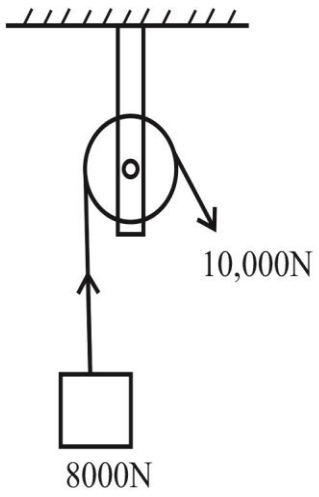

Fig. 4

Turn over

(a) The diagram in fig. 4 shows a machine used to raise a load at a construction site. What is it's efficiency? (03 marks)

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(b) State **one** way in which such a machine eases work. (01 mark)

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44. (a) Define the term diffusion. (01 mark)

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(b) In an oil film experiment to estimate the size of a molecule, $0.005cm^3$ of oleic acid was dropped on lycopodium powder on a water surface, the mean diameter of the acid was $5cm$. calculate the thickness of the oleic acid molecule. (02 marks)

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(c) State any **two** factors that affect the rate of diffusion. (01 mark)

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45.

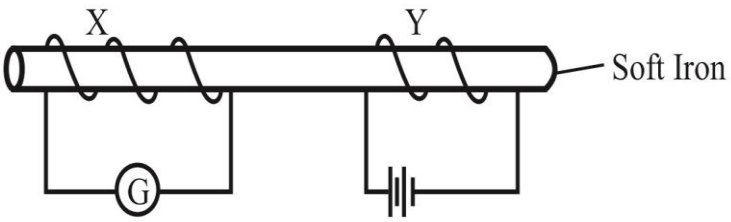

Fig. 5

(a) The diagram in fig. 5 shows two coils wound on a piece of soft iron. State

(i) what is observed when the key is closed and then opened. (01 mark)

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(ii) **two** ways in which the effect in 45. (a) (i) can be increased with out changing the cell.

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(b) State **two** causes of power loss in a transformer and give **one** solution for each. (02 marks)

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46. (a) Distinguish between a real and a virtual image with respect to light. (02 marks)

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Turn Over

(b) Complete the diagram in fig. 6 below to show the formation of an image by a plane mirror. (02 marks)

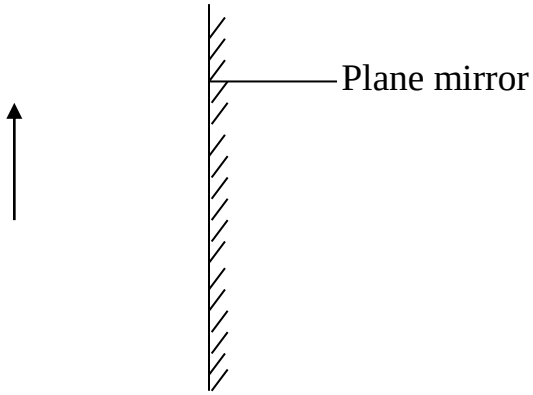

Fig. 6

47. A ticker timer has a frequency of $25\ Hz$. Determine

(a) it's periodic time (01 mark)

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(b) the distance between two successive dots if the velocity of the tape from the machine is $10ms^{-1}$. (02 marks)

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48. (a) Define a saturated vapour. (01 mark)

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(b) Sketch a graph to show the variation of saturated vapour pressure with;

(i) temperature (01 mark)

(ii) volume (01 mark)

(c) State **two** ways of raising the boiling point of a liquid. (01 mark)

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49. (a) Draw a well labelled diagram of a Gold leaf electroscope. (03 marks)

Turn Over

(b) The atoms of a very small body lose electrons to form a point charge. Draw a diagram to show the electric field pattern around it. (01 mark)

50. (a) Define half – life of a radioactive material. (01 mark)

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(b) A radioactive material takes 50 hours for 93.75% of it's mass to decay, find it's half – life. (03 marks)

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END