



HOME SCHOOLING MATERIAL

PASS O'LEVEL

YOUR GUIDE AWAY FROM SCHOOL



YOUR GUIDE AWAY FROM SCHOOL BIOLOGY PAPER ONE SOLUTIONS (MAY 14)

1.	C	6.	A	11.	A
2.	A	7.	B	12.	C
3.	D	8.	D	13.	B
4.	D	9.	C		
5.	B	10.	C		

- C - This is because it involves using a portion of the shoot system.
- A - Because photosynthesis instead incorporates carbon into plants, while the rest release carbon from the plants.
- D - Long sightedness causes one to clearly see distant, not near objects.
- D - In scientific naming, a species is given a single name for all its stages, which is the same in all parts of the world.
- B - Kidney does not remove bile salts, skin does not remove carbon dioxide and liver does not remove excess heat, but when exhaling, carbon dioxide and excess water are removed from the body.
- A - Alveoli are formed due to inward folding of the lungs, this increases surface area for gaseous exchange.
- B - Because the back paper is opaque, light does not pass through it but rather absorbs all light rays incident on it.
- D - A pollen grain contains two nuclei, the pollen tube nucleus controls the growth of pollen tube, but generative nucleus divides to form two male nuclei by mitosis when the pollen tube reaches the micropyle.
- D - Surface water runoffs at the same place create gullies with time.
- C - Alignment of the equator by chromosomes occur only during metaphase. During anaphase, there is migration of chromosomes and telophase, division of the cytoplasm.
- A - Microscopes only magnify the image of the object, while linear magnification results either in increase or decrease in size of the image relative to the object.
- C - Cervical vertebrae are found in the neck, thoracic in the thorax.
- B - As adrenaline is not secreted by the adrenal gland not thyroid gland. Thyroid gland is not found in the groin, but rather in the neck.

SECTION B

14. (a) From 0 to 5th minute, oxygen concentration remained constant, then from 5th to 24.5th minute, oxygen concentration decreased rapidly and attained a minimum at 24.5th minute and, finally, from 24.5th minute to 30th minute, oxygen concentration increased rapidly.



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(b)(i) No lactic acid produced. Oxygen concentration was sufficient to meet the low energy demand as exercise had not yet started.

(ii) Lactic acid concentration increased rapidly due to increase in rate of anaerobic respiration as exercise increases energy demand such that oxygen concentration becomes too low to meet the energy demand.

(iii) Lactic acid concentration decreased rapidly due to the decrease in the rate of anaerobic respiration as oxygen concentration increased.

(c) From 0 to 5th minute. This is because no lactic acid was produced.

(d) Liver.

(e) .

Photosynthesis	Respiration
Uses carbon dioxide	Produces carbon dioxide
Produces oxygen	Uses oxygen
Forms food nutrients	Breaks down food nutrients
Occurs only in autotrophs	Occurs in all organisms

15. (a)(i) Oxygen.
(ii) To absorb oxygen from the setup.
(b) X: The seeds did not germinate/seeds were rotting.
Y: The seeds germinated.

(c) X: No or little energy produced that could not support germination due to absence of oxygen in the setup.
Y: Sufficient energy for germination produced due to presence of oxygen to support aerobic respiration.

- (d) Dry condition.
Cold condition.
Airtight condition.

33 (a) (i).

	Leaf	Reason
Simple	A or B or E	Lamina not divided.
Compound	C or D	Lamina divided into leaflets.

(a)(ii).

	Leaf	Reason
Monocotyledonous plant leaf	E	Lamina has parallel venation/leaf sheath.
Dicotyledonous plant leaf	A or B or C or D	Lamina has network venation.

(b) The leaves are green, hence chlorophyll is present to absorb sunlight energy required for photosynthesis. Numerous veins on the lamina contain xylem to supply water required for photosynthesis. Transport manufactured food away from the leaves whose accumulation in the leaves would slow down the rate photosynthesis.

- (c) A dichotomous key to identify specimens A, B, C, D and E
a) Leaf with parallel venation. E
b) Leaves with network venation (A, B, C, D) go to 2

- a) Leaves with divided lamina. (C, D) go to 3
b) Leaves with undivided lamina. (A, B) go to 4

- a) Leaf with three leaflets. C
b) Leaf with eighteen leaflets. D

- a) Leaf with entire margin. A
b) Leaf with serrated margin. B

BIOLOGY PAPER ONE REVISION QUESTIONS (OB003)

1. Why does placing food items under low temperature by use of a refrigerator result in their preservation?
A. It keeps the surface fresh such that no microorganisms enter.
B. It deactivates the enzymes that catalyse decomposition.
C. It freezes the food items keeping food items fresh inside.
D. Enzymes that catalyse decomposition are inactivated.
2. **Figure 1** below shows a type of feathers in chickens.

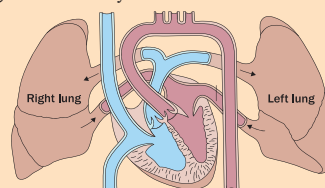


Figure 1
What is the type of the feather and its location on the body of a chicken?

	Type of feather	Location on the body
A	Quill	Wings
B	Down	Tail
C	Covert	Back
D	Filoplume	All parts

3. Under which of the following conditions would the rate of transpiration be very high?
A. High humidity, low temperature and strong wind.
B. High temperature, weak wind and low humidity.
C. Strong wind, low humidity and low temperature.
D. Low humidity, strong wind and high temperature.

4. Identify the type of mammalian blood circulation illustrated in **figure 2** below by the arrows.



- A. Coronary circulation.
B. Systemic circulation.
C. Pulmonary circulation.
D. Open circulation.

5. Which of the following determines the carrying capacity of an environment?

- A. Amount of resources in the environment.
B. Presence of environmental resistance.
C. Size of the environment.
D. The number of heterotrophs in the environment.
6. Tendency of the head of a bony fish to deflect laterally due to sideways movement of the tail during locomotion is.
A. Pitching.
B. Rolling.
C. Yawing.
D. Instability.
7. Which of the following is the function of homeostatic systems in animals?
A. Prevent increase in body entities above the normal.
B. Maintain a fairly constant internal environment.
C. Prevent decrease in body entities below the normal.
D. Maintain a fairly constant external environment.
8. **Figure 3** below shows a feeding relationship obtained by a student during an investigation from a local ecosystem in Uganda.

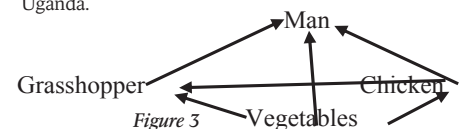


Figure 3

Continued from page 17

Which of the following is true for man in the feeding relationship?

- Primary consumer.
 - Secondary consumer.
 - Producer.
 - Tertiary consumer.
 - Decomposer.
- (iii), (ii) and (v).
 - (iv), (i), and (ii).
 - (v), (i), and (iv).
 - (i), (ii), and (iii).

9. Which of the following is the sequence of stages of human growth and development after birth?

- Adolescence → Adulthood → Childhood.
- Infancy → Childhood → Adulthood.
- Childhood → infancy → Adolescence.
- Infancy → Childhood → Adolescence.

10. Taxis response involves:

- Locomotion of an organism due to directional stimulus.
- Only growth movement in plants.
- Movement of part of an organism due to non-directional stimulus.
- Movement of whole organism due to non-directional stimulus.

11. Which of the following is an example of chemical digestion along the mammalian alimentary canal?

- Breakdown of food due to mastication in the mouth.
- Coagulation of milk proteins in the stomach.
- Breakdown of food materials due to churning stomach wall.
- Emulsification of lipids by bile in the duodenum.

12. Organisms belonging to a higher taxonomic level but to different lower taxonomic levels means they:

- can interbreed producing fertile offspring.
- belong to the same species.
- have the same scientific name.
- have the same ancestry but evolved differently.

13. Figure 4 shows a model designed by a student to investigate the role of diaphragm during breathing in mammals.

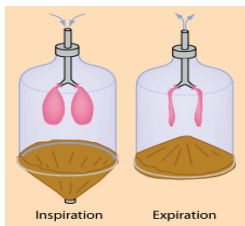


Figure 4

Why do the balloons in the bell jar inflate when the rubber sheet covering the bottom of the jar is pulled downwards? Air enters into the balloons because:

- both volume and pressure are increased inside the bell jar.
- volume is increased while pressure is decreased inside the bell jar.
- volume is decreased while pressure is increased inside the bell jar.
- both pressure and volume are decreased inside the bell jar.

14. Which of the following is a pupa during metamorphosis in insects?

- Maggots.
- Caterpillar.
- Chrysalis.
- Imago.

15 The blood vessel that supplies the foetus with nutrients obtained from the mother at the placenta is:

- Vena cava.
- Umbilical artery.
- Aorta.
- Umbilical vein.

16 Which of the following is the meaning of evolution?

- Formation of new species.
- Removal of old species by natural selection.
- Relationship between organisms and their environment.
- Organisms becoming more adapted to their environments.

17. Which of the following terms best describes the association between organisms of different species that have close physical contact?

- Symbiosis.
- Commensalism.
- Parasitism.
- Mutualism.

SECTION B

- (a) Suggest the needs for locomotion in birds.
- Illustrate the orientation of the body and wings of a bird during:
 - Gliding flight.
 - Soaring flight.
- Suggest the difference in action of wings of birds during passive and active flight.
- Explain how the functioning of antagonistic muscles results into effective stroke active flight in birds.

19. (a) Suggest the importance of movement of materials in and out of cells.

(b) Suggest the meaning of each of the following:

- Concentration gradient.
- Movement against a concentration gradient.

(c) Describe how you would design an experiment to investigate the effect of different sizes on the rate of diffusion in a laboratory. Include your expected observations and conclusion.

20. (a) State the:

- Difference between autosomes and sex chromosomes.
- Number of autosomes and sex chromosomes in a human cell.
- Sex cell produced by mammalian testis and ovary.

(b) Explain the 1:1 ratio of producing male to female offspring by human parents.

(c) Seeds from a tall plant were planted on different types of soil samples A and B and the results obtained are as below.

- Seeds planted in soil sample A grew into tall plants.
- Seeds planted in soil sample B grew into short plants.
- But when seeds from plants previously grown in soil sample A were planted in soil sample B, all grew into short plants.
- But when seeds from plants previously grown in soil sample B were planted in soil sample A, all grew into tall plants.

i) With a reason, suggest the type of variation exhibited by the plants described above.

ii) When short plants obtained from soil sample B were crossed with a homozygous short plant, all offspring were tall plants. Use genetic crossing explain the results of this crossing.

21 (a) Describe the relationship between the size of clay soil particles and its properties.

(b) Describe an experiment to compare the rate of soil drainage between clay and loam soil samples.



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ENGLISH LANGUAGE PAPER TWO SOLUTIONS (MAY 14)

Guidelines for summary writing

- Read the summary question and understand what is required of you.
- Read the passage as you underline ONLY those sentences/statements that answer the question. Leave out anything else that is not answering the question.
- The title must be derived from the question.
- Your summary MUST be presented in one paragraph even if the question is asking for two ideas e.g. causes and solutions. You can use the word 'However' to branch off to the second idea, but still in the same paragraph.
- The rough copy should also be presented in a paragraph.
- The opening words of your summary must be the main idea/subject/topic of the passage e.g. election violence, road accidents, environmental degradation etc.
- You must write complete sentences with a subject, verb and object (if there). Incomplete sentences score you half marks.
- Use the tense given to you in the question. Changing it leads to loss of marks.
- Spellings, punctuation and sentence construction must be accurate.
- Some points (not all) may be combined in one sentence. If you must combine points, strictly don't go beyond two commas and one 'and'.
- Be mindful of the word limit.

QUESTION 1: SUMMARY WRITING

ROUGH COPY

CAUSES OF ELECTION VIOLENCE AND WHAT SHOULD BE DONE TO AVOID IT.

Election violence is caused by doing things at the last minute which results resulting into making mistakes. Security organs provoke and restrain the voters and candidates who are exercising their rights. They beat people marching peacefully, who in turn defend themselves, causing violence. Absence of an election violence early-warning system, a highly polarised society, intolerance and mistrust between citizens and the government cause violence. ~~On the other hand,~~ However, this can be avoided by early planning to avoid anomalies. The public should be sensitised about why they need ~~to~~ take part in peaceful elections. Messages need to be pinned all over the villages and towns in local languages. ~~understood by the people.~~ Some state-Security agencies should desist from provoking and restraining the voters and candidates.

FAIR COPY

CAUSES OF ELECTION VIOLENCE AND WHAT SHOULD BE DONE TO AVOID IT.

Election violence is caused by doing things at the last minute, resulting in mistakes. Security organs provoke and restrain the voters and candidates who are exercising their rights. They beat people marching peacefully, who in turn defend themselves, causing violence. Absence of an election violence early warning system, a highly polarised society, intolerance and mistrust between citizens and the government cause violence. However, this can be avoided by early planning to avoid anomalies. The public should be sensitised about why they need peaceful elections. Messages need to be pinned all over the villages and towns in local languages. Security agencies should desist from provoking and restraining the voters and candidates.

(110 words)



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- 2A.
- 2.1 (a) What measures will the police take to deal with the gangs?
- The police will apprehend and penalise them in the courts of law.
 - The police will rehabilitate them.
- (b) Two heinous acts of the gangs
- They kill their victims
 - They steal their cars
 - They dump the victims' bodies in Mukono and around Ssezibwa swamp.
- 2.2 Why is it not good for people to take the law into their own hands?
- It promotes lawlessness
 - It denies suspects the right to be heard, tried under law and ensure justice is served.
 - It flouts the due process of the law.
- 2.3 Lt. Gen. Gutti deserves a pat on the back because:
- he sentenced guilty gangsters to death

3A

- 3.1 So terrified was the toddler that it started screaming.
- 3.2 Mary said that she did not (didn't) particularly enjoy watching football but she supposed she would have to.
- 3.3 What shall we do in the event of our parents refusing to give us money?
- 3.4 Is there?
- 3.5 Please, spare me the noise.
- 3.6 The president advised us to stay at home in order that we might be safe from COVID-19.
- 3.7 His rudeness resulted into his expulsion.
- 3.8 If you listened, you wouldn't be in this mess.
- 3.9 Scientists in Uganda are going to earn twice as much as before.
- 3.10. Our sons abused each other.

- he gave other deterrent sentences like 40 years in jail.
 - he delivers the sentence without fear or favour.
- 2.4. Their souls should "wander in the wilderness" because
- they masterminded the infamous Muto Complex

- robbery, where two innocent workers were killed.
- 2.5 Meanings of words and expressions.
- (i) aggravated robbery – extreme theft/ hardcore theft/ high degree theft etc, with unnecessary violence.
- (ii) warmth - happiness/joy
- (ii) cherish – value/ treasure/appreciate/hold dear
- (iv) battling - struggling/fighting/suffering (with)

2B

- 2.6 D
- 2.7 B
- 2.8 D
- 2.9 A
- 2.10 C

3B

- 3.11 C 3.16 B
- 3.12 D 3.17 B
- 3.13 B 3.18 D
- 3.14 C 3.19 A
- 3.15 A 3.20 A

ENGLISH LANGUAGE REVISION QUESTIONS (OE003)

1. Read the passage below and answer the question that follows.

Until a few years ago, the Green Revolution was considered the most important breakthrough in agricultural development. It was thought that it would solve the food scarcity crises in several parts of the world.

The Green Revolution, a simple concept, means modernising agriculture by getting more yields out of the land from high yielding varieties of rice, wheat and maize as the more important grain crops.

The joy that accompanied the development of these 'miracle' varieties has been tempered by skepticism and disillusionment as famine continues to stalk some poorly developed regions. Although these revolutionary seeds and the technology that goes with them still hold the potential for greatly improving the food intake of millions of impoverished people, this potential remains substantially unrealised. The reasons for this are many, the most important being that many farmers who switched to the new varieties have not been able to increase their output much, if at all, because they were not able to take full advantage of, or have access to the supporting technology, namely the required fertilisers, insecticides and water.

The new fertiliser-sensitive varieties require millions of tonnes of fertilisers, which are now not available. There is also increasing dependence on pesticides to control pests among the genetically uniform varieties of grain crops. The poor farmer, living from crop-to-crop, simply cannot afford the added costs

without credit, which is expensive, if available at all.

High-yield varieties are not yet in common use in tropical Africa, with the exception of maize in East Africa and rice in West Africa. It is not generally realised that these varieties demand much more care in cultivation and up to 50% more in labour requirements than ordinary crops. Such consideration as marketing, storage and transport of the surplus produce are all new problems not faced in the growing of traditional crops. Moreover, some of the high-yielding cereal varieties are already proving susceptible to diseases and it is likely that any resistance they currently have will lessen with time.

One by-product of the Green Revolution that its designers perhaps did not realise is that it will increase water pollution problems because these crops require heavy use of fertilisers. Careful attention should be given to this type of environmental damage. Another unforeseen problem created by the Green Revolution is that it has helped to widen the gap between the rich and poor farmers because those farmers who can afford the requirements necessary to produce bumper crops rapidly get richer than their poor counterparts. If only a small fraction of the rural population moves into the modern century while the bulk remains behind, a highly explosive situation is foreseeable.

Question: In not more than 120 words, summarise the challenges associated with the Green Revolution.

2A Read the following passage and answer the questions that follow:

It was not until the beginning of the twentieth century that it was recognised that certain substances were essential in the diet to prevent, or cure some diseases. These substances are now known as vitamins and they are vital for growth, good health, and maintenance of the normal functions of the body. The Hungarian biochemist, Szentayorgyl, who first isolated vitamin C (ascorbic acid), defined the vitamin as a substance which makes you ill if you don't eat it.

A well-balanced diet should provide all the vitamins we normally require. Those of us who are fortunate enough to be able to buy sufficient food should not suffer from vitamin deficiency. However, for various reasons, some people do not maintain a balanced diet.

People often lose their appetite because of illness. People living alone may not bother to eat proper meals and people on diet may not eat sufficient quantities of necessary foods. Moreover, modern methods of preserving, freezing, and long-term storage of food, together with overcooking, can destroy many of the vitamins. Food served in restaurants and canteens has often lost much of its vitamin content because it has been kept hot, even prepared the day before. So you may have problems if you eat it.

Answer questions 2.6 to 2.10 by selecting the best answer from the choices given

Put a ring around your best choice

- 2.1 Vitamins are necessary to:
- (a) make one ill
- (b) keep the body in a healthy condition
- (c) encourage vitamin deficiency
- (d) make a balanced diet
- 2.2 Loss of appetite may be due to:
- (a) lack of vitamins
- (b) not maintaining a balanced diet
- (c) not eating sufficient quantities of necessary food

- (d) illness
- 2.3 The following are ways of destroying vitamins except:
- (a) modern methods of preserving food
- (b) freezing
- (c) keeping and eating food fresh
- (d) long term storage of food
- 2.4 Food served in restaurants may lose its vitamin because of
- (a) being kept under hot temperature or being prepared over night
- (b) having been stored too long
- (c) not being fresh
- (d) being eaten regularly
- 2.5 Elderly people may suffer ill health particularly because they
- (a) may be unable to buy their food and prepare their meals
- (b) do not know about balanced diets
- (c) often eat in restaurants
- (d) always keep essential vitamins out of their diet

Re-write the following sentences according to the instructions without altering the meaning.

- 3.1 Let's go now. It is rather late. (Begin: We had ...)
- 3.2 How stressful it is to have to wait for twenty-one more days in quarantine! (Begin: Having to wait ...)
- 3.3 He wanted to pass the examination but he didn't work hard for it. (Re-write using: Much as ...)
- 3.4 Do you know the departure time of the Mombasa train? (Replace 'departure' with 'depart')
- 3.5 I will not marry. I will remain in school and complete my studies. (Use: ... would rather ...)
- 3.6 When one embezzles government funds, one condemns innocent citizens to starvation. (Begin: To ...)
- 3.7 Terissa is a girl of intelligence and industry. (End ... girl.)
- 3.8 "Will it be possible for us to watch the football match

PAPER ONE

SECTION A

This question is compulsory. (Use 180 – 200 words)

1. Imagine you are the president of the Wildlife Club at your school and one of the members has succumbed to a strange illness. Write a eulogy you would present at the funeral.

SECTION B

Choose one question and write a composition of 500 – 600 words.

2. Write a composition with the title: A BLOODY CLASSROOM FIGHT.
3. Discuss the steps that should be taken to avoid contagious diseases in our community.
4. Write a story to illustrate the saying "One good turn deserves another"
5. "You cannot cheat nature forever" Give your views to support this statement in relation to what is happening to the people living in wetlands.
6. Should the COVID-19 vaccine be tested on Africans? Give reasons for your answer.
7. Write a story ending "..... and finally, the fight was over and the doctors were free to go back home."

- tonight?" asked Teddy. (Report this question)
- 2.9 Since he did not drive his car cautiously, he met an accident. (Begin: If ...)
- 3.10 His parents said his excuse was silly. (Use 'dismissal')

Choose the most correct alternative.

- 3.11 Too much interest in games may a student from his studies.
- A. distract B. deviate C. distract D. stop
- 3.12 I was so upset about the whole affair that I did not get a of sleep.
- A. doze B. nap C. flash D. wink
- 3.13 I should consider it me to do such a thing.
- A. beside B. besides C. beneath D. behind
- 3.14 He dared to challenge the speaker.
- A. daredn't he? B. didn't he? C. did he? D. dare he?
- 3.15 Robbing a blind man is a thing to do.
- A. contemptible B. contemporary
- C. contemptuous D. contempting
- 3.16 The match was put off for a week because of bad weather. Put off means;
- A. cancelled B. removed C. stopped D. postponed
- 3.17 The robber tried to escape but it was a flash in the pan. The underlined words mean;
- A. he was caught B. he did not get caught
- C. he escaped D. he did not succeed
- 3.18 After killing his wife, he to the police.
- A. turned himself in B. handed himself over
- C. ran himself D. turned himself over
- 3.19 I would like to talk to the manager. Will you please to him?
- A. put me through B. connect me through
- C. take me through D. help me through
- 3.20 Though we put in a lot of effort, our team was
- A. won B. defeated
- C. beaten D. destroyed

PHYSICS PAPER TWO SOLUTIONS (MAY 14)

1. (a)(i) Micrometre screw gauge.
 (ii) Measuring density of a small stone requires the determination of two quantities namely; volume and mass.
- Measuring volume of the small stone using the displacement method.
 - Place a measuring cylinder on a flat surface.
 - Pour water up to three quarters the height of the measuring cylinder.
 - Read and record the initial volume of the water in the cylinder, say V_1
 - Tie the small stone on a string and gently lower it into the cylinder.
 - Read and record the new volume of the water in the cylinder, say V_2
 - Determine the volume V , of the stone using;
 $V = V_2 - V_1$

Measuring mass of the small stone:

The mass M , of the stone can be determined by using a balance such as the beam balance, lever arm balance, triple beam balance and, of course, the common balance found in many retail shops.

Then determine density of the small stone using;

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{M}{V}$$

- (b) Given; volume of concrete, $V = 2.5\text{m}^3$,
 weight of concrete per trip = 600N
 density of concrete = 3000kgm⁻³
 Total load on site = $m \times g = \text{density} \times \text{volume} \times g$
 $= 3000 \times 2.5 \times 10 = 75000 \text{ N}$
 $\therefore \text{Number of trips} = \frac{75000}{600} = 125$

- (c)(i) Pressure is defined as the force exerted normally on a surface of area 1 m².

S.I unit of pressure is Nm^{-2} or pascals (Pa)

- (ii) Given; force = 6N and area = $8 \times 10^{-6} \text{ m}^2$,

Using pressure = $\frac{\text{force}}{\text{area}}$

$$\text{Pressure} = \frac{6}{8 \times 10^{-6}} = 750000 \text{ Nm}^{-2} \text{ or } 750000 \text{ Pa}$$

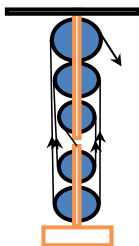
- (d)(i) Oil, instead of air, is used in a hydraulic brake system because it is less compressible as compared to air. Air is not used in a hydraulic brake system as the fluid because air is easily compressible and so, if used, the energy would mostly go into compressing the air.

- (ii) Bubbles cause abnormal noise.

Bubbles accelerate the degradation of the hydraulic fluid, which in turn causes overheating and burning of seals.

Note: You are advised to regularly check the condition of the pump shaft seal and if found leaking, replace it.

2. (a)(i) Velocity ratio is the ratio of the distance moved by effort to the distance moved by the load in the same time.
 (ii) Efficiency is the ratio of the work output to work input expressed as a percentage.



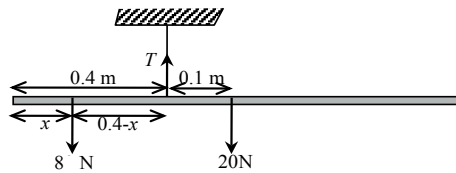
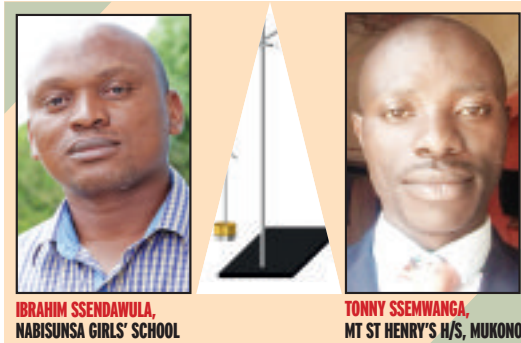
$$\text{Velocity ratio} = \frac{\text{Effort Distance}}{\text{Load distance}}$$

$$5 = \frac{4}{\text{Load distance}}$$

$$\text{Load distance} = 0.8 \text{ m}$$

- (c)(i) Principle of moments states that when a body is in equilibrium, the sum of clockwise moments about any point or axis is equal to the sum of anticlockwise moments about the same point.

OR. It can be stated as when a body is in equilibrium, the algebraic sum of moments about any axis is zero.



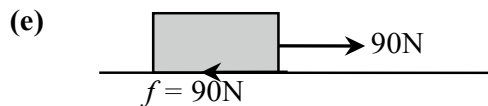
Let the distance of 8N from A be x m
 Taking moments from the suspension;
 Sum of clockwise moments = sum of anticlockwise moments

$$20 \times 0.1 = 8 \times (0.4 - x)$$

$$2 = 3.2 - 8x$$

$$x = \frac{1.2}{8} = 0.15 \text{ m}$$

- (ii) On a door, the hinge is the pivot and the knob is where the force is applied. To easily open or close the door with a less force, you need to provide maximum torque. To achieve this, the distance of the force from the pivot should be big. A bigger distance is achieved when the knob is placed far from the hinge.



Given; Mass = 24 kg
 Applied force, $F = 90 \text{ N}$
 Friction, $f = 48 \text{ N}$
 Using; Resultant force $F_R = ma$

$$F_R = ma$$

$$F - f = ma$$

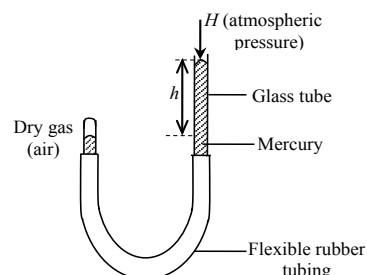
$$90 - 48 = 24a$$

$$42 = 24a$$

$$a = 1.75 \text{ ms}^{-2}$$

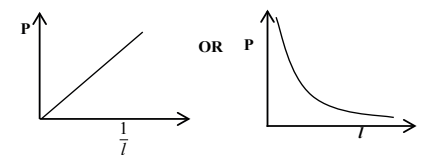
3. (a)(i) Boyle's law states that the pressure of a fixed mass of a gas is inversely proportional to its volume, provided temperature is kept constant.

- (ii) Experiment to verify Boyle's law



- Trap a fixed mass of a gas in a U tube of a uniform cross-sectional area using mercury.

- Measure and record the atmospheric pressure H using a barometer.
- Adjust the flexible tube by lowering or raising the open end.
- Measure and record the difference in mercury levels h .
- Record the length of the air column trapped in the closed tube
- Obtain the air pressure, $P = H \pm h$
- Repeat the procedure and obtain a series of values Pressure P and length l , where $l \propto \text{volume}$
- Plot a graph of P against $\frac{1}{l}$



- A straight line graph passing through origin is obtained and this verifies Boyle's law.

(b) $P_1 = 3500 \text{ Nm}^{-2}$ Using $\frac{P_1}{T_1} = \frac{P_2}{T_2}$
 $T_1 = 27 + 273 = 300 \text{ K}$
 $P_2 = 4950 \text{ Nm}^{-2}$
 $T_2 = ?$
 $T_2 = \frac{P_2 \times T_1}{P_1} = \frac{4950 \times 300}{3500} = 424.3 \text{ K}$

- (c) Compressing a gas reduces its volume. This results in an increase in collisions between the gas particles themselves and with the walls of the container. It is these increased collisions that produce an increase in pressure.

- (d) (i) Latent heat of vaporisation is the quantity of heat required to change the state of a substance from liquid to vapour or vapour to liquid at constant temperature.

- (ii) Given; Mass $M_w = 600 \text{ g}$, Mass of calorimeter, $M_c = 500 \text{ g}$,

Mass of steam $M_s = 70 \text{ g}$

Initial temperature of water, $\theta_1 = 30^\circ \text{C}$, final temp of mixture $\theta_2 = 89.5^\circ \text{C}$

Heat lost by steam;

$$Q_s = M_s l_v + M_s C_w (\theta_s - \theta_2)$$

$$= 0.07 \times 2.26 \times 10^6 + 0.07 \times 4200(100 - 89.5)$$

$$= 158200 + 3087$$

$$= 161287 \text{ J}$$

Heat gained by water;

$$Q_w = M_w C_w (\theta_2 - \theta_1)$$

$$= 0.6 \times 4200(89.5 - 30)$$

$$= 149940 \text{ J}$$

Heat gained by calorimeter

$$Q_c = M_c C_c (\theta_2 - \theta_1)$$

$$= 0.5 \times C_c (89.5 - 30)$$

$$= 29.75 C_c$$

From; Heat lost by steam = heat gained by water + heat gained by calorimeter

$$161287 = 149940 + 29.75 C_c$$

$$C_c = \frac{11347}{29.75} = 381.41 \text{ Jkg}^{-1} \text{K}^{-1}$$

4(a)

Regular reflection	Irregular/ diffuse reflection
Smooth surface	Rough surface

- Reflection occurs on a smooth surface
- Reflected rays are parallel to each other i.e move in the same direction.
- Angles of incidence and angles of reflection are equal for all the rays.

Note: Angle of incidence is equal to angle of reflection for each ray or reflection.

- Reflection occurs on a rough surface
- Reflected rays are scattered i.e move in the different directions to each other
- Angles of incidence and angles of reflection are different for different rays.

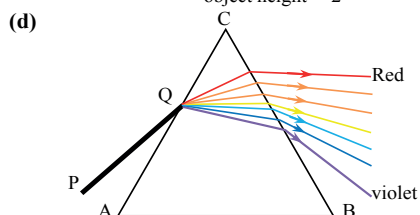
Note: Angle of incidence is equal to the angle of reflection for each ray or reflection.

(b) (i) A convex mirror provides a wider field of view.

- (ii) A convex mirror produces an upright image
(c) Position = 30 cm behind the mirror.

Nature; virtual, erect, bigger than the object
Magnification = $\frac{\text{image distance}}{\text{object distance}} = \frac{30}{10} = 3$

Or. Magnification = $\frac{\text{image height}}{\text{object height}} = \frac{6}{2} = 3$



When white light is passed through a prism, it is deviated and split into seven constituent colours. These are red, orange, yellow, green, blue, indigo and violet.

This is because of the fact that glass has a different refractive index for each component of white light, hence causing the colours to move at different speeds while passing through the prism. This results into splitting.

- 5.(a) (i). Amplitude is the maximum displacement of particles from their rest position.
(ii). Wavelength is the distance covered by a wave in one complete cycle.

- (b) The speed, v of a wave refers to the distance a wave covers in one second.
But in one second, a wave completes f - cycles, each of length λ .

$$v = \frac{\text{distance}}{\text{time}} = \frac{f \times \lambda}{1s} = f\lambda$$

OR

Speed, $v = \frac{\text{distance covered in a cycle}}{\text{time taken to complete a cycle}}$

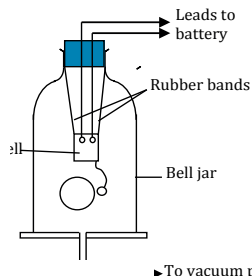
Note: the time taken to complete a cycle is called period (T) of a wave.

$$\rightarrow v = \frac{\lambda}{T}, \text{ but } T = \frac{1}{f} \rightarrow v = \lambda f$$

- (c). $f = 3.5\text{MHz} = 3.5 \times 10^6\text{Hz}$, $v = 330\text{ms}^{-1}$

Using $v = \lambda f$; $\Rightarrow 330 = 3.5 \times 10^6 \lambda$
 $\Rightarrow \lambda = \frac{330}{3.5 \times 10^6} = 9.43 \times 10^{-5}\text{m}$

- (d). Experiment to show that sound cannot travel through vacuum.



A small electric bell is hung from rubber bands inside a bell jar and switched on.
A vacuum pump connected to the bell jar is operated to evacuate it.

Observation:

As the air is sucked out, the sound of the bell becomes fainter and fainter until it dies out completely, although the hammer is still seen striking the gong. But when air is gradually allowed in, sound from the bell is heard again and its loudness keeps on increasing as more air is let in. This shows that sound requires a material medium for its propagation i.e cannot travel through a vacuum.

- (e). (i). An echo is a reflected sound.
(ii) Echoes cannot be heard in small rooms because the distance between the source and the reflected sound is so small that the incident sound mixes up with the reflected sound making it difficult for the ear to differentiate between the two.

Note: There is a minimum distance (17.2m) between the source and the walls that is required for an echo to be produced. This is when the time that elapses to hear the echo is 0.1s. So rooms that do not have this minimum distance between their walls cannot enhance observable echo formation to human beings.

Also read about

- Wave front, crest, trough, rear fraction
- Transverse and longitudinal waves
- Differences between mechanical and electromagnetic waves
- Why astronauts use devices only to communicate to each other on the moon.
- Echo method of determining speed of sound
- Harmonics and overtones
- Reverberations

- 6.(a)(i). Is an electric current that periodically reverses direction.
(ii). A.C is easy to generate and transmit over long distances with minimum power losses which is not the case with D.C
- A.C can be stepped up and down, but D.C cannot be.

- (b). A step-up transformer has more turns in the secondary coil than it has in the primary coil, while a step-down transformer has more turns in the primary coil than it has in the secondary coil.

(c) (i). $N_p : N_s = V_p : V_s \Rightarrow \frac{N_p}{N_s} = \frac{V_p}{V_s}$ **$N_p : N_s = V_p : V_s$**
 $\Rightarrow \frac{1}{60} = \frac{240}{V_s}$

$$V_s = 60 \times 240 = 14400\text{ V}$$

- (ii) (1). Power off. Before doing any electrical work, make sure the power is off (use a voltage tester to establish if all the wires and electrical connections are dead before working with them)

- (2). Avoid water at all times when wiring the electricity at home.

- (3) All cables to be used must be properly insulated.

- (d). - Use of low resistance wires that have a large cross-section area.
- Stepping up the voltage at the power station before transmission.

- (e)**Observation:** The galvanometer will deflect in the clockwise direction as the magnet is brought near and then in an anticlockwise direction as the magnet is being withdrawn away from the coil until when it rests.

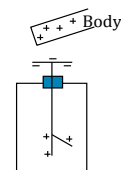
Explanation: Bringing the magnet near the coil induces a current that flows in such a way that its direction (clockwise) opposes the change causing it. The change is the movement of the magnet towards the coil. On withdrawing the magnet, the direction of the current changes in a such a way to oppose the withdrawing action.

Note: When the magnet is being brought near the coil, the clockwise direction of the current induces a north pole at the end of the coil near the magnet and a south pole at the opposite pole.

Also read about

- Power transmission
- Transformer
- Power losses and the remedies
- Differences between A.C and D.C.
- Rectification (half wave and full wave)
- The graphs of the input and output voltages

- 7(a). Bring the body under test (glass rod) near the cap of a neutral gold leaf electroscope. If the leaf deflects or diverges, then the body has got a charge.
However, if the leaf remains undeflected, then the body is neutral (has no net charge).

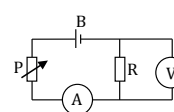


Explanation: If the body under test is positively charged, electrons are attracted from the gold leaf and the brass plate to accumulate on the cap. This leaves both the brass plate and the leaf with only the positive charge. Since like charges repel, the leaf is repelled away from the plate, hence divergence.

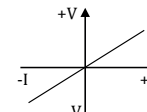
- (b). All insulators do not have electrons arranged in the same way, i.e. some insulators have electrons held to them fairly loosely, while others are tightly bound to their nucleus. For example, in glass, electrons are held fairly loose compared to silk. When glass is rubbed with silk, glass tends to lose electrons faster than silk. This results in electrons being lost from atoms of glass and at the same time gained by silk.
The lost electrons from glass are carried by silk atoms, so glass becomes positively charged and silk negatively charged.

Note: The production of charge by rubbing is due to electrons being transferred (lost) from materials where they are less held by the nucleus to the other materials where they are tightly held by the nucleus.

- (c). Consider the circuit diagram and the graph below.



(i) Circuit



(ii) Graph

- A circuit is connected, as shown above, in which B is a battery, R a wire-wound resistor of low resistance and P a rheostat of the same order of resistance as R.
- The current I is varied by adjusting P, and the potential difference V is measured at each value of current.
- The procedure is repeated when the current is reversed.
- The results are recorded in the two columnar table below

I (A)	V(V)

- A graph of V against I is plotted. It is a straight line through the origin. (See above). This verifies Ohm's law. The slope of the graph is the resistance R .

- (d). Let the total resistance of the circuit be R_0
So since the current $I = 0.5\text{A}$ and the battery has negligible resistance, then

$$\Rightarrow R_0 = \frac{4}{0.5} = 8\Omega$$

$$4 = 0.5R_0$$

The set of 4Ω and the 6Ω is in parallel connection. Consider the special case of two resistors R_1 and R_2 in parallel, the effective resistance R_e is given by

$$\frac{R_1 R_2}{R_1 + R_2} = \frac{4 \times 6}{4 + 6} = 2.4\Omega$$

But, R and R_e are in series, i.e $R + R_e = R_0$

$$\text{So } R = 8 - 2.4 = 5.6\Omega$$

Also read about

Ohm's law, ohmic and non- ohmic conductors
Resistors in series and parallel connections
Factors that determine resistance of a material etc.

- 8 (a). Half-life is the time taken for half the mass of a radioactive element to decay.

- (b). (i) ${}^1_0\text{N} \rightarrow {}^{16}_8\text{O} + {}^0_{-1}\beta$

- (ii). Since the half-life is 6.5minutes and 32.5minutes elapsed, then the number of half-lives.

$$k = \frac{32.5}{6.5} = 5; \text{ using } M = \frac{M_0}{2^k} \text{ where } k = \text{number of half-lives, } M = \text{mass left after } k \text{ half-lives and } M_0 \text{ is}$$

Continued from page V

the initial mass, then, $M = \frac{M_0}{2^5} = \frac{M_0}{32}$.

Therefore, fraction left will be $\frac{1}{32}$.

Alternatively; You can also use a tabular form.

Mass	Number of half lives	Time taken (minutes)
1	0	0
$\frac{1}{2}$	$1 t_{1/2}$	6.5
$\frac{1}{4}$	$2 t_{1/2}$	13.0
$\frac{1}{8}$	$3 t_{1/2}$	19.5
$\frac{1}{16}$	$4 t_{1/2}$	26.0
$\frac{1}{32}$	$5 t_{1/2}$	32.5

- (iii). -They produce radiations that are used in radiotherapy. They produce gamma rays that are used to sterilise medical instruments and equipment.
- (c). 1. Cathode: Emits electrons by thermionic emission
2. Time base: Produces a saw-tooth wave form at a rate that determines the time per division on the screen.
3. Anode: It accelerates the electron beam along the C.R.O and focuses the beam to the fluorescent screen.

- (d)(i). The cathode is heated to emit electrons by thermionic emission. Using a low voltage supply. A high p.d connected across the tube accelerates the electrons towards the anode.
When the cathode rays strike the metal target, about 99% of their energy is converted to heat energy and the remaining 1% is converted to X-rays. The heat

generated in the anode is conducted away by the cooling fins.

(ii) Hard X-rays	Soft X-rays
Highly energetic	Low energy content
Very short wavelengths	Longer wave lengths
High frequency	Low frequency
High penetrating power	Low penetrating power

Also read about:

- Photo electric effect
- Cathode rays and X-rays (X-ray tube and uses of the parts)
- Table and graphical method to determine half life
- The formula $M = \frac{M_0}{2^k}$, where k is number of half lives
- Mass number, atomic number, neutrons, protons, electrons, isotopes etc.

Cathode ray tube, cathode ray oscilloscope, their uses of their parts etc.



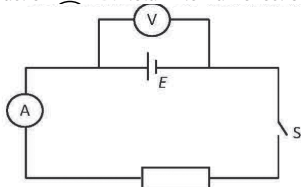
For enquiries, send an email to learners@newvision.co.ug

PHYSICS PAPER ONE QUESTIONS (OP003)

- Acceleration due to gravity = 10 m s^{-2}
- Specific heat capacity of water = $4200 \text{ J kg}^{-1} \text{ K}^{-1}$
- Speed of sound in air = 330 m s^{-1}
- Speed of light = $3.0 \times 10^8 \text{ m s}^{-1}$

SECTION A

- Which of the following occurs when a ripple from a region of shallow water reaches a region of deep water?
A. The velocity remains constant and the wavelength increases.
B. The velocity increases and the wavelength increases.
C. The frequency increases and the velocity increases.
D. The frequency decreases and the wavelength increases.
- In a house wiring system, all connection to power points are in parallel so as to;
A. supply the same current.
B. operate at the same voltage.
C. minimise the cost of electricity.
D. consume the same amount of energy.
- How much heat is required to raise the temperature of 20 g of water from 30°C to 60°C?
A. 2520 J
B. 6300 J
C. 8400 J
D. 126000 J
- A current of 5 A flows through a given point in a circuit for 2 minutes. Calculate the quantity of charge that passes the point.
A. 2.5 C
B. 10 C
C. 300 C
D. 600 C
- The colour seen in a thin soap film is due to
A. refraction
B. interference
C. diffraction
D. total internal reflection



In the circuit diagram above, the readings of the ammeter A and voltmeter V when switch S is open and closed respectively are as shown in the table below.

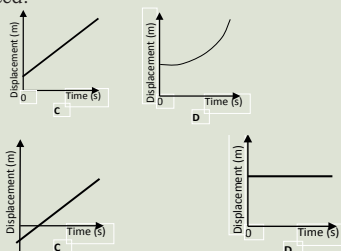
	Ammeter reading (A)	Voltmeter reading (V)
S is open	0.0	4.5
S is closed	3.0	3.0

Calculate the internal resistance of cell E

- 0.0 Ω
 - 0.5 Ω
 - 1.0 Ω
 - 1.5 Ω
- In which of the following devices is kinetic energy converted to electric energy?
A. An accumulator
B. An electric motor
C. A combustion engine
D. A dynamo
 - Calculate the time required for a kettle taking 10 A from 240 V supply to heat 5 kg of water through 80° assuming no heat is lost

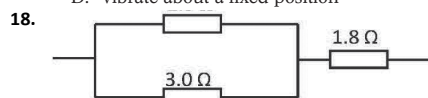
- 1.7 s
- 8.8 s
- 292 s
- 700 s

- For a converging lens, magnification, m of an object placed a distance, u from the lens to form an image at a distance, v from the lens of focal length, f is given by
A. $m = \frac{u}{v}$
B. $m = \frac{v}{u}$
C. $m = u \times v$
D. $m = \frac{uv}{f}$
- Plants inside a greenhouse emit radiations which cannot pass through the greenhouse glass because the radiations are;
A. of short wavelength
B. of long wavelength
C. used to warm up the greenhouse
D. absorbed by the glass
- An air bubble is introduced at the bottom of a jar containing mercury. Which one of the following explains what will happen to the bubble?
A. The bubble will burst due to high pressure exerted by the mercury column
B. The bubble will rise to the surface while decreasing in volume
C. The bubble will rise to the surface while increasing in volume and burst
D. Nothing will happen to the bubble
- Which of the following displacement-time graph shows the motion of a car moving away from traffic lights at a steady speed?



- The temperature at which all the heat energy is removed from a substance is called
A. Kelvin temperature
B. celcius temperature
C. freezing temperature.
D. absolute zero temperature.
- A tank 2 m tall and base area of 2.5 m² is filled to the brim with a liquid which exerts a force of 40,000 N at the bottom. Calculate the density of the liquid.
A. $\frac{4000}{25 \times 2 \times 20} \text{ kg m}^{-3}$
B. $\frac{40000}{2.5 \times 2 \times 10} \text{ kg m}^{-3}$
C. $\frac{40000}{25 \times 2 \times 10} \text{ kg m}^{-3}$
D. $\frac{40000}{2.5 \times 2} \text{ kg m}^{-3}$
- A notch on a material spreads more rapidly when the material is
A. in tension
B. in compression
C. pre-stressed
D. reinforced

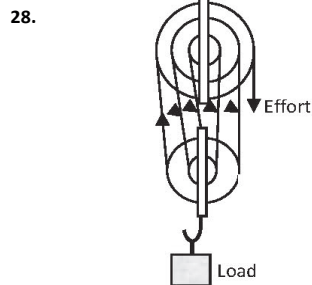
- The leaf of a charged gold leaf electroscope gradually collapses with time due to
A. leakage of charges to the surroundings.
B. surrounding magnetic field.
C. pressure variation in the surroundings.
D. similar charges from the surroundings.
- When sound waves pass through a metal bar, the atoms of the metal
A. rotate in circles
B. move along the bar.
C. expand and contract.
D. vibrate about a fixed position



Calculate the effective resistance for the arrangement of resistors in the figure above.

- 0.7 Ω
 - 2.8 Ω
 - 3.0 Ω
 - 6.8 Ω
- The frequency of a radio wave is $6.6 \times 10^8 \text{ Hz}$. Find the wavelength of the wave.
A. $2.20 \times 10^3 \text{ m}$
B. $4.55 \times 10^1 \text{ m}$
C. $3.60 \times 10^3 \text{ m}$
D. $1.98 \times 10^4 \text{ m}$
 - Which one of the following statements is true?
A. The average kinetic energy of the molecules of the gas depends on temperature.
B. The average speed of the molecule of a gas decreases as temperature increases.
C. The pressure of a fixed mass of gas decreases as temperature increases.
D. The volume of a fixed mass of gas increases as temperature decreases.
 - ${}_{90}^{234}\text{X} \longrightarrow {}_{91}^{234}\text{Y} + \text{P}$
In the above reaction, P is likely to be:
A. an alpha particle
B. a beta particle.
C. a gamma ray
D. a neutron
 - An electric appliance is rated 240 V, 750 W. Its fuse should be of:
A. 1 A
B. 3 A
C. 5 A
D. 13 A
 - The pitch of a note from a guitar string can be made higher by
A. lengthening the string
B. tightening the string
C. heating the string
D. increasing the thickness of the string.
 - The power used in a 100 Ω resistor connected to a 12 V source of e.m.f is:
A. 0.69 W
B. 1.20 W
C. 1.44 W
D. 8.33 W
 - The stability of a bus is reduced when a heavy load is placed on its roof rack because
A. the total weight is increased.
B. the pressure upon the tyres is increased.
C. the maximum speed is reduced.

26. If the forces acting on a train moving along a level straight track are equal and opposite, the train will
- come to a stop
 - accelerate uniformly
 - move with faster speed
 - move with constant speed
27. Which of the following represents the firing order of a four stroke petrol engine?
- exhaust, inlet, compression, power.
 - inlet, power, compression, exhaust.
 - power, compression, inlet, exhaust.
 - inlet, power, exhaust, compression.



The block and tackle pulley system above has an efficiency of 80%. The load which it can lift by an effort of 10 N is

- 4 N
- 8 N
- 40 N
- 50 N

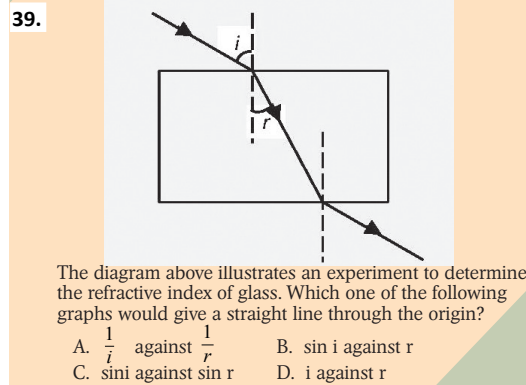
29. The statement of Archimedes' principle is
- When a body is immersed in a fluid it experiences a force that is equal to the weight of the fluid displaced.
 - A floating body displaces its own weight of the fluid in which it float a
 - When a body is wholly or partially immersed in water, it experiences an up thrust equal to the weight of the water displaced.
 - When a body is wholly or partially immersed in a fluid, it experiences an up thrust equal to the weight of the fluid displaced.
30. In a simple cell, the source of electrons which constitutes the electron current is
- the zinc plate
 - the copper plate
 - dilute sulphuric acid
 - potassium dichromate
31. On a cool day, a metal feels cold to the touch because
- metals contain less heat.
 - the temperature of the metal is the same as that of the surroundings.
 - the temperature of the metal is less than that of the surroundings.
 - the metal conducts the heat away from the hand.
32. A hippopotamus can easily walk on mud without sinking while a goat will sink because
- a hippopotamus has more weight than a goat.
 - the centre of gravity of a hippopotamus is lower than that of a goat.
 - a hippopotamus exerts more pressure on the ground than a goat.
 - a hippopotamus exerts less pressure on the ground than a goat.
33. The process by which a substance emits particles spontaneously on its own is called
- Radiation.
 - Radioactivity.
 - Photo electricity.
 - Thermionic emission.
34. When a balloon filled with hydrogen is released into the air on a calm day, it
- rises to a definite height when the pressures inside and outside are equalised.
 - rises until the pressure inside reduces to zero.
 - rises for a while and then bursts.
 - comes to the ground and darts around.
35. When a metal sphere is dropped in a viscous fluid, it eventually attains a steady velocity called
- turbulence velocity.
 - terminal velocity.
 - viscous velocity.
 - streamline velocity.

36. A copper atom, $^{63}_{29}\text{Cu}$ has

	Electrons	protons	neutrons
A	29	29	34
B	34	34	29
C	34	29	29
D	34	29	34

37. A uniform metre rule pivoted at the 25 cm mark balances when a mass of 0.15 kg is hung at the 8 cm mark. Calculate the mass of the metre rule.
- 0.020 kg.
 - 0.048 kg.
 - 0.102 kg.
 - 1.020 kg.

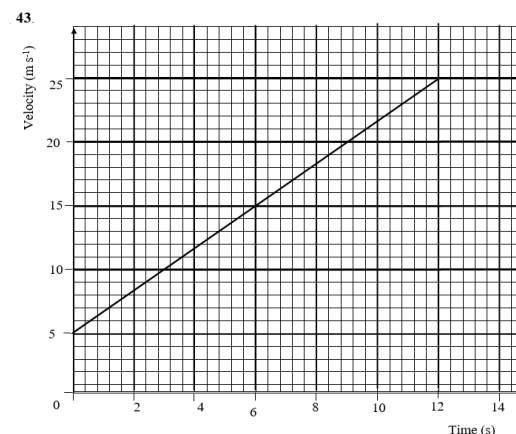
38. If a mercury barometer reads 760 mm of mercury, what is the atmospheric pressure in N m^{-2} ?
(The density of mercury is $1.36 \times 10^4 \text{ kg m}^{-3}$)
- $1.03 \times 10^4 \text{ N m}^{-2}$
 - $1.36 \times 10^4 \text{ N m}^{-2}$
 - $1.03 \times 10^5 \text{ N m}^{-2}$
 - $1.36 \times 10^5 \text{ N m}^{-2}$



40. If a negatively charged ebonite rod is brought near the cap of a negatively charged electroscope, the gold leaf
- decreases in divergence.
 - increases in divergence.
 - remains unchanged.
 - gains positive charges.

SECTION B

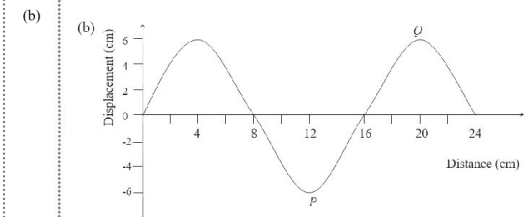
- 41.(a) Define moment of a force.
(b) A uniform metre rule is balanced at the 30 cm mark when a load of 0.80 N is hang at the zero mark. Find the mass of the metre rule.
42. An electrical appliance is rated 240 V, 60 W.
(a) What do you understand by this statement?
(b) Calculate the current flowing through the appliance, when the appliance is operated at the rated indicated values.



The velocity-time graph above shows the motion of a 2 kg mass. Calculate

- the acceleration of the mass.
- the force acting on the mass.
- the total work done by the end of 6 s.

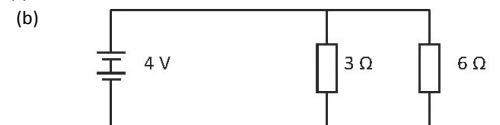
44. (a) What is a transverse wave?



The diagram in the figure above represents a wave travelling in water.

- Name the parts labelled P and Q.
 - If the frequency of the wave is 20 Hz, calculate the velocity of the wave.
45. (a) Define focal length of a converging lens.
(b) The focal length of a converging lens is 20.0 cm. What is its power?
(c) State any two properties of an image of a real object formed by a diverging lens.

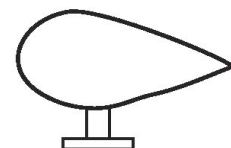
- 46.(a) State Ohm's law.



Two resistors of resistances 3 Ω and 6 Ω are connected across a battery of 4 V of negligible internal resistance as shown above. Find the

- combined resistance.
- current supplied by the battery.

47. (a) What happens to an insulator when it is rubbed by another insulator of different material?



The diagram shows a conductor supported on an electrical insulator. The conductor is given some positive charge. Show how the charge is distributed on the conductor.



Sketch the electric field pattern due to the two charges P and Q placed near each other as shown above.

48. (a) Define electromotive force (e.m.f) of a battery.
(b) List four different sources of e.m.f
(c) What is meant by lost volts?
49. (a) Draw circuit diagrams showing how two lamps may be connected to the mains power supply in a house so that
- the lamps are controlled by only one switch.
 - each lamp is controlled by its own switch.
- (b) (i) An electric flat iron is marked 240 V, 800 W. What does this mean?
(ii) Calculate the quantity of heat energy that is given out by the flat iron in b(i) above if it is operated for 1 hour.
50. A dam at a height of 550 m above sea level supplies water to a hydroelectric generating station which is at a height of 50 m above sea level. 2000 kg of water pass through the turbines in one second.
- (i) Calculate the potential energy per second.
 - (ii) the maximum electrical power output of the station if the whole system is 80% efficient.
- (b) Find the velocity of the water when it reaches the generating station.