Candidate's Name:

……..……..……

Signature:……

Random No.						Personal No.		

(Do not write your School Name anywhere on this booklet)

535/1
PHYSICS
Paper 1
June. 2022
2¼ hours

EXTERNAL MOCK EXAMINATIONS 2022 (SET 2)

Uganda Certificate of Education

PHYSICS

Paper 1

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** *in* **blue** *or* **black** *ink against each question in the box at the right hand side.*

Section **B** *contains* **10** *structured questions. Answers are to be written in the spaces provided on this question paper.*

Mathematical tables and silent non-programmable calculators may be used.

Acceleration due to gravity, g = 10 ms^{-2}.
Specific heat capacity of water = 4200$Jkg^{-1}K^{-1}$

For Examiners' use only

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

[redacted]

SECTION A (40 MARKS)

1. The most suitable instrument for measuring the diameter of a ball bearing is;
A. Micrometer screw guage B. Ruler C. Engineers caliper D. Vernier scale

2. Which of the following leads to conversion of chemical energy to heat energy when used?
A. Dry cells B. Electric motor C. Charcoal D. Filament bulb

3. A lens of power 4 dioptres is used to focus an object at infinity. How far must the screen be from the lens for a clearly focused image?
A. 0.20cm B. 0.25cm C. 20cm D. 25cm

4. A bimetallic strip made of iron and brass was heated. Which of the following statements is true about the observation?
A. It bends with iron on the convex side
B. It bends with Brass on the convex side
C. It bends with Iron on the concave side
D. It experiences linear expansion

5.

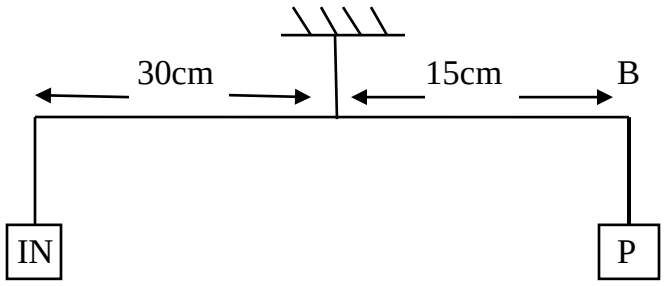


Fig. 1

The value of P in Figure **1** is?
A. 0.5N B. 0.2N C. 2N D. 5N

6. After mixing 100g of water at 24^0C with M grams of water at 36^0C, the final temperature is 28^0C. What is the value of M?
A. 30g B. 50g C. 20g D. 200g

7. Two straight wires near each other,
A. Repel each other always
B. Repel each other when they carry current in the same direction
C. Repel each other when they carry current in opposite direction
D. Repel each other when no current flows in them

8. A rainbow is an example of…
A. a mirage B. interference C. Diffraction D. dispersion

9. 15g of ethanol of relative density 0.8 is mixed with 10g of water. Determine the density of the mixture in Kgm^{-3}.
A. 0.8696 B. 1.1500 C. 869.6 D. 1150.0

10. Nuclear reactors convert……
A. Chemical into electrical energy
B. Electrical energy into heat energy
C. Nuclear energy into electrical energy
D. Heat energy into chemical energy

11. A body becomes positively charged when it;
A. gains electons B. loses electrons C. gains protons D. loses protons

12. The total energy of 720J is converted to heat when a current of 2.0A flows through a coil in 1minute. Determine the resistance of the coil.

A. 1.0Ω B. 2.0Ω C. 3.0Ω D. 180.0Ω

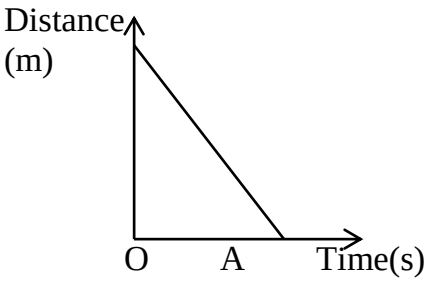
13. A radioactive material decays by loss of $\frac{15}{16}$ of its original quantity in 2 hours. What is its half life?

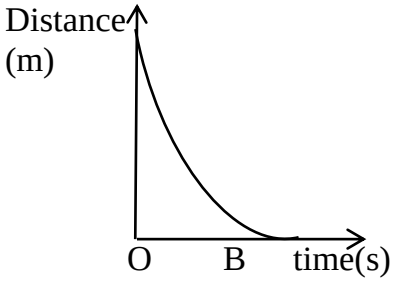
A. 10minutes B. 15minutes C. 30minutes D. 45minutes

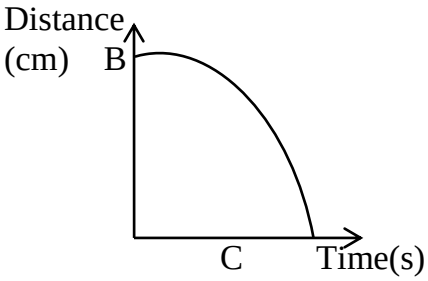
14. Which of the following has got lower frequency than yellow light?

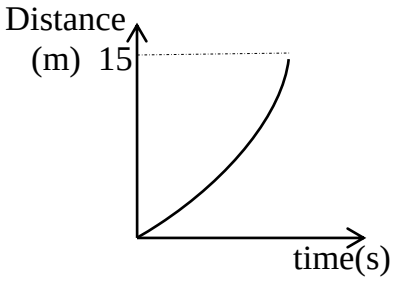
A. X-rays B. γ −rays C. Ultra violet rays D. Radio waves

15. Which of the graphs below best describes the motion of a body which falls freely from a height of 15m.









16. A ray of light travels from medium A to medium B as shown in the figure **2**.

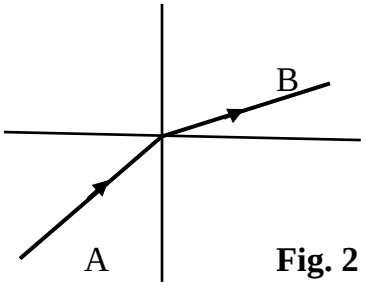


Fig. 2

Which of the following statements about the set-up above is true?

A. Medium A is denser than medium B

B. Light travels slower in medium B than in medium A

C. Light travels slower in medium A than in medium B

D. Medium B is less dense than medium A.

17. Fans in electrical appliances are used to…..

A. increase the durability of the appliance

B. decrease the rate of circulation of air by forced convection currents

C. provide fresh air

D. increase the rate of circulation of air by forced convection currecnts.

Turn Over

18. In the circuit in figure **3**, what is observed on the Oscilloscope when the time base is on;

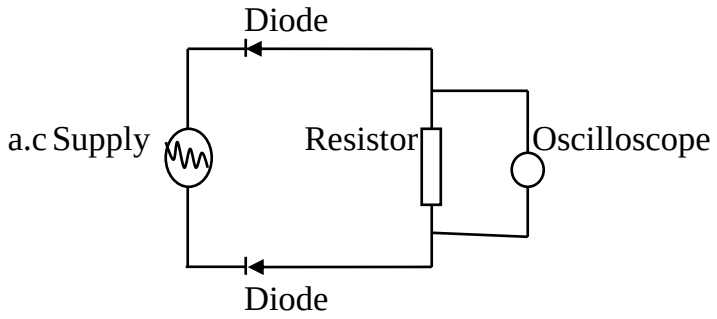


Fig. 3

A.  B.  C.  D. 

19. The parabolic mirror is used…….

A. to reduce the size of the image
B. to avoid formation of an image
C. to avoid spherical aberration of the image
D. to avoid distraction of the object

20. Which of the following statements is not true about ammeters and voltmeters?

A. A voltmeter is connected in parallel to the load
B. A voltmeter is connected in series with load while the ammeter is connected in parallel to the load.
C. A voltmeter has a higher resistance than the ammeter
D. A voltmeter is used to measure p.d while the ammeter is used to measure current.

21.

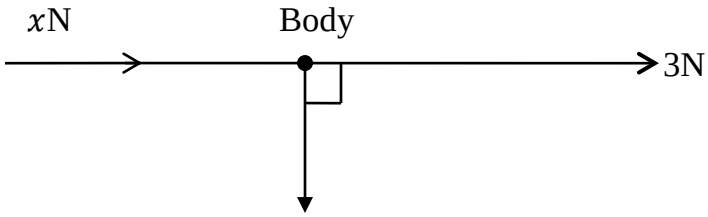


Fig. 4

The vector diagram shown in Figure **4** is of three forces acting on a body. If the magnitude of the resultant force is 13N. Find the value of x

A. 1N B. 2N C. 4N D. 5N

22. During resonance, the

A. frequency of the wave is increased
B. wavelength of the wave is increased
C. amplitude of the wave is increased
D. velocity of the wave is increased

23. A transformer has thrice as many turns in the secondary coil as in the primary coil. The input a.c in the primary coil is 6V. Find the output a.c

A. 20V B. 18V C. 14V D. 12V

24. If two bodies are released at the same time from the same height with one dropped to fall freely and the other projected sideways horizontally, one of the following statements is true;

A. The dropped body reaches the ground first
B. The projected body reaches theh ground first

C. In both cases, there is no work done
D. They both take the same time to reach the ground

25. A car is decelerated from $40ms^{-1}$ to $20ms^{-1}$ in 10 seconds. Calculate the displacement covered by the car

A. 100m B. 200m C. 300m D. 500m

26. The hydraulic brakes operate on one of the following principle. Identify it.

A. Archimede's principle
B. Bernoulli's principle
C. Pressure in fluids increases with depth
D. Pascal's principle of transmission of pressure in fluids.

27. The image produced by a pin hole camera can be enlarged by;

A. reducing the object distance
B. increasing the object distance
C. increasing the size of the pin hole
D. reducing the size of the pin hole

28. The temperature at which pure ice melts at standard atmosphere pressure is called;

A. Lower fixed point
B. Melting point
C. Freezing point
D. Latent heat of fusion

29. Destructive interference occurs when……..

A. A crest of one wave superposes a crest of another coherent wave
B. A trough of one wave superposes a crest of another coherent wave
C. A node of one wave superposes a node of another coherent wave
D. An antinode of one wave superposes an antinode of another coherent wave.

30. Two cells each of emf 2V and negligible internal resistance are connected as shown in Figure **5**

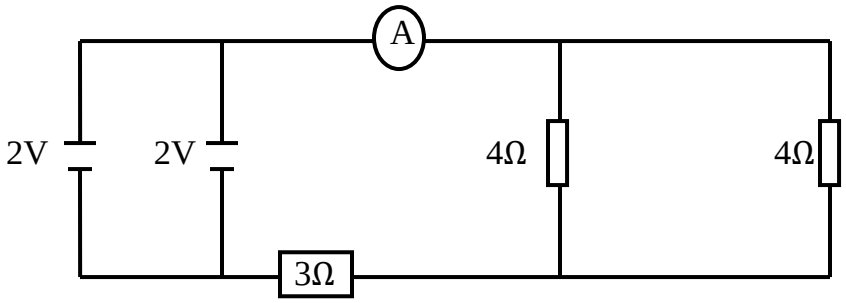


Fig. 5

What is the ammeter reading?

A. 0.18A B. 0.36A C. 0.40A D. 0.80A

31. An increase in pressue of $120,000Nm^{-2}$ is experienced by a diver on descending from 20m to a new depth in sea water. Assuming density of sea water to be $1000kgm^{-3}$, calculate the new depth reached by the diver.

A. 8m B. 12m C. 30m D. 32m

32. Solar panels generate electricity by a process called…….

A. Photo electric emission
B. Thermionic emission
C. Radioactive emission
D. Radiation

33.

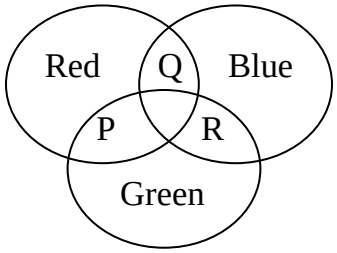


Fig. 6

Turn Over

Three primary colours red, blue and green are mixed as shown above. Name the colours P, Q and R.

	P	Q	R
A	Magenta	Yellow	Magenta
B	Yellow	Magenta	Cyan
C	Cyan	Yellow	Magenta
D	White	Yellow	Cyan

34. Which one of the following shows the correct distribution of electric charges generated in clouds due to voilet movements with the thunder clouds?

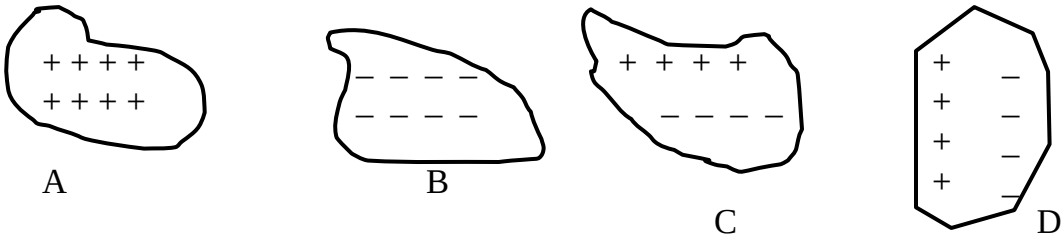


Fig. 7

35. When power is being transmitted over long distances, it is in such a way that……

A. it is stepped up to high voltage and low current
B. it is stepped up to high voltage and high current
C. it is stepped down to low voltage and low current
D. it is stepped down to low voltage and high current

36. Which of the following statements is true of a wedge used as a simple machine.

The figure above shows a spring balance A fixed on the wall and connected to a spring balance B. When a force F is applied on B…….

A. A very small force is required to lift a big load
B. Work done is always so much
C. Effort on the wedge is applied vertically
D. There is no frictional force

37. Background radiation is due to;

(i) Cosmic rays from the sun
(ii) Micro waves
(iii) Radioactive fall out
(iv) Radioactions from TV set

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

38. A girl of mass 70kg stands in a lift. What willo happen to her weight when the lift accelerates upwards?

A. It will not change B. It will decrease C. it becomes zero D. it will increase

39. Ice pieces of mass 500g at 0^0C are mixed with 3kg of water at 0^0C. How much heat is needed to convert the mixture to water at 10^0C?

A. 168,000J B. 126,000J C. 147,000J D. 315,000J

40. A train travelling at a constant speed of $20ms^{-1}$ overcomes a resultant of 5KN. Find the power of the train. (5×20)W B. (5×1000)W C. $(5 \times 1000 \times 20)$W D. $(5 \times 20 \times 10)$W

SECTION B (40 MARKS)

Write in the spaces provided

41. (a) What is meant by **coefficient of static friction**? *(01mark)*

……

……

(b) A particle of mass 3kg is being pulled on a rough horizontal plane by a horizontal force of magnitude 12N as shown in figure **8**

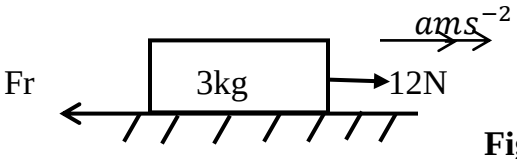


Fig. 8

Find the acceleration of the particle if the coefficient of friction between the block and the surface is $\frac{1}{5}$. *(03marks)*

……

……

42. (a) State **two** factors that affect the rate of diffusion of gases. *(01mark)*

……

……

(b) $0.008cm^3$ of oil placed on water spread out to form an oil patch of area $1600cm^2$.

(i) Calculate the size of oil molecule. *(02marks)*

……

……

(ii) State **one** assumption made in the calculation in b(i) above. *(01mark)*

……

43. (a) Define **aperture** of a mirror. *(01mark)*

……

b(i) An object O is placed infront of a convex mirror as shown in Figure **9**.

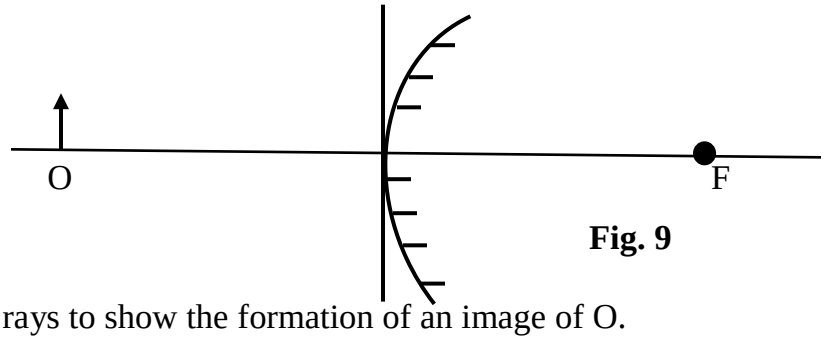


Fig. 9

Draw rays to show the formation of an image of O. *(02marks)*

(ii) State **one** use of a convex mirror. *(01mark)*

……

Turn Over

44. (a) Draw a diagram to show the mode of vibration that produces the second overtone in a closed pipe.

(b) Determine the frequency of sound waves whose wave length is $8 \times 10^{-2} m$. *(03marks)*

……

……

45. (a) Define the term **electrical power**. *(01mark)*

……

……

(b) A house-heating device has a power of 2500 watts and is switched on for 4 hours a day for 30 days. If the unit cost is 110/=, find the monthly bill. *(03marks)*

……

……

46. (a) What is a **radioactive nuclide**?

……

……

(b) Radium, Ra decays to nuclide Y according to the equation.

$^{226}_{88}\text{Ra} \longrightarrow {}^{A}_{z}\text{Y} + 2\alpha + \beta$. Find the value of A and Z. *(02marks)*

……

……

(c) Give **one** danger of radioactive materials. *(01mark)*

……

47. (a) State Lenz's law of electromagnetic induction. *(01mark)*

……

……

(b) Figure **10** shows a magnet being moved into a solenoid connected to a galvanometer.

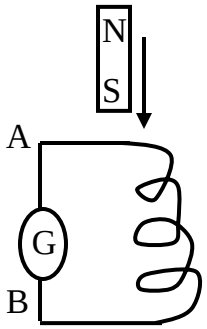


Fig. 10

(i) State what is observed as the magnet is moved in and out. *(02marks)*

……

……

(ii) State **one** way of increasing the magnitude of the effect in b(i) above…*(01marks)*

……

……

48. (a) Define **strength** as applied to materials *(01mark)*

……

……

(b) Differentiate between a **tie** and a **strut** *(01mark)*

……

……

(c) Give **two** reasons why a bicycle is made up of hollow frames. *(02marks)*

……

……

49. (a) State **pressure law** *(01mark)*

……

……

(b) A gas of constant volume exerts a pressure of 82cmHg when its temperature is 50^0C. At what temperature will the pressure exerted be 100cmHg? *(02marks)*

……

……

(c) State **one** practical application of the principle in (b) above. *(01mark)*

……

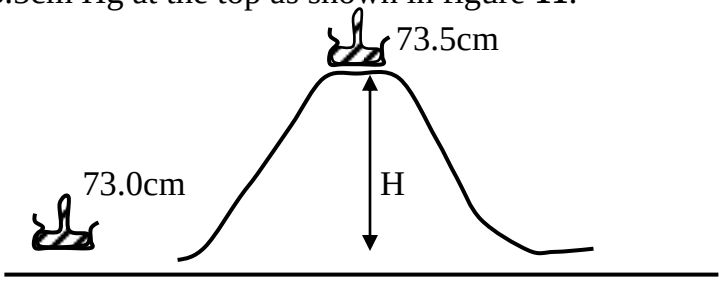
……

50. (a) Define **atmospheric pressure** *(01mark)*

……

……

(b) A mercury barometer reads a pressure of 75.2cm Hg at the bottom of a mountain and 73.5cm Hg at the top as shown in figure **11**.



If the density of mercury is $13600kgm^{-3}$and that at air is $1.25kgm^{-3}$ Calculate the height of the mountain. *(03marks)*

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