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Department of Education, Higher Education and Vocational education.

Science Branch

Grade 11	G.C.E Ordinary Level Supportive Test - 2026	34	E	I

Science I	One Hour

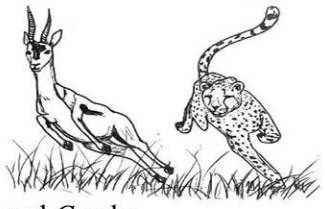
IMPORTANT : .

- Answer all questions.
- Choose the correct or most appropriate answer from the answers given in question 1 to 40.

($g = 10\ m\ s^{-2}$)

1. Mainly absorbed in the large intestine during the process of digestion is,
   (1) Fatty acids. (2) Glycerol. (3) Amini acids. (4) Water.
2. What is the most suitable indicator to distinguish between a weak acid and a strong acid of equal concentration?
   (1) pH papers (2) Litmus papers (3) Methyl orange (4) Phenolphthalein
3. Which of the following types of waves is used to send a short message (SMS) from a mobile phone?
   (1) Radio (2) gamma (3) Infra red (4) UV
4. What is the pair of invertebrate animals whose outer body is covered by a hard shell or an exoskeleton, but belong to two different groups ?
   (1) Snail Bivalve. (2) Shrimp and Crab.
   (3) Scorpion and Crab. (4) Crab and Snail.
5. Several pieces of information regarding a certain element are given below.
   - Forms covalent bonds with chlorine.
   - Forms an amphoteric oxide.
   - Forms compounds where the octet of electrons around the central atom is incomplete.

   What could be the matching element for the above statements?
   (1) Al (2) B (3) Mg (4) Si
6. When pure silicon semiconductor is doped with arsenic, it results in,
   (1) An intrinsic semiconductor. (2) A p-n junction.
   (3) A p-type semiconductor. (4) An n-type semiconductor.
7. Consider the following statements regarding several changes that occur within the bodies of a deer and a leopard when the leopard chases the deer.

   A - The "fight or flight response" occurs in both the deer and the leopard.
   B - Saliva secretion of the deer is inhibited, while saliva secretion of the leopard is stimulated.
   C - The pupils of both the leopard and the deer dilate.
   Which of these is/are true,
   (1) *A* only. (2) *A* and *B* only. (3) *A* and *C* only. (4) *B* and *C* only.
8. Which of the following is the pair of ions that has a number of electrons equal to the number of electrons in a Neon (Ne) atom ?
   (1) Na^+ and O^{2-} (2) Mg^{2+} and P^{3-} (3) Ca^{2+} and S^{2-} (4) Al^{3+} and Cl^-
9. When a door of width 1.4 m is opened by applying a force at its edge, a force of 5 N had to be applied. What is the moment of force exerted about the axis of rotation in this instance?
   (1) 6.4 N m (2) 7 N m . (3) 14 N m (4) 50 N m
10. Which statement correctly indicates a hormone that acts on the ovary and a hormone produced by the ovary, respectively?

	Acts on ovary	Produced by the ovary
(1)	FSH	LH
(2)	Progesterone	FSH
(3)	LH	Oestrogen
(4)	Oestrogen	Progesterone

11. Which of the following molecules contains the highest number of atoms in one mole of the compound?

(1) C_2H_5OH (2) CH_3CH_2Cl (3) CH_3CHO (4) CH_3COOH

12. After a rain, mud had deposited in the yard, and a child who tried to walk across that area slipped and fell the moment they took a step. When walking through such a place, the most suitable action to walk without slipping is,

(1) walking fast barefooted.
(2) jumping and skipping across that area.
(3) walking while wearing well-worn shoes.
(4) walking while wearing shoes with grooved soles.

13. Contributing to the transport of water and minerals absorbed by the roots of a plant are,

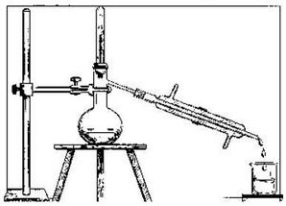
(1) vessels and tracheids.
(2) tracheids and sieve tube elements.
(3) sieve tube elements and companion cells.
(4) companion cells and vessels

14. Several setups used for separating components contained in mixtures are shown by diagrams ***A***, ***B***, ***C***, and ***D***.


A


B


C


D

Which choice includes the separation technique and its matching diagram ?

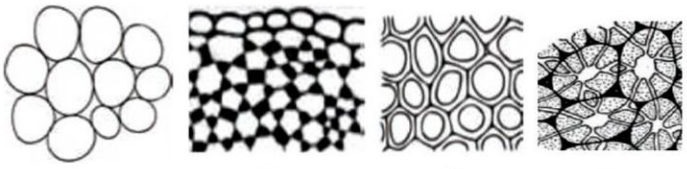
	Separation technique	Set up
(1)	Essential oil extraction	***D***
(2)	Solvent Extraction	***C***
(3)	Separating and identifying the components contained in chlorophyll	***B***
(4)	Preparing colourless lime water	***A***

15. The equivalent resistance of a circuit in which three resistors are connected in series is 30 Ω. If those three resistors are connected in parallel, the value of the equivalent resistance,

(1) Lower than 10 Ω .
(2) Equal to 10 Ω.
(3) Greater than 10 Ω.
(4) Equal to 30 Ω.

16. Which of the plant tissues designated as ***A***, ***B***, ***C***, and ***D*** in the diagram are non-living cells?

(1) ***A*** and ***B*** only.
(2) ***A*** and ***C*** only.
(3) ***B*** and ***C*** only.
(4) ***C*** and ***D*** only.


A ***B*** ***C*** ***D***

17. Which answer includes all the constituents contained in an aqueous H_2SO_4solution?

(1) H^+, OH^- , SO_4^{2-} and H_2SO_4
(2) H^+, OH^- , SO_4^{2-} and H_2O
(3) H^+, OH^- and H_2SO_4
(4) H^+, OH^- and SO_4^{2-}

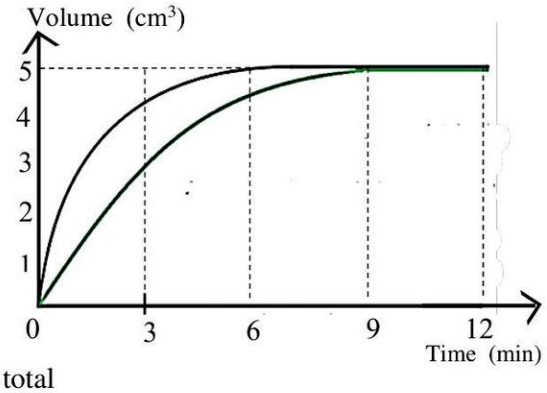
18. It took 1 s for a coconut on a coconut tree to fall to the ground. The height of the coconut tree could be, (Acceleration due to gravity = 10 m s^{-2})

(1) 5 m ය.
(2) 10 m ය. .
(3) 20 m ය.
(4) 30 m ය.

19. Two plants of the same species and showing equal growth were cultivated under different light intensities. When observed after a few weeks, it was seen that the growth of the plant that received the higher light intensity was greater than that of the other plant. The reason for this observation is most correctly explained by the fact that the higher light intensity,

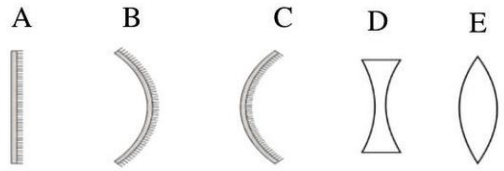
(1) increases the rate of photosynthesis, thereby elevating food production.
(2) increases the absorption and storage of water within the plant.
(3) decreases the respiration rate and the utilization of oxygen in the plant.
(4) causes a rapid reduction in the surface area of the plant leaves.

20. When equal volumes of dilute hydrochloric acid with the same concentration react under two instances with a constant mass of calcium carbonate chips and powder, the volume of gas released is graphed as shown below. Accordingly, what would happen if calcium carbonate chips are used instead of powder?



(1) The rate of reaction increases, and the total volume of gas obtained at the end also increases.
(2) The rate of reaction decreases, and the total volume of gas obtained at the end does not change.
(3) The rate of reaction decreases, and the total volume of gas obtained also decreases.
(4) There is no change in the rate of reaction, and no effect on the total volume of gas

21. Out of the mirrors and lenses shown below, which are always produce only upright images?



(1) A, B හා C (2) A, C හා D
(3) A, B හා D (4) A, C හා E

22. Which of the following statements regarding the process of parthenocarpy occurring in plants is true?
(1) Fruits formed by this process produce fertile seeds.
(2) Fruit formation takes place after the fertilization of ovules.
(3) In certain plants, fruit formation occurs without the fertilization of ovules.
(4) It helps plants to produce seeds under unfavorable environmental conditions.

23. Consider the following statements regarding the functions performed by coke added to the blast furnace during the extraction of iron
A - Acts as a fuel and provides heat.
B - Produces the gas contributing to the reduction of hematite.
C - Removes impurities present in the ore.
Out of the above statements, the correct one(s) is/are
(1) ***A*** only. (2) ***B*** only. (3) ***A*** and ***B*** only. (4) ***A*** and ***C*** only.

24. With the rise in fossil fuel prices in Sri Lanka, a large amount of money is spent on electricity generation. The most suitable measure that can be adopted for the conservation of electricity is,
(1) using electric lamps as minimally as possible.
(2) using hot plates for cooking food.
(3) using appliances like electric irons and washing machines during the daytime.
(4) keeping appliances like electric fans and air conditioners turned off during the daytime.

25. Animals like the frog and the crocodile are called poikilothermic (cold-blooded) animals because,
(1) they generate their internal body heat by themselves.
(2) their body temperature depends on external heat sources.
(3) they are animals that live only in low-temperature environments.
(4) their body temperature maintains a low value because they live in water.

26. Which of the following correctly shows the salts present in seawater arranged in increasing order of their water solubility?
(1) $CaSO_4$, $CaCO_3$ and NaCl. (2) $CaCO_3$, NaCl and $CaSO_4$.
(3) NaCl, $CaSO_4$ හා $CaCO_3$. (4) $CaCO_3$, $CaSO_4$ and NaCl .

27. A student with a mass of is sitting on a swing. In this instance, his feet are not touching the ground. If the swing remains stationary, what is the tension developed on one rope supporting the swing?

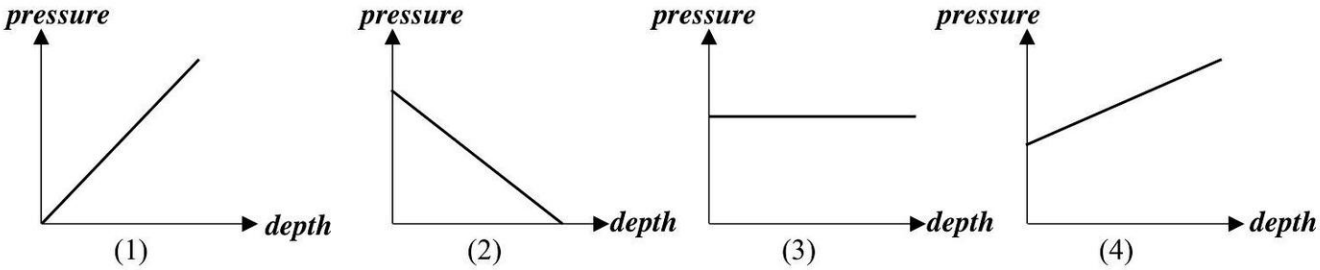


(1) 1.9 N (2) 19 N .
(3) 190 N (4) 380 N

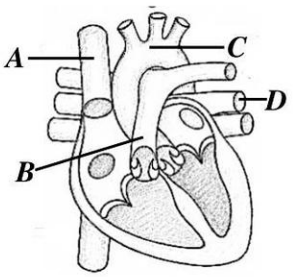
28. A woman who is a carrier for red-green color blindness marries a normal male. Which of the following is correct regarding the children they could have?
(1) 50% of the daughters will be color blind. (2) 50% of the sons will be color blind.
(3) 100% of the sons will be normal. (4) 50% of the children will be color blind carriers.

29. Consider the following statements regarding the procedures that can be followed during a practical experiment to calculate the heat change of an exothermic reaction.
A - Keeping the bulb of the thermometer without touching the bottom of the solution container.
B - Using a thermally insulated container to minimize heat loss.
C - Measuring the maximum temperature of the solution while stirring the solution well.
Out of the above statements, the correct one(s) is/are,
(1) ***A*** and ***B*** only. (2) ***A*** and ***C*** only. (3) ***B*** and ***C*** only. (4) All ***A***, ***B*** and ***C*** .

30. Which graph correctly represents the variation of pressure with depth in a container containing a incompressible fluid? (Neglect atmospheric pressure.)



31. A vertical section of the human heart is shown in the figure.
Out of these, the blood vessels with a higher concentration of oxygen are,
(1) ***A*** and ***B*** .
(2) ***A*** and ***C*** .
(3) ***B*** and ***C*** .
(4) ***C*** and ***D*** .



32. Consider the following statements regarding the ethene molecule.
A - The reactivity of the ethene molecule is higher than that of the ethane molecule.
B - A double bond exists between the carbon atoms of the ethene molecule.
Out of the above statements,
(1) Only ***A*** is true. (2) Only ***B*** is true.
(3) Both ***A*** and ***B*** statements are true. (4) Both ***A*** and ***B*** statements are false.

33. Study the pairs of physical quantities given in **A**, **B**, and **C** below.

	(a)	(b)
A	Unbalanced force	Acceleration
B	Mass	Acceleration
C	Velocity	Momentum

An increase in (a) directly causes an increase in (b) in
(1) ***A*** and ***B*** only. (2) ***A*** and ***C*** only. (3) ***B*** and ***C*** only. (4) All ***A***, ***B*** and ***C*** .

34. When analyzing the scientific relationship between marriages among close blood relatives (consanguineous marriages) and the prevalence of genetic disorders such as thalassemia in Sri Lanka, why are pre-marital clinical screenings essential ?
(1) Because in consanguineous marriages, dominant genes always undergo mutation, resulting in the birth of affected children.
(2) Because in a marriage between two asymptomatic carriers, there is a higher probability of recessive genes coming together in the offspring.
(3) Because a blood test cannot provide medications to completely prevent future gene mutations.
(4) Because even if there is no family history of genetic disorders, a consanguineous marriage will almost certainly result in an affected child.

35. Consider the following statements:
- ……equal to the number of atoms present in 12.00 g of Carbon-12.
- ……equal to the number of oxygen molecules contained in 32 g of oxygen.

Which of the following corresponds to the above blanks?

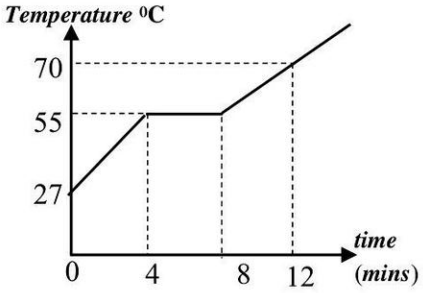
(1) Atomic mole (2) Molecular mole (3) Avogadro constant (4) Relative atomic mass

36. Consider the following statements regarding the graph that illustrates the variation of temperature with time as a piece of wax at room temperature is heated continuously

A – Melting point of wax is 55 ^{0}C .

B – Boiling point of wax is 70 ^{0}C .

C - The heat absorbed by the piece of wax from 4 minutes to 8 minutes is known as the latent heat of fusion.



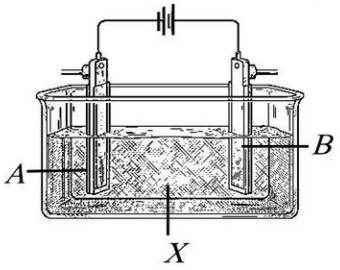
Which of the above statements is/are true,

(1) *A* and *B* only. (2) ***A*** and ***C*** only.

(3) B and ***C*** only. (4) All ***A, B*** and ***C***.

37. When an aqueous solution **X** is electrolyzed using carbon electrodes, hydrogen gas is evolved near electrode **A**, and chlorine gas is evolved near electrode **B**. Which option correctly identifies electrodes **A** and **B**, solution **X**, and the final solution?

	Initial aqueous solution *X*	Final Solution
(1)	Aqueous sodium chloride	Aqueous copper sulphate
(2)	Aqueous sodium chloride	Sodium Hydroxide
(3)	Acidulated water	Sulphuric acid solution
(4)	Aqueous copper sulphate	Sodium Hydroxide



38. The loss of biodiversity directly and indirectly adversely affects human survival. Which of the following statements regarding this is the most scientifically correct statement?

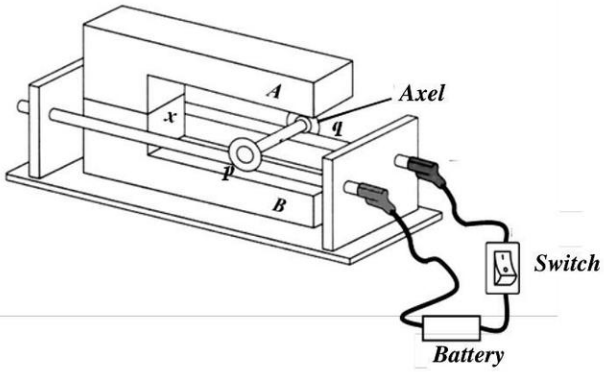
(1) Food and resource security collapses due to the breakdown of food webs and natural balance within ecosystems.

(2) Since the reduction of biodiversity is a natural process, technological advancement ensures it causes no impact.

(3) When habitats are lost, all living species adapt in the same manner to ensure their survival.

(4) Although deforestation reduces biodiversity, it favorably impacts the expansion of crop cultivation.

39. The figure shows an setup prepared by a group of students to demonstrate electromagnetism. When the switch is closed, the axle is pushed towards **x**. Consider the following statements regarding magnetic poles **A** and **B**, and the direction of current flowing through the axle:



	Pole A	Pole B	Direction of current
P	N	S	*From p to q*
Q	S	N	*From p to q*
R	S	N	*From q to p*

Which of the above statements is/are true,

(1) ***P*** and ***Q*** only. (2) ***Q*** and ***R*** only. (3) ***P*** and ***R*** only. (4) All ***P***, ***Q*** and ***R***.

40. Which of the following is the most eco-friendly and practical measure that can be taken to significantly minimize excessive heat inside homes?

(1) Closing windows and curtains on sides exposed to harsh sunlight during daytime to minimize heat entering the house.

(2) Allowing the air to cool by placing a clay pot filled with water or building a small waterfall in the living room or hotter areas.

(3) Minimizing incident sunlight by cultivating passionfruit or another large-leafed vine in a way that its leaves cover the roof surface without causing damage to the roof.

(4) Painting the outside of walls directly exposed to sunlight with a dark green color paint.

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Ministry of Education, Higher Education and Vocational Education
Science Branch

34 | S | II

Grade 11

G.C.E Ordinary Level Supportive Test - 2026

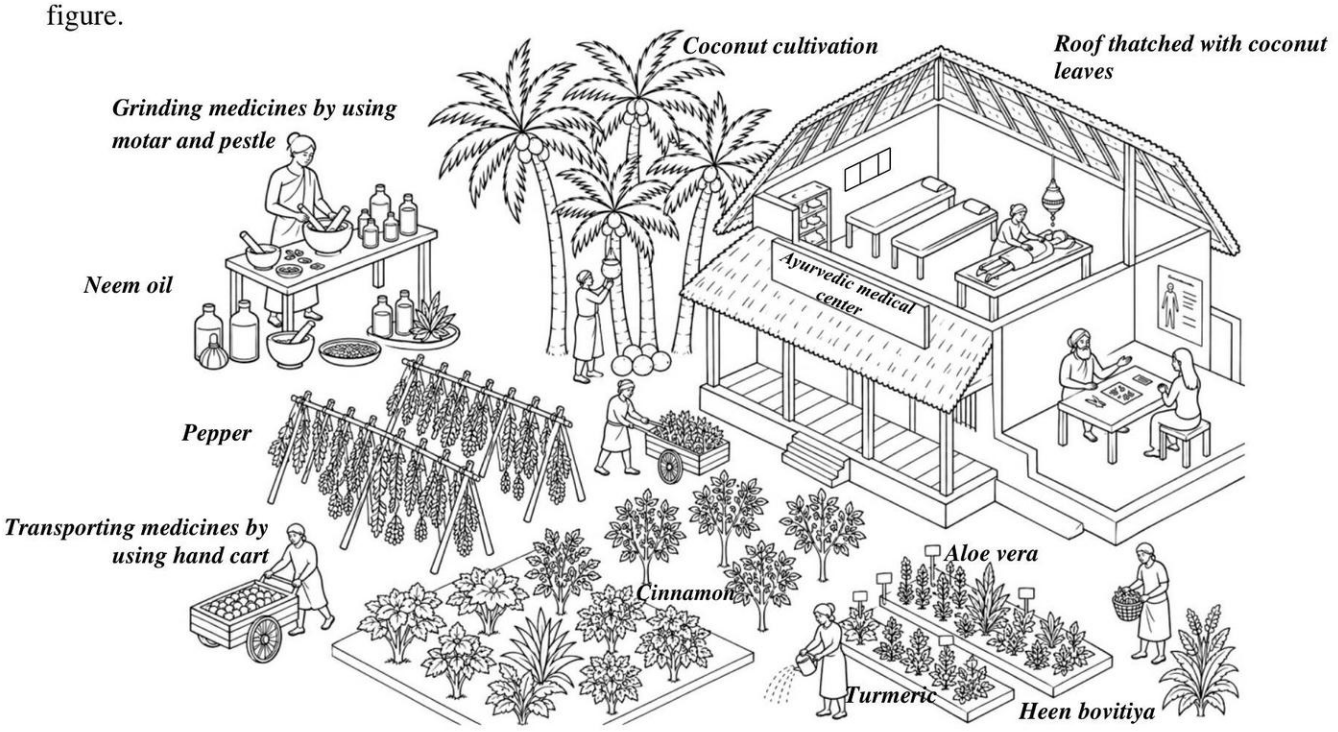
Science II

Three hours

Instructions: This question paper consists two **parts A** and **B**.
Answer all the questions in **Part A** in the space provided.
Answer only three of the five questions in **Part B**

Part A

1. (*A*) An Ayurvedic medical center that treated patients in the past and its surrounding environment are shown in the figure.



(i) Select the plant from the figure that corresponds to each of the following usage and write it in the blank space of the table. ' (04)

Usage	Plant / Material
(a) a medicine as well as a natural flavoring agent.	.....
(b) A cosmetic material free of side effects, used for thousands of years.	.....
(c) An environmentally friendly pesticide. It is also used as a disinfectant	.....
(d) Used for making high quality herbal porridge (Kola Kenda).	.....

(ii) Write a fact that confirms that the carbon footprint and food mile are at a minimum level associated with this Ayurvedic medical center

(a) Minimizing carbon foot print- .....

(b) Minimizing food mile - ..... (02)

(iii) Write the expected benefit of the following changes in the building of ayurvedic medical center

(a) A high roof thatched with coconut leaves - .....

(b) Positioning windows along North and south direction -..... ..... (02)

(iv) Write down two advantages of Ayurvedic treatment method.

.....

..... (02)

(***B***) Environmental pollution is a major global issue today. Severe environmental pollution occurs due to various human activities, and it is unknown whether any other living organism has an impact on environmental pollution.

(i) State two main types of environmental pollution.

(a) ..... (b) .....

(ii) State two types of pesticides that enter the environment as agrochemicals.

(a) ..... (b) .....

(iii) State two types of pesticides that enter the environment as agrochemicals.

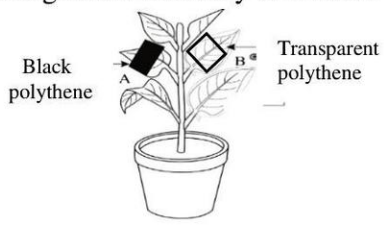
.....

(iv) State what is meant by antiseptics.

.....

.....

2. (***A***) The figure shows an apparatus set up by a group of Grade 11 students to investigate the necessity of a factor required for photosynthesis. The plant was kept in the dark for 48 hours beore starting the experiment.



(i) What is the factor tested by the students? .....(01)

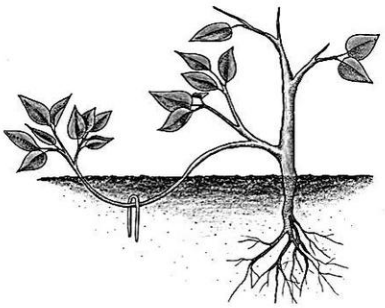
(ii) What is the reason for keeping the plant in the dark for 48 hours ?

.....(01)

(iii) Complete the blanks in the table regarding the usage of leaves for the starch test. (03)

Step	Reason
Boiling the leaf in water.	(a) .....
(b)	To remove chlorophyll
Adding iodine solution.	(c) .....

(***B***) The figure shows an activity performed by a group of students to obtain new plants through an artificial vegetative propagation.



(i) What is the name given to this method of artificial vegetative propagation?

.....(01)

(ii) Place a tick mark (✓) in front of the plant from which new plants can be successfully obtained through this method (01)

Lemon ☐ Mango ☐

(iii) Write down an advantage of this method over tissue culture.

.....(01)

(iv) This plant is a flowering plant and also produces new plants through sexual reproduction.

(a) If the number of petals in this flower is less than 10, what could be the possible number of petals?.....(01)

(b) Write an adaptation shown by the flower for cross-pollination .....(01)

(c) If the fruit of this plant is dispersed by animals, mention a possible adaptation of the fruit.

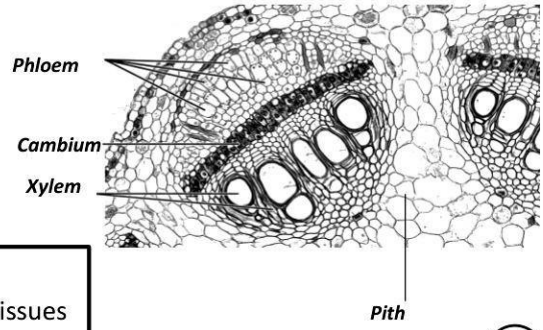
..... (01)

(v) The figure shows a microscopic representation of a specimen prepared by the teacher using a tender branch section obtained from the above plant.

(a) Draw a circle around the word that names a structural feature confirming that the specimen has been obtained from a dicotyledonous plant itself . (01)

(b) Several cards given by the teacher are shown below, select and write the matching plant tissue type from the figure.

. (03)



Simple permanent tissues I ……..	Meristematic tissues II …….	Complex permanent tissues II …….

15

3' (***A***) Given below are the symbols (not real symbols) and their atomic numbers of three elements X, Y, and Z belonging to the first 20 elements of the periodic table..

Element	***X***	***Y***	***Z***
Atomic number	10	11	17

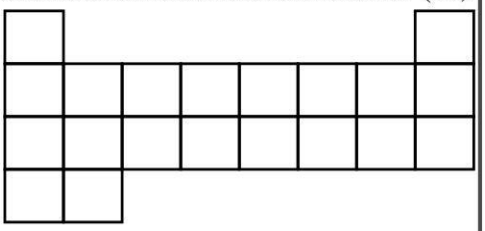
(i) Write down the electronic configuration of an atom of element Y ..... (01)

(ii) For the compound formed by the reaction between Y and Z,

(a) Write the chemical formula..... (01)

(b) Is this compound a covalent or an ionic compound?..... (01)

(iii) (a) Correctly place the three elements X, Y, and Z in the given periodic table. (01)



(b) Mention a special characteristic possessed by atoms of element X relative to atoms of elements Y and Z.

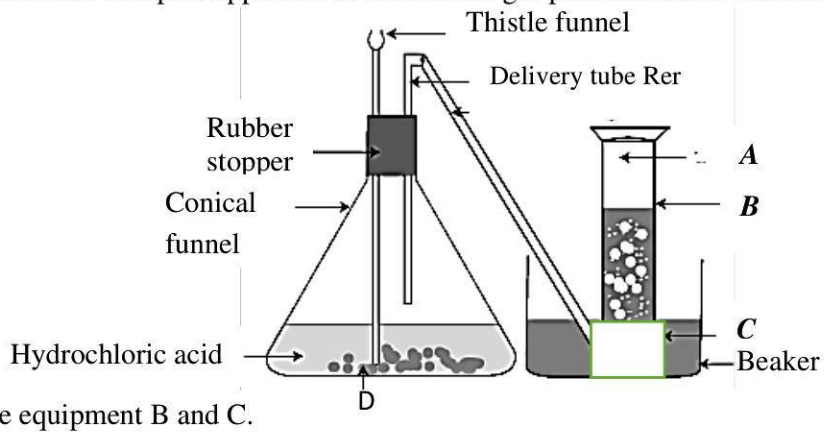
..... (01)

(iv) Write down the observations when a red and a blue litmus paper are placed into the solution formed by the reaction of element Y with water

.....

..... (01)

(***B***) A group of students set up an apparatus as follows for gas production and collection.



(i) Name the equipment B and C.

B..... *C*..... (02)

(ii) Name the method used here to collect the gas.

..... (01)

(iii) Complete the following table based on the dilute hydrochloric acid and the substance used as D. (02)

Substance used as D	Gas collected as A
(a) ……..	Carbon dioxide
Zinc metal	(b) ……..

(***C***)(i) In the Haber process for producing ammonia, a temperature of 450 C is provided and catalysts are also used..

(a) What is the catalyst used here?.....(01)

(b) Mention the two gases used for the production of ammonia.

.....(01)

(ii) Write an advantage of using a catalyst instead of increasing the temperature to increase the rate of a chemical reaction.

.....(01)

(iii) Apart from catalysts and temperature, write another factor that affects the reaction rate.

.....(01)

15

4. A helicopter with a mass of 1000 kg is parked on a field with a horizontal uniform surface.



(i) What is the weight of the helicopter? ..... (02)

(ii) For the helicopter to remain in equilibrium,

(a) How many forces acting on it?..... (01)

(b) Mark those forces on the above figure. (01)

(iii) The lifting of the helicopter upwards is caused by the thrust force generated on the air due to the rotation of the helicopter blades at a certain inclination to the horizontal.

(a) What is the minimum force that must be exceeded to lift the helicopter barley upwards..... (01)

(b) What is the Newton's law that can be used to describe lifting the helicopter barely upwards?..... (01)

(iv) When the flying helicopter is at a stationary position 1125 m high in the sky, a parachutist with a mass of 50 kg is preparing to jump from the aircraft to the ground.

(a) What is the potential energy possessed by the parachutist while on the aircraft?

..... (03)

(b) If an object with mass m fell vertically from the aircraft, what velocity would it acquire at the moment it touches the ground? (Neglect air resistance. g = 10 m s^{-2}) (03)

.....

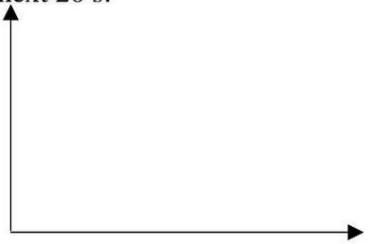
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(v) After the parachutist fell freely vertically downwards for 5 s from the moment of jumping from the aircraft, the parachute opened, and during the next 4 s, moving with uniform deceleration, attained a velocity of 10 m s^{-1}. From there onwards, assume it moved with a uniform velocity for the next 20 s.

(a) Complete the table corresponding to the above information. (01)

Time t (s)	0	5	9	15	29
Velocity v (m s^{-1})	0	50	.....	.....	.....

(b) Draw the velocity-time graph relevant to the motion. (02)



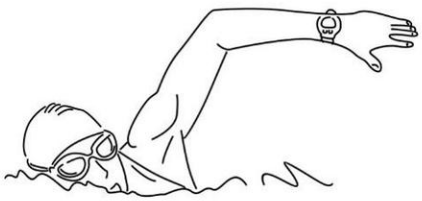
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15

Part B

- Answer only **three** questions from the questions No. **5, 6, 7, 8** and **9**.

5. (A) The diagram shows a swimmer swimming across a reservoir. While swimming, he periodically turns his head side to side to perform gas exchange.



(i) Neck muscles are used to turn the head from side to side.

(a) Which muscle type is used to turn the head from side to side? (01)

(b) Write two characteristics unique only to that type of muscle. (02)

(ii) Write another benefit obtained by turning his head side to side while swimming, in addition to gas exchange. (01)

(iii) Write down the two types of muscles connected to the thoracic cavity that contract during the mechanism of inhalation. (02)

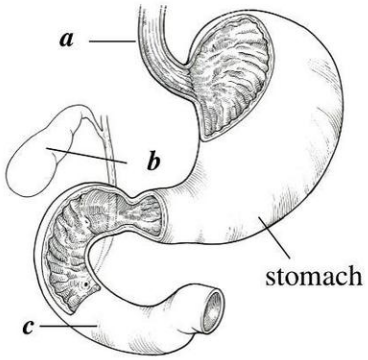
(iv) Oxygen gas obtained from the external respiratory process is used for cellular respiration. Write the balanced chemical equation relevant to it. (02)

(v) In addition to the aerobic respiratory process, a process that occurred within cells associated with the athlete's leg muscles is shown by the following word equation. Glucose → Lactic acid + Energy

(a) What is the name given to this process? (01)

(b) Mention a complication that can arise when energy is produced by such a process. (01)

(***B***) The diagram shows a part connected to the human digestive system as drawn by a student.



(i) Name parts a, b, and c. (03)

(ii) Name two organs where both physical and chemical digestion take place. (02)

(iii) Due to a complication, a person who had part 'b' removed has been advised by doctors to consume less food containing lipids.

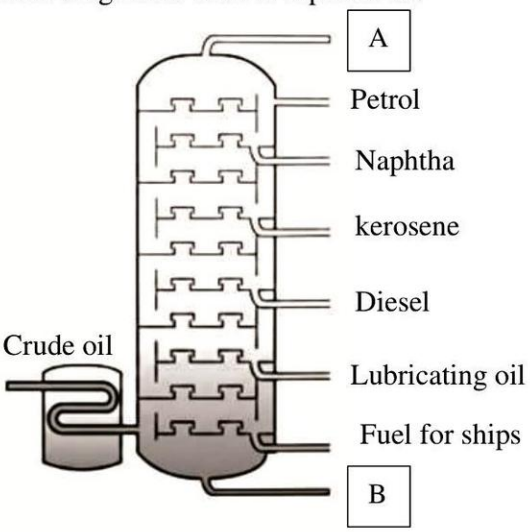
(a) What could be the reason for this? (01)

(b) Why is it appropriate for even healthy individuals to reduce the intake of food containing high amounts of lipids? (01)

(iv) Write down the organizational levels of life that include the digestive system and the stomach respectively. (02)

(v) What is the biomolecule subjected to chemical digestion in the stomach? (01)

6. (***A***) Crude oil is a mixture containing hydrocarbons. The setup shown in the diagram is used to separate the constituents present in that mixture.



(i) What is the separation of constituents of the mixture by this setup called? (01)

(ii) State two constituents contained in the substance separated from position A. (02)

(iii) Indicate how the boiling point of componenets gradually varies from bottom to top in this setup. (01)

(iv) Tar separated must be heated to a high temperature to liquefy before being laid on roads. A group of students observed tyres being burnt to obtain heat for melting tar. Describe an environmental impact that can occur due to this. (01)

(v) The main constituent of petrol is octane C_8H_{18}

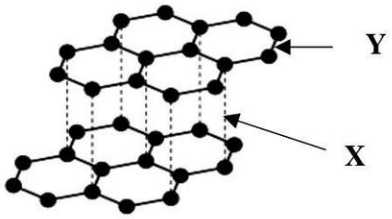
(a) What is the hydrocarbon type to which octane belongs? (01)

(b) Give the balanced chemical equation relevant to the complete combustion of octane. (01)

(***B***) (i) Bonds are formed between atoms or ions in order for element atoms to become stable.

(a) What is the type of bond indicated as X existing between carbon atoms in the atomic lattice of graphite? (01)

(b) State a special property received by graphite due to the presence of the weak bonds indicated as Y between the graphite layers. (01)



(ii) State a structural difference present in the diamond that is not present in the graphite. (01)

(iii) Draw the Lewis structure of the molecule formed between carbon and chlorine. (02)

(***C***) When a wasp stings, the pain can be relieved by applying a weak acid like vinegar on that location.

(i) Why is acetic acid called a weak acid? (01)

(ii) Write two other instances of utilizing acetic acid. (02)

(iii) A neutralization reaction also occurs in the reaction between H_2SO_4, which is a strong acid used in the laboratory, and NaOH.

(a) Describe what is meant by a neutralization reaction. (01)

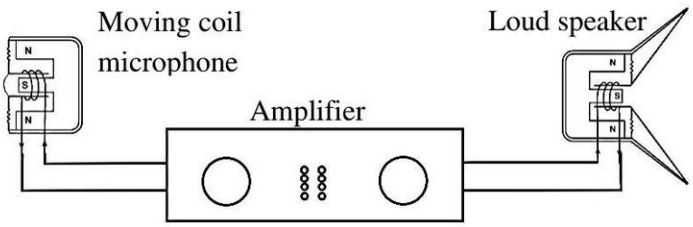
(b) When 40 cm^3 of H_2SO_4 solution and 60 cm^3 of NaOH solution were mixed, the temperature of the mixture rose by 10 ^{0}C. Calculate the heat change that occurred in this reaction. (c = 4200 J kg^{-1} K^{-1}, density of water = 1 g cm^{-3}) (02)

(c) According to the heat change, to which type does this reaction belong? (01)

(d) Draw the energy level diagram relevant to the reaction. (01)

(20 Marks)

7. (***A***) A rough diagram showing the process related to amplifying a sound wave and listening to it again is shown in the figure.



(i) State whether the phenomenon that can explain the operation of the following devices is electromagnetic induction or electromagnetic force.

(a) Microphone (01)

(b) Loudspeaker (01)

(ii) What is the basic electronic component used to perform the amplification process of the sound wave? (01)

(iii) State the energy transformation that occurs from the moment the sound wave is captured by the microphone until it leaves the loudspeaker. (01)

(iv) Briefly explain how sound is produced by the loudspeaker. (02)

(v) A sound wave is a mechanical wave.

(a) Does the sound wave propagate as a transverse wave or as a longitudinal wave? (01)

(b) State the reason for your statement. (01)

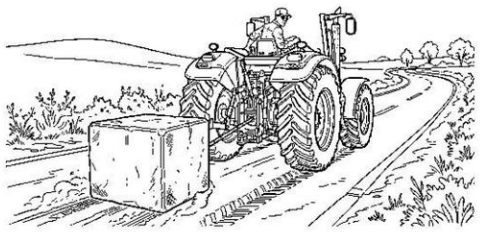
(vi) A musical sound produced by a loudspeaker is heard over a longer distance at night than during the daytime. Explain the reason for this? (02)

(***B***) The diagram shows a concrete block being pulled by a tractor.

(i) State whether motion is easier when friction is reduced or when it is increased in the following instances of contact.

(a) Between the wheels of the tractor and the road (01)

(b) Between the concrete block and the road (01)



(ii) Frictional force is applied in the direction of motion of the tractor when which wheels, out of the front and rear wheels, are in contact with the road? (01)

(iii) Due to lubricating oil being spilled only on the places where the rear wheels of the tractor rest on the road, it was unable to move further forward due to slipping. The people who came to assist offered the following suggestions:

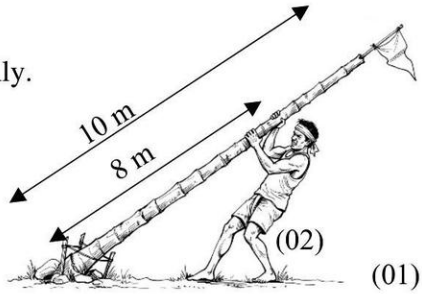
(a) Adding sand onto the lubricating oil.

(b) Several people climbing onto the tractor.

(c) Several people climbing onto the concrete block.

Briefly explain your opinion on each of the above suggestions. (03)

(*C*) A 12 m long areca nut log prepared for a New Year festival is kept horizontally. When a man attempted to lift it to erect it vertically at distances of 8 m and 10 m from the end touching the ground, in both instances it could just barely be subjected to a rotational effect.



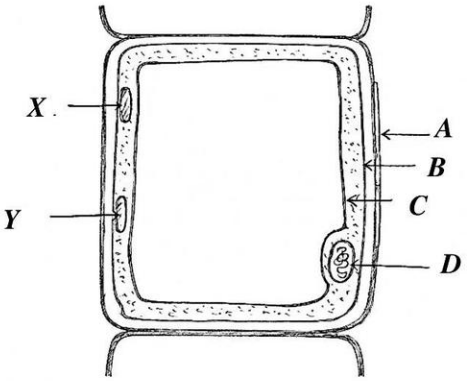
(i) Calculate the moment of force at the instance when a force of 160 N was applied at a distance of 10 m (02)

(ii) What is the force applied at a distance of 6 m in the other instance? (01)

(iii) In which instance, at what distance, was the greater force applied? (01)

(20 Marks)

8.(*A*) The structure of a plant cell recorded in a science magazine is shown i



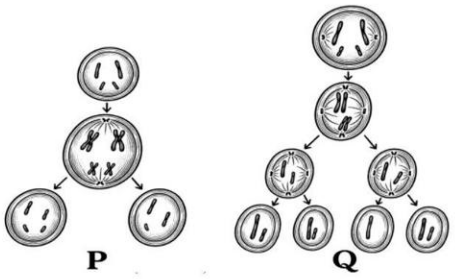
- X - Performs photosynthesis.
- Y - Produces energy through cellular respiration.

(i) Write the names by which organelles X and Y are called. (02

(ii) Out of A, B, and C, write a structure that can be seen only in pla (02)

(*B*) The two main methods by which cell division occurs in a shoe flower plant observed during a field trip are indicated as **P** and **Q** by a student in the diagram below.

(i) What are the two methods of division **P** and **Q**? (02)



(ii) If the number of chromosomes in a shoe flower pollen grain is 28, what is the number of chromosomes in the nucleus of a cell in a plant leaf? (01)

(iii) Mention an importance of cell division method **Q**. (01)

(iv) All plants of the F_1 generation obtained by crossing a plant with yellow flowers and a plant with red flowers were red.

(a) What is the dominant character relevant to the colour of the flowers? (01)

(b) Explain the inheritance of characters to F_2 generation using a Punnett square using suitable letters. (02).

(*C*) Inside motor vehicles, a plane mirror is fixed to view the rear, while convex mirrors have been used as side mirrors.

(i) Write down one similarity and one dissimilarity between the images obtained from the rear-view mirror and a side mirror. (02)

(ii) Write down an advantage of using convex mirrors as side mirrors. (01)

(iii) An object of height 10 cm is placed at a distance of 10 cm in front of a convex mirror with a focal length of 10 cm. Represent the image using a ray diagram drawn to a suitable scale. (03)

(*D*) A submarine is parked at a depth 400 m from the water surface and 10 m above the seabed.
(Density of sea water = 1050 kg m^{-3} , g = 10 m s^{-2})

(i) What is the pressure exerted on the upper surface of the submarine by water alone? (02)

(ii) If the weight of the submarine along with the contents inside it is W_1, what is the upthrust exerted on the submarine by the sea water? (01)

(iii) In order for the submarine to come to the surface, should it change its weight or its upthrust? (01)

(20 Marks)

9. (***A***) Urea, which is a chemical fertilizer widely used in Sri Lanka, is manufactured by reacting ammonia and carbon dioxide under high temperatures and pressures. The chemical equation for it is given below..

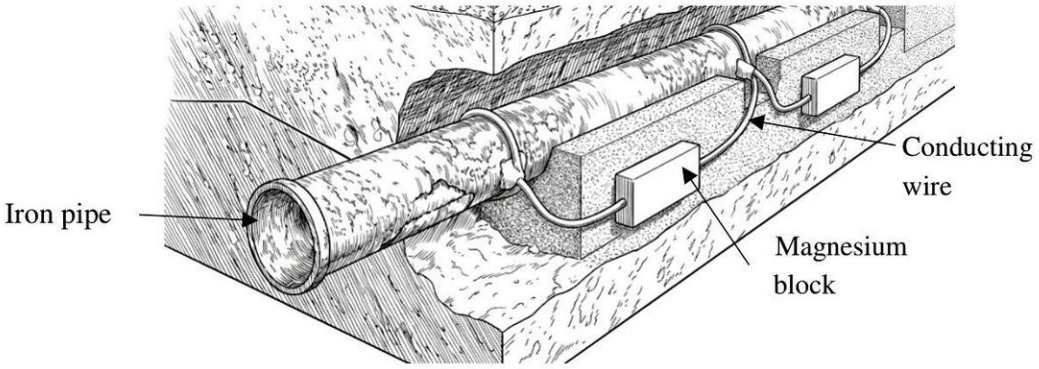
$$2NH_3\,(g) + CO_2\,(g) \rightarrow CO(NH_2)_2\,(s) + H_2O\,(l)$$

(i) Calculate the relative molecular mass of urea. (H = 1, C = 12, O = 16, N = 14) (01)

(ii) Find the mass percentage of nitrogen contained in urea . (02)

(iii) What is the minimum mass of ammonia required to produce 600 kg of urea? (02)

(***B***) Leakage of water occurs in a water supply system of a city, due to the rusting of underground iron pipes. To prevent this, magnesium blocks connected to the iron pipe by a conducting wire are buried near the pipe as shown in the diagram.



(i) By what name this method of preventing iron from rusting known? (01)

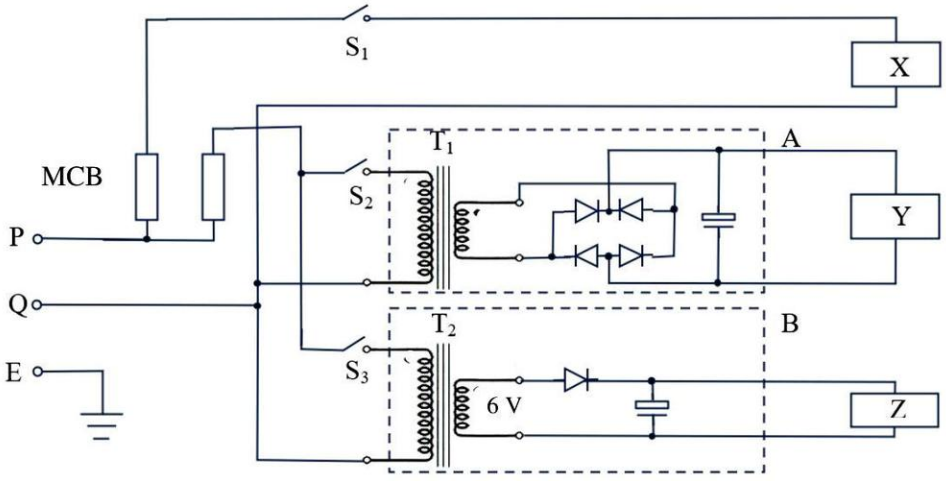
(ii) In the electrochemical cell formed during the reaction ,

(a) Which metal act as the anode? (01)

(b) Write down the oxidation half reaction occurring at the metal. (01)

(iii) What would be the effect on the Iron pipe if a copper block were connected instead of the magnesium block? (02)

(***C***) A circuit diagram showing several electrical appliance connected to a domestic circuit operating under a potential difference of 240 V is given below.



(i) What are the two types of wires connected to positions P and Q in the circuit? (01)

(ii) Mention the type of current use to operate appliances X and Y separately current (DC) or a an alternating current (AC). (02)

(iii) Draw and show the wave shape displayed when cathode ray oscilloscope is connected instead of appliance X and Y. (02)

(iv) What is the type of rectification performed by the circuit indicated as B? (01)

(v) The transformer is labelled as T_2 .

(a) State whether it is a step down or a step up transformer, (01)

(b) What is the amount of current flows in the primary coil if the amount of current in the secondary coil is 2 A? (02)

(c) State whether a coil with large cross sectional area should be used for the primary coil or the secondary coil. (01)

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(20 marks)