Ministry of Education
Science Branch

Grade 11 | **Supportive Test - 2023** | **34 S II**

Science II | **3 hours**

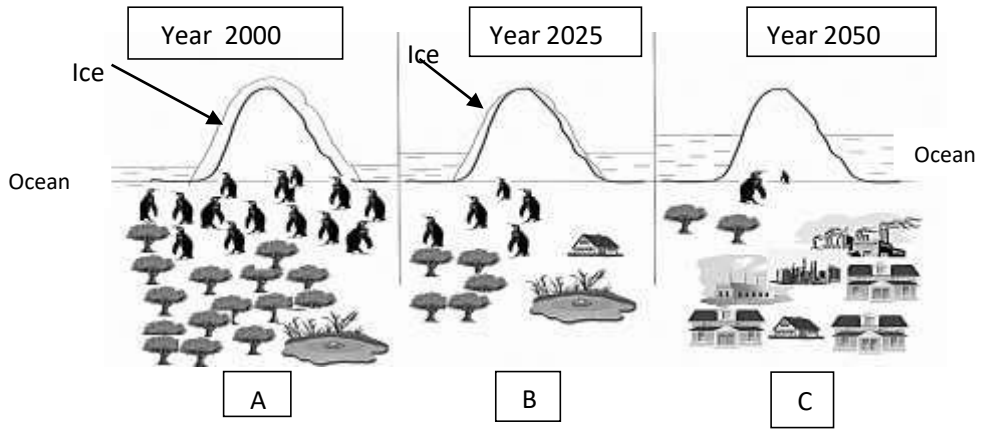
Instructions:-

- **Write your answers in clear handwriting.**
- Answer the four questions in **part A,** in the space provided.
- Of the five questions in **part B** answer three questions only.
- **After answering, attach Part A and the answer script of Part B and handover together.**

Part A- Structured Essay

1. The influence of human activities on the environment of a polar region is shown by the forecasting diagram given below.

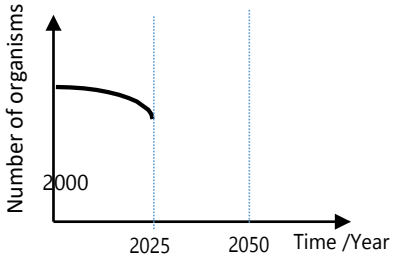
(A)



i. Mention the environmental issue that affected the rising of the water level of oceans in the year 2050 ?
……(1)

ii. Name two gases that cause the environmental issues which responsible for the rise in the water level in the ocean as indicated in part C of the forecasting diagram.
…… (2)

iii. The following curve represents the variations in the number of organisms in the penguin population between the time period year 2000 to 2025 according to the above forecasting diagram.



a. According to the graph, mention two human activities affect for the variation. (02)
……
……

b. Complete the remaining part of the graph relevant to the time period from year 2025 to 2050. (02)

(B) A student states that poor management of materials and energy and not using other energies sustainably are thereasons for the unfavorable environment changes.

i What is meant by Sustainable development?
…… (2)

ii. Complete the table relevant to the 4R practices in waste management. (03)

Instance	4R Principle
Using empty plastic water bottles to put honey	Reuse
Taking antibiotics without medical advice	(a) …….
(b) …….	Replace (using Substitution)
Production of biogas using animal waste matter	(c) …….

.

iii. Mention two suitable power stations that can be operated by using natural energy resources currently present in Sri Lanka apart from Hydro power stations

……..(02)

iv. Write a factor that should be considered to minimize the energy crisis when planning houses.

…….(01)

2. (A) Carbohydrates, proteins, lipids, and nucleic acids are considered as main biomolecules in living matter.

i. What is the element present in protein but absent in carbohydrates and lipids?

…….(01)

ii. Mention two biomolecules which important as an energy source in living bodies.

…… (02)

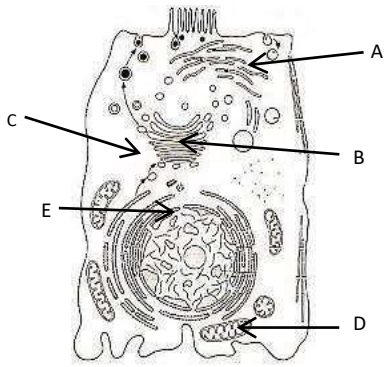
iii. Which element deficiency causes yellow or purple patches on plant leaves?

…… (01)

iv. Write one deficiency syndrome that occurs due to the deficiency of Vitamin K in human bodies.

…….(01)

(B) A typical animal cell created using electron microscopic information is shown below.



i. Name parts A and B

A …….

B.....(01)

ii. What is the letter used to indicate the organelle that divides first during the cell division process?

…….(01)

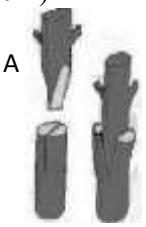
iii. Write the function of the organelle indicated by the letter D

…….(01)

iv. Mention an organelle which cannot be seen above cell but can see the plant cells

…….(01`)

(C) Reproduction contributes to the continuity of life.

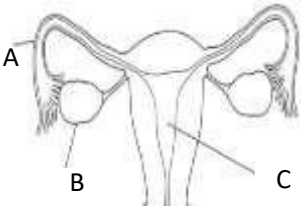


i. The following diagram shows an instance related to the grafting of plants. A is known as …… while B is known as …….. This method of grafting is known as …… (2)

ii. A part of the female reproductive system is given below. Write the **letters** relevant to the places where implantation and fertilization take place.

a. Fertilization .....(1)

b. Implantation .....(1)



v. Mention a stage of the menstrual cycle where a change in ovaries occurred and the hormone secrets from ovaries at that stage.

a. Phase ..... (01)

b. Hormones .....(01)

3. (A) A diagram of a setup of an activity conducted by a group of students in the school laboratory is shown below. Equal masses of magnesium are used in A, B, and C test tubes and the experiment is conducted to obtain the conditions given in the table 1.

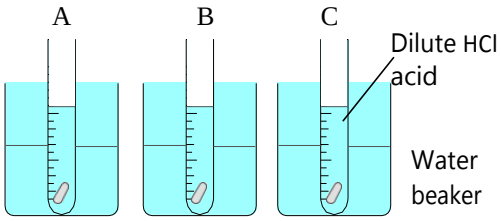


Table 1

	Tube A	Tube B	Tube C
HCl	0.5 ml	5 ml	5 ml
Water	9.5 ml	5 ml	5 ml
Temperature	30^0C	30^0C	10^0C

i. In which test tube, the chemical reaction with the highest rate of reaction takes place?

…….. (1)

ii. To identify the factors affecting the rate of a reaction, the experiment should be done by keeping the relevant factor under controlled. Fill in the blanks in the table by using the above given data.

Pair of test Tube	The factors affecting the rate of reaction
A and B	(a).....
(b).....	Temperature

iii. (02)

a. Write the balanced chemical equation for the reaction between HCl and Mg

…… (2)

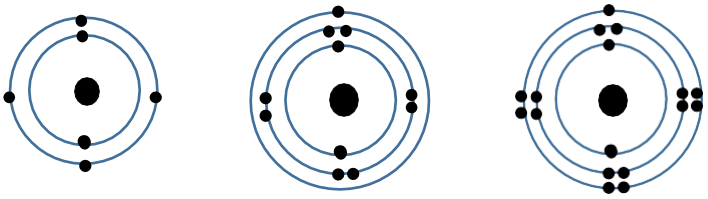
b. Is it possible to use a piece of Cu instead of the piece of Mg in this experiment under the given conditions?

……(01)

c. Give the reason for the answers you mentioned in the above question b

…… .(1)

(B) Three atoms of certain elements are denoted by P, Q, and R. (The given letters are not standard symbols)



P Q R

i.

a. Identify and name the element Q

……(1)

b. Write the electron configuration of P

……(1)

c. Which element has the highest electron negativity among P, Q, and R

……(1)

ii. Bonds are formed in between atoms to complete the octet of electrons in the valence shell.

a. Write the formula of the compound formed by the reaction between P and R.

…… (1)

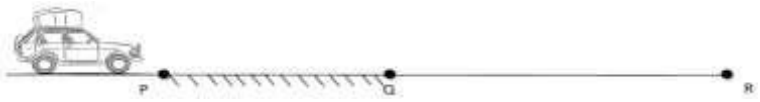
b. Mention the types of the bonds formed between P and R and Q and R.

I. P and R ……

II. Q and R..... (2)

c. Diagrammatically represent the formation of the bonds between Q and R (2)

4. (A) A motor car travels on a horizontal straight way is shown by the diagram given below. The frictional force exerts on the tiers of the vehicle is higher in P Q area than that of the Q R area. The frictional force act on the vehicle is 300N when it travels from P to Q.



i. The engine gives a continuous force of 300 N when the motor car moves from P to R. Complete the table according to the situation. (04)

	Type of the motion	Reason for the type of motion
When travels from P to Q	Uniform velocity	(a)……..
When travels from Q to R	(b)…….	(c)……..

(4)

ii. What is the name given for the type of frictional force which applies on the motor car by the road?(01)

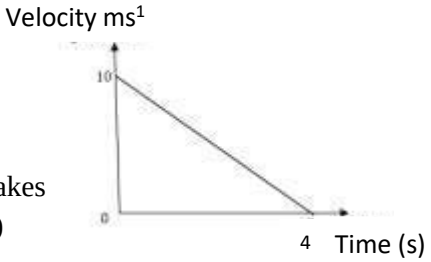
……

iii. Name one advantage and one disadvantage that the moving motor car receives by the frictional force whichapplies on the vehicle by the road.

Advantage .....(01)

Disadvantage.....(01)

iv. The velocity time graph of the motion of the motor car after applying brakes



a. Find the deceleration of the motor car according to the graph (01)

…… (01)

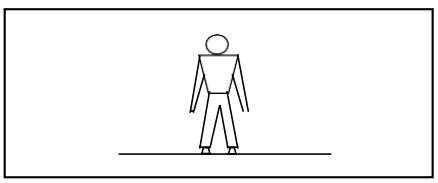
b. Find the distance travelled at a deceleration. (02)

……

v. The passengers standing on a moving bus without holding anything for support push forward when the bus suddenly stops by applying brakes. Which law of Newton can be applied to describe the situation?

…… (01)

B. A man of 80 kg mass is standing on a lift. (02)



i. Mark the forces act on the man when he is standing on the lift.(02)

ii. Write the forces react by the floor of the leverage during the given instances.

a. When the lift is still without moving)

……

……(01)

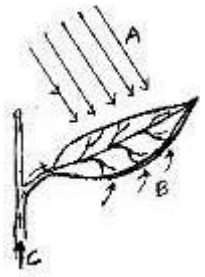
b. When the lift moves upward at a 0.5 m s $^{-2}$ acceleration.

……

……(02)

Science II – Part B

5. (A) The following diagram represents one of the metabolic processes that take place in organisms.



(i) Define "Photosynthesis" (01)

(ii) Write material and non-material substances that contribute to the, photosynthesis from A, B, and C separately. (02)

(iii) Name the chemical reagent that can be used to identify the storage material produced by the photosynthesis. (01)

(iv) The material that is produced in the plant leaf by the photosynthesis is transported through the phloem tissue to the other parts of the plant later.

a. As what compound, the material produced by the above process does transport through the phloem tissue? (01)

b. To which type of plant tissues, phloem tissue belongs under the classification of plant tissues? (01)

(v) Briefly describe the contribution of photosynthesis to maintain the carbon cycle by pointing two factors . (02)

(B) When plants with blue colour flowers are crossed with plants with white colour flowers, all plants in the F_1 generation were a blue colour flower plants.

(i) Name the dominant feature and recessive feature used for the above cross. (02)

(ii) Write the genotype of the mother plants by using capital and simple letters of a suitable English letter to represent the colours of the flowers. (02)

(iii) A plant with recessive feature is crossed with a plant with a heterozygous genotype. Write the phenotype and genotype of the F_1 generation. (02)

(iv) A flower planter needs plants which bear only blue flowers only. Briefly describe with the help of Mendel's theory, the process which you follow to give suitable seeds to him. (02)

(C) Different types of hormones are produced by the endocrine glands.

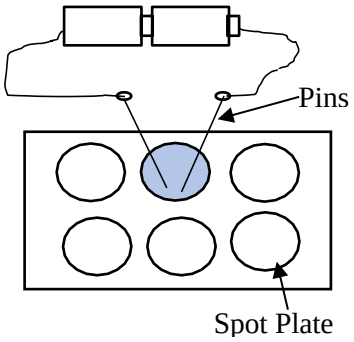
(i) Name the gland which produces the Calcitonin hormone. (01)

(ii) Which hormone prepares our body for an emergency situation? (01)

(iii) Diabetes patients take insulin hormone as a vaccine. What is the function done by insulin? (02)

(A) Attention is being paid to plan laboratory experiments using less amount of chemicals to minimize harmfulenvironmental issues.

i. The below diagram shows a setup prepared to demonstrate the process of electrolysis. Two drops of Copper Sulphate solution are put onto a spot plate.



a. Write two observations that can be observed when the two pins are inserted into the Copper Sulphate solution. (02)

b. A Student mentioned that the usage of two graphite pencil rods instead of pins, is more suitable for this experiment. Give a reason for his idea. (01)

ii. The group of students used the spot plate to identify acids and bases. A B and C are colourless solutions used for this activity. The following table gives the observations of the activity.

	Solution A	Solution B	Solution C
Litmus	Red litmus turns into blue	Blue Litmus turns into red	Blue Litmus turns into red
pH papers	Purple	Red	Yellow

a. What among A, B, and C solutions, are strong base and weak acid? (02)

b. Mention the reason for the difference in strong acids and weak acids according to the method of ionization of ions in the aqueous solutions. (02)

c. The following observations were resulted when X, Y and Z metals were added to the aqueous solution of the strong acid.

X -Gas Bubbles evolved slowly

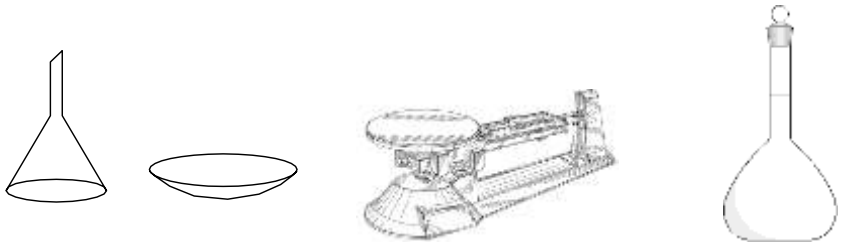
Y-No gas Bubbles evolved.

Z- Gas Bubbles evolved rapidly.

i. Arrange element X, Y and Z according to the descending order of their reactivity. (1)

ii. Which pair of metals displaces Copper when added to a dilute copper sulphate solution? (1)

(B) Following diagrams show some instruments used to prepare a standard solution by using Copper Sulphate. (Cu = 64, S = 32, O = 16)



i. P Q R S

a. Name the instruments P, Q R and S. (2)

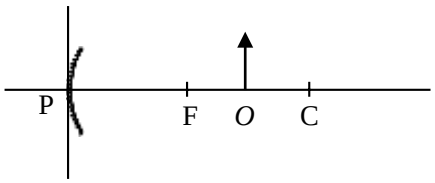
b. What is the mass of a one Mole of Copper Sulphate? (2)

c. What is the mass of Copper Sulfate ($CuSO_4$) required to prepare the 0.1 moles of $CuSO_4$ solution? (1)

d. Write the steps of preparing 250 cm^3 of standard $CuSO_4$ solution by using the correct mass of $CuSO_4$ (4)

ii. The mixture is prepared by dissolving 10 g of CuSO4 in 90 g of water. Write the composition of the mixture as a mass fraction (2)

7. (A) Following diagram shows the position of the object indicated as " ***O*"** in front of a concave mirror.

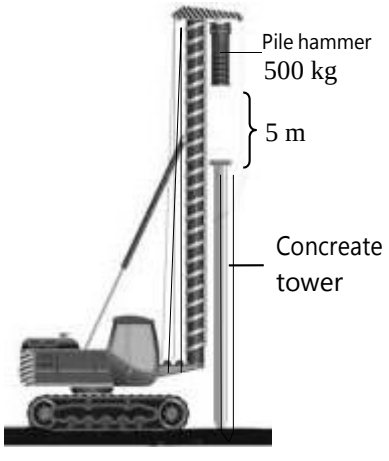


(i) Copy the diagram to the answers script and draw the ray diagram of the image formed by the object. (03)

(ii) Mention two features of the image formed. (02)

(iii) Mention one usage of concave mirrors in our day-to-day life. (01)

(B) Following diagram shows a concrete tower fixed into the ground by a pile driver. The mass of the pile hammer is 500 kg. This mass always lifts to 5m height from the concrete tower and drops onto it. (g = 10 m s^{-2})



i) Find the mass of the pile hammer. (02)

ii) Calculate the energy stored in the pile hammer after it lifts 5m above fro concrete tower. (02)

iii) Write which type of energies increased and decreased from potential and kinetic energies, when moving Pile hammer from up to down and down to up respectively. (02)

iv)iv)

a) Write a formula to express the velocity of the pile hammer when it strikes on the concrete tower. (01)

b) Calculate the velocity of the pile hammer when it strikes the concrete tower. (02)

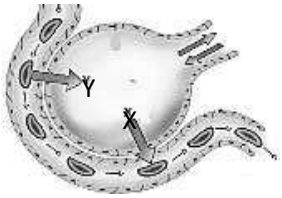
v) An electric motor with 230 V is used to lift the pile hammer. The time taken to lift the pile hammer top to 5 mheight is 4 seconds.

a) What is the work done when the pile hammer is lifting? (02)

b) Find the power of the motor. (01)

c) Calculate the current flows through the motor when it works. (02)

8. (A) Gas exchange takes place in alveoli during the process of external respiration of human beings. Gas exchange takes place in alveoli and it is shown in the diagram given below.



(i) Name the two gases indicated as X and Y in the diagram. (01)

(ii) Name the process by which the exchange of gases takes place in alveoli. (01)

(iii) Mention two adaptations of the respiratory surfaces for efficient gas exchange. (02)

(B) The atria and Ventricles of the heart contract to pump blood out of the heart.

(i) What is known as heartbeat? (01)

(ii) Name a valve which closes during systole. (01)

(iii) An Electro cardiogram of a healthy person is given in the diagram. What is the stage indicated by the letter T ? (01)

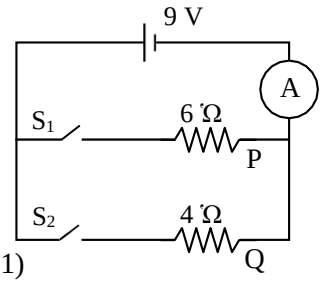
(C) Removal of excretory products produced during metabolism from the body is called excretion. The main organthat carries out nitrogenous excretion in the human body is the kidney

(i) What is the structural and functional unit of the kidney? (01)

(ii) Name one nitrogenous excretory matter which gets filtered from the blood. (01)

(iii) Why fecal matter is not considered as an excretory substance? (01)

(D) A diagram of an electric circuit is given below. 9V potential difference is supplied to the circuit by the electric source.



i. According to what method the resistors are fixed to the circuit? (01)

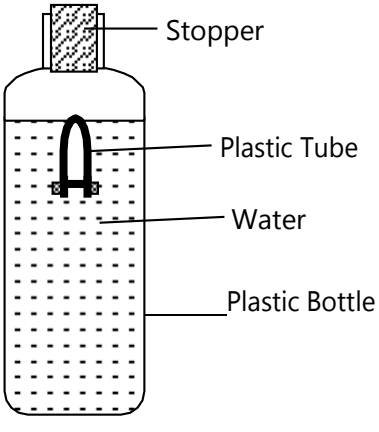
ii. What is the force by which the negative terminal of the electric source releases electrons to the external circuit? (02)

iii. What is the reading of the ammeter when S_1 switch is closed?

iv. What is the amount of heat energy emitted by Q when only the S_2 switch is closed? (01)

v. What happens to the reading of the ammeter when both S_1 and S_2 switches are closed? Will it increase or decrease the value of the answer for the above question (ii)? (01)

D) The diagram below shows one side close-ended plastic tube which is connected to a weight and immersed in water.



i. What is the name of the upward force given by water which applied to the plastic tube? (01)

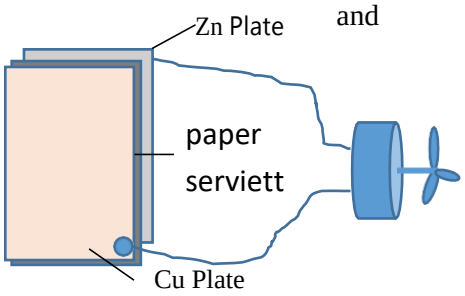
ii. The plastic tube moved downwards when the bottle was pressed by hand.

a. What the change happens in the volume of air inside the bottle when the bottle is pressed by hand? (01)

b. A certain volume of water is displaced when the plastic tube is still and immersed in water. Will this volume of displaced water be higher or lower than the volume of water displaced when the bottle was pressed? (01)

c. Mention the reason for the downward movement of the plastic tube. (02)

9. (A) In a school exhibition (Cu) plate and Zn plate, paper serviettes, lime juice, and conducting wires were used to rotate a motor.



i. In which direction do electrons flow through the plates in the circuit when the motor rotates? (01)

ii. What acts as the cathode from the Copper and Zinc plate? (01)

iii. Write the half reaction that takes place on the Zinc Plate. (01)

iv. Metal atoms convert to ions during the corrosion.

a. Which metal from Copper and Zn can be used to protect iron from rusting? (01)

b. Give an example for an instance where iron can be protected from rusting by using the above method. (01)

(B) Polymers are used for different purposes.

i. Name an instance of usage of each polymer given below.

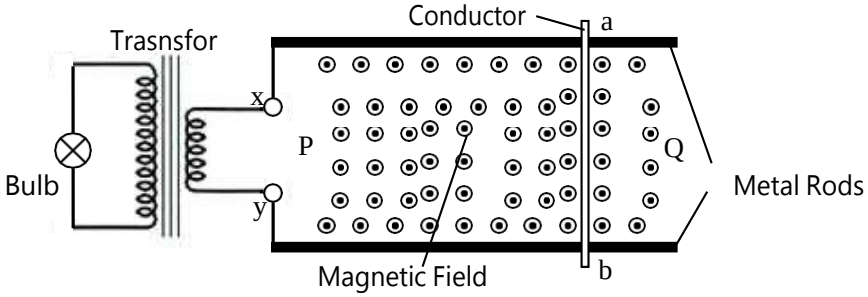
a. PVC (01)

b. Teflon (01)

ii. What is the monomer of polythene which used to make plastic bottles? (01)

iii. Name two natural polymers. (02)

(C) a and b conductors are placed on a magnetic field after placing them on a smooth metal rod as they can move freely on those smooth metal rods. X and Y ends of the metal rods are connected to a transformer.



i. When the a-b conductor moves from Q to P uniform speed,

a. Write an observation that can be seen. (01)

b. Write the current flowing direction across the primary coil of the transformer with the aid of X and Y. (01)

c. What is the law applied to find the direction of the current flow? (01)

ii. The number of turns in the primary coil is 100 while the number of turns in the secondary coil is 1200, 0.25 Vpotential difference takes place between the X and Y points when this activity.

a. Find the potential difference between the two ends of the bulb when the ab conductor starts to move. (03)

b. Name an instrument which uses electromagnetic induction effectively. (01)

iii. Positive and negative potentials are given to X and Y terminals respectively after removing the transformer.

a. Write the direction of the motion of the rod with the aid of P and Q. (02)

b. Write an instance of a usage of this phenomenon. (01)