Western Province Education Department

General Certificate of Education - Ordinary Level Examination – 2022 (2023)

Support Seminar Paper

Grade 11 | **Subject – Science** | **Part I** | **Duration – 1 hour**

Answer all the questions.

01. Which is most abundant gas in earth's atmosphere?

(1) N_2 (2) CO_2 (3) O_2 (4) Ar

02. Which of the following waves requires a medium for propagation?

(1) Rays of light (2) Rays of heat (3) Ultraviolet rays (4) Sound waves

03. Which type of tissue forms the outer or inner lining of the animal body?

(1) Epithelial tissue. (2) Muscle tissue. (3) Connective tissue. (4) Nervous tissue.

04. In which of the following criteria is **not** a fundamental difference between kingdom Plantae and kingdom Animalia?

(1) Cellular organization (2) Nutrition (3) Growth (4) Movement

05. What is a characteristic of compounds with covalent bonds?

(1) Existence in the solid state at room temperature.
(2) Conduction of electricity through aqueous solutions.
(3) Taking lower values of melting and boiling points.
(4) Conduction of electricity only through solid solutions.

06. A student attached a small bendable rubber tube to a water faucet. When the faucet was opened, the rapid flow of water caused the pipe to move in the opposite direction to the flow of water. What term describes this phenomenon?

(1) Newton's third law (2) Newton's second law.(3) Archimedes' principle. (4) Newton's first law.

07. Which of the following is an instance that uses moment of couple of force?

(1) Draw water using a pulley. (2) Turning a vehicle.
(3) Cutting cloth with scissors, (4) Cutting of arecanut seed with nut cracker

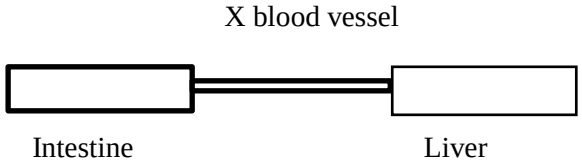
08. Select the pair of substances which give only a homogeneous mixture.

(1) Wheat flour and salt solution. (2) Alcohol and laundry blue powder
(3) Water and turmeric powder (4) Urea and water

09. If pistilate flowers and staminate flowers occur on the same plant, what is the name given for that plants?

(1) Dioecious plants (2) Monoecious plants (3) Staminate plants (4) Pistilate plants

10. Below is a section related to the digestive system.



Following are some of the statements made regarding blood vessel X.
a. The x vessel is the hepatic portal vein.
b. The x vessel has the highest concentration of glucose.
c. x Veins begin as capillaries and end in the vena cava.
Correct one is,
(1) a,b only. (2) b,c only. (3) a,c only. (4) a,b,c only.

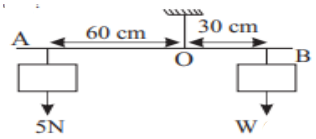
11. Which cell type transports water in the xylem tissue?
(1) Xylem vessel element (2) Tracheids (3) Paranchyma cells (4) Xylem fibers

12. A man took 2 minutes to lift an object of mass 50 kg up 10 m with the help of a pulley. His power is? ($g = 10ms^{-2}$)

(1) $\frac{50 \times 10 \times 10\ Js^{-1}}{2}$ (2) $\frac{50 \times 10 \times 10\ Js^{-1}}{2 \times 60}$

(3) $\frac{50 \times 10 \times\ Js^{-1}}{2}$ (4) $\frac{50 \times 10 \times\ Js^{-1}}{2 \times 60}$

13. A light rod of length1m has a load of 5N hanging from its end A. What is the weight of the object hanging at B when the rod is balanced?
(1) 5N
(2) 20N
(3) 12N
(4) 10N

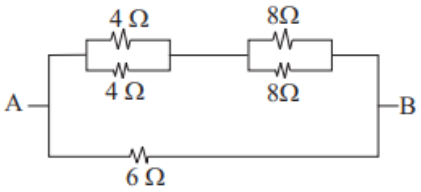


14. Select the correct answer given of the plant having reticulate venation of the leaf.
(1) No secondary growth. (2) A single cotyledon in the seed
(3) Stem is branched (4) Trimerous flowers.

15. Equivalent resistance between A and B is,

(1) 2 Ω (2) 3 Ω

(3) 4 Ω (4) 6 Ω



16. What is the correct symbol of the appliance that use to store electrical charges?

(1)  (2)  (3)  (4) 

17. Out of fungi and algae which can be seen only in fungi?
(1) Being heterotrophic. (2) Cell wall is made of cellulose.
(3) Bearing chlorophyll. (4) Bearing differentiated tissue.

18. Which answer includes ions / molecules which **cannot** be present in an aqueous solution of H_2SO_4?

(1) H_2SO_4 molecules (2) H_2O molecules

(3) H^+ (4) OH^- and SO_4^{2-}

19. Human inherited characteristics are passed down from generation to generation.

(1) By mitochondria. (2) by Golgi bodies.

(3) By genes. (4) by endoplasmic reticulum.

20. What is the common phenomenon for cricket players in cold countries to wear dark (black) colored clothes and blacken the bottom surface of the pots placed on the stove?

(1) Reflection of radiant heat. (2) Absorption of radiant heat.

(3) Conduction of radiant heat. (4) Convection of radiant heat.

21. Below are some statements made regarding 3 muscle tissues.

a) Contribute to maintaining the voluntary movements of the body by connecting with the bones.

b) Contribute to form peristaltic movements of the alimentary canal wall.

c) Contribute to maintaining the rhythmic movements of the heart.

The tissues related to above a,b,c processes are shown respectively,

(1) Smooth muscle, skeletal muscle, cardiac muscle. (2) Cardiac muscle, smooth muscle, skeletal muscle.

(3) Skeletal muscle, smooth muscle, cardiac muscle. (4) Cardiac muscle, skeletal muscle, smooth muscle.

22. The electron configuration of several elements is shown below. Symbols shown are not standard.

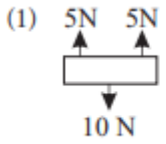
a) 2, 1 b) 2. 2 c) 2, 6 d) 2,7

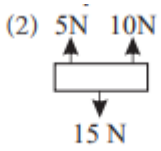
Which of the following shows the charge order of the stable ion that forms these elements?

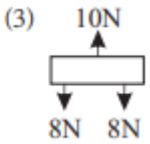
(1) +1.+2.-2, -1 (2) -1, -2, +1, +2

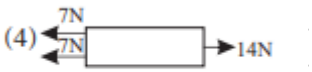
(3) +1, -2, -2, -1 (4) -1, +2, +1, -1

23. Which system is not in equilibrium?

(1) 

(2) 

(3) 

(4) 

28.

24. 1moldm^{-3} NaOH and moldm^{-3} HCl solutions were taken 50g each and mixed. There the temperature of the mixture was raised by 10^0C. How much heat is produced in the reaction?

(Take S.H.C of mixture as 4200 Jkg^{-10}C^{-1})

(1) $\frac{100}{1000}$ kg x 4200 Jkg^{-1} C$^{0-1}$ x 10^0C (2) $\frac{50}{1000}$ kg x 4200 Jkg^{-1} C$^{0-1}$ x 10^0C

(3) 100 g x 4200 Jkg^{-1} C$^{0-1}$ x 10^0C (4) 500 g x 4200 Jkg^{-1} C$^{0-1}$ x 10^0C

25. Breeding was done to a heterozygous plant with round seeds and a homozygous plant with round seeds. Choose the answer that includes possible genotype patterns in F_1 generation

(R - Round Seed) (r -long seeds)

(1) RR and Rr (2) RR and RR (3) RR and rr (4) Rr and Rr

26. The results of an activity related to identifying 3 gases are shown in the table below

Gas	Activity	Observation
X	Inserting a glowing splinter	A pop sound.
Y	Inserting a glowing splinter	Burn out
Z	Inserting a glowing splinter	Light up

Regarding the above observations, what is the correct answer for the 3 gases x y z respectively?

(1) H_2, O_2, Co_2 (2) H_2, N_2, O_2 (3) H_2, O_2, Co_2 (4) H_2, O_2, N_2

27. The ratio between the number of threads in the primary coil and the secondary coil of a transformer is 4:1. An alternating voltage of 240V is supplied between the terminals of the primary coil.
Which of the following statements is correct?

(A) An alternating voltage of 60V is induced across the terminals of a secondary coil.
(B) This is a step down transformer.
(C) This is a step up transformer.
(D) A voltage of 960V is induced between the terminals of the secondary coil.

The correct statement is,
(1) A and B (2) A and C (3) B and C (4) B and D

28. Which of the following is the correct reaction that shows neutralization?

(1) $2HCl\ (aq) + Zn(s) \longrightarrow ZnCl_2\ (aq) + H_2\ (g)$
(2) $HCl\ (aq) + NaOH(aq) \longrightarrow H_2O(l) + NaCl(aq)$
(3) $H_2O\ (l) + Na(s) \longrightarrow NaOH\ (aq) + H_2\ (g)$
(4) $Ca(OH_2)_{(aq)} + CO_{2(g)} \longrightarrow CaCO_3(s) + H_2O(l)$

29. Which pair of substances can be used to produce carbon dioxide gas in the laboratory?
(1) Zn and HCl (2) $CaCO_3$ and HCl (3) Mg and HCl (4) Cu and $CaHCO_3$

30. A current of 1A flows through a 240V light bulb. How much electrical energy is consumed when it is lit on for 3 hours a day?
(1) 25.92 kJ (2) 259.2 kI (3) 1728 kJ (4) 2592 kJ

31. Both solids A and B conduct electricity. Consider the following statements.
As the temperature of A is increased, the ability to conduct electricity increases.
As the temperature of B is increased, the ability to conduct electricity decreases.
Choose the most correct statement regarding substances A and B.
(1) A is a metallic conductor. B is a semiconductor.
(2) A and B are 2 conductors.
(3) A and B are 2 metallic elements.
(4) A is a semiconductor. B is a metallic conductor.

32. Which separation technique is used to separate the components from a chlorophyll solution?
(1) Filtration (2) Distillation (3) Chromatography (4) Evaporation

33. Which statement is **false** related to genetic engineering?
(1) Removal of certain DNA segments from genes.
(2) Insertion of DNA segments in addition to genes.
(3) Production of insulin using E-Coli bacteria.
(4) Production of gelatin by animal bone marrow using HCl acids.

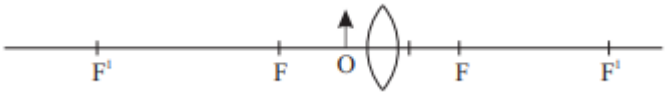
34. A car travels 800m in the first 30 seconds and 1000 m in the next minute. What is the average speed of the car?
(1) 10 ms^{-1} (2) 15 ms^{-1} (3) 20 ms^{-1} (4) 30 ms^{-1}

35. Select the correct option regarding aerobic and anaerobic respiration
(1) All organisms engage in aerobic respiration.
(2) All bacteria engage in aerobic and anaerobic respiration.
(3) In anaerobic respiration, more energy is produced than aerobic respiration.
(4) Aerobic respiration necessarily consumes oxygen gas.

36. Below are some patterns of classification of organisms.
A - Winged and wingless animals B - plants and shrubs, trees
C - Swimming animals, flying animals D - Prokaryotic animals, Eukaryotic animals
Letters that belongs to natural classification,
(1) AB only (2) BC only. (3) ABC only. (4) D only.

37. Which of the following metals contains the metal pair extracted by electrolysis?
(1) Li and Cu (2) Mg and Ca (3) Pb and Ag (4) Na and Fe

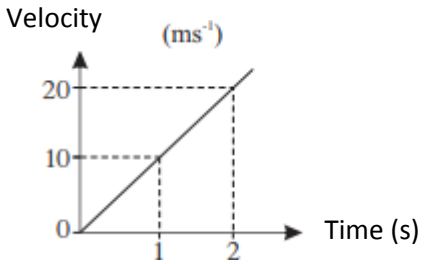
38. Choose the correct statement about the image formed by the object O placed in front of the convex lens



(1) Forms a real, upright image.
(2) Forms a small upright image
(3) Forms a virtual upright image
(4) Forms a virtual upright image.

39. Which process has an immediate effect on the carbon cycle?
(1) Ozone layer depletion.
(2) Use of chemical fertilizers
(3) Collection of electronic waste.
(4) Combustion of hydrocarbons.

40. The velocity-time graph of a vehicle of mass 2500 kg is shown in Figure
What is its momentum of it at 2s?



(1) 250 $kgms^{-1}$
(2) 2500 $kgms^{-1}$
(3) 25000 $kgms^{-1}$
(4) 50000 $kgms^{-1}$

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General Certificate of Education - Ordinary Level Examination – 2022 (2023)

Support Seminar Paper

Grade 11	Subject – Science	Part II	Duration – 3 hours

- **The paper consists of two parts A and B**
- **Answer all the questions in part A in the space provided.**
- **Write answers to <u>only</u> three questions from Part B**

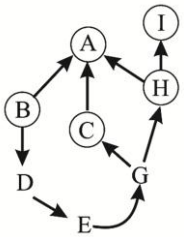
Part A – Structured Essay

(01)(A) Following is a diagram of a food web that can be seen in an ecosystem related to a lake environment.

i. Name a primary producer and a tertiary consumer from the following food web.

a. Primary producer ……

b. Tertiary consumer ……..



ii. Why is an energy pyramid always upright?

……

(B) Few surveys have revealed the prevalence of a non-communicable kidney related disease among farmers.

i. Explain what is a "non-communicable disease"

……

……

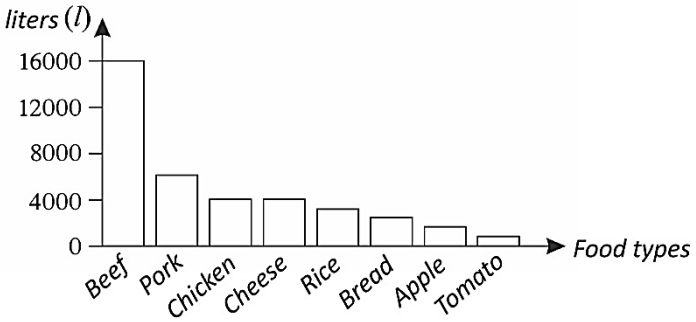
ii. What would be the non-communicable disease that contracted by the farmers.

……

iii. Mention an action that you can take to prevent the above-mentioned disease.

……

(C) Following chart shows the water foot print of some food types consumed by man.



(i) Explain what water foot print is.

……

(ii) Approximately how many liters of water are required to produce 1kg of pork?

……

(iii) Indicate an action to be taken to minimize the water footprint with reference to the above graph.

……

(iv) Write a method how you can contribute to reduce food mile.

……

Write the digit/digits in brackets of the correct answer.

a. A gas mainly contributes to Form acid rain. ( ) (1) CFC

b. A gas causes Ozone layer depletion ( ) (2) CO

c. A gas that avoid binding of O_2 with hemoglobin ( ) (3) SO_2

(D) The biosphere is arranged in an array of several levels of organization.

(i) Write a suitable example for a population of organisms.

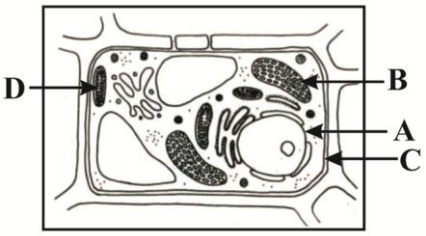
……

(ii) Write 2 factors that affect the increase in density of a population.

……

……

(02)(A) Following is a diagram of a typical plant cell.



(i) Name the parts A and B

A) ……

B) ……

(ii) Name a chemical substance that make up the structure C?

……

(iii) Write 2 differences in a plant cell and an animal cell.

	Plant cell	Animal cell
1)	……	……
2)	……	……

(iv) Name 2 materials used in the biological process in the D organelle.

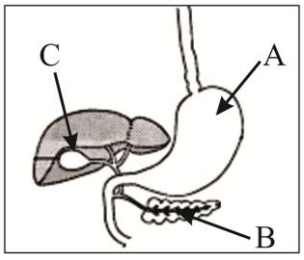
……

……

(B) Following is a diagram that includes several organs belongs to the digestive system.

(i) What is the name of the food that is temporarily stored in the organ A.

……



(ii) Fill in the gaps a, b related to the process of digestion carried out by the enzymes contained in the digestive juices released form the intestinal wall.

Protein $\xrightarrow{\text{a -}\ldots\ldots\ldots\ldots\ldots\ldots}$ b ……

(iii) What is the function of the accumulated juice in organ C?

……

(iv) Write the function performed by the hormones released from organ B in the process of homeostasis.

Hormone	Function
(a) Insulin	……
(b) Glycogen	……

(v) Write the causes of the following non-communicable disease related to the digestive system.

a - Gastritis ……

b - Constipation ……

(03) (A)Some of the elements included in the periodic table are given below.

(Sulfur, Neon, Sodium, Nitrogen, Magnesium, Carbon)

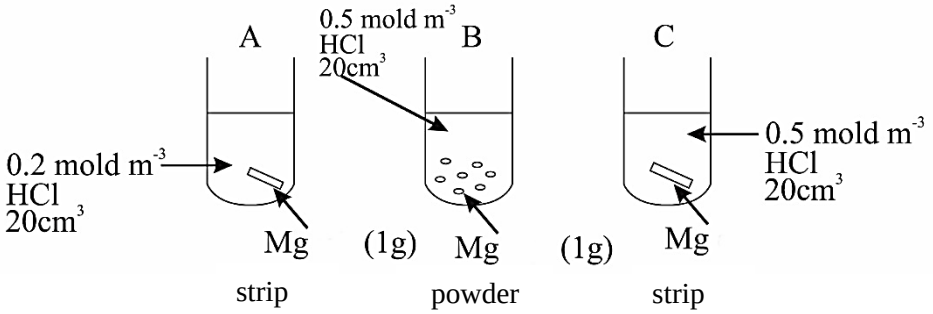
(i) a - A metal which stored in Paraffin oil ( )

b - An element burns with a blue flame ( )

c - A gas that fills bulbs which glows red ( )

d - An element used to cut Gems ( )

(ii) The following is an experimental set up to test the rate of reaction, between Mg and dilute HCl acid.



(a) Write the factor that affected the rate of reaction examined in the following pair of test tubes.

B and C

……

(b) In which test tube does the Mg stripe react rapidly and disappear quickly.

……

(c) Write 2 observations in the above activity.

……

……

(d) What advance strategy should be used to keep the temperature of the above 3 test tubes constant?

……

(e) Balance the following equation related to the reaction of Mg metal and HCL acid.

$Mg_{(g)} + HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$

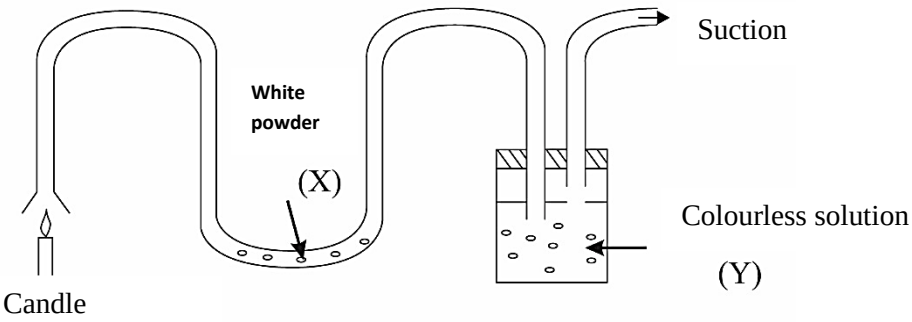
(f) Is the above reaction exothermic or endothermic?

……

(g) Write an instance where H_2 gas is used.

……

(B)



Above is a diagram of an experimental set up to examine the products of fuel combustion.

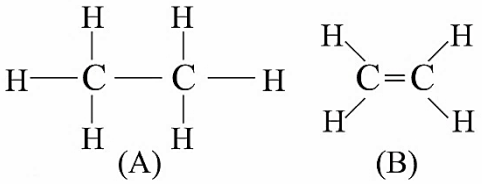
i. Fill the following table based on the observations mode in the above activity.

Materials used	Observation	Conclusion
X ……	……	……
.	……	……
Y ……..		

ii. Why is candle wax considered as hydrocarbon?

……

(C) Given below are 2 structural formulas of 2 hydrocarbons.



(A) (B)

(i) a).What is the chemical name of A ?

……

b). From the above two hydrocarbons A and B, which one is more reactive?

……

(ii) Which polymer is formed by polymerization of compound B?

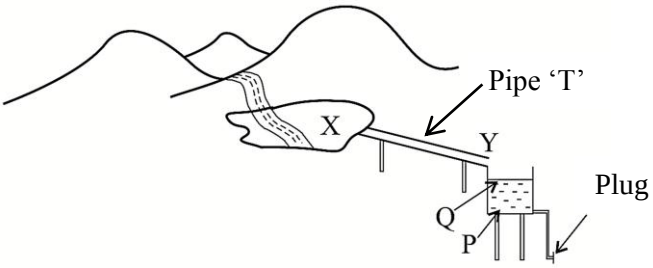
……

(04)(A) The diagram below shows the strategy of how to fill and drain a water tank used to get water to a house near a mountain slope.

(i) Write the mechanical Energy types possessed by the water at point X and Y in the pipe carrying water from the small reservoir.

X - ……

Y - ……



(ii) Out of points P and Q, at which points of the water in the tank exert the greatest pressure.

……

(iii) What is the liquid pressure exerted on the bottom of the tank when the water is filled to a height of 1.5m?

(density of water is 1000 kg m^{-3}, g = 10 m s^{-2})

……

……

(iv) As soon as the plug is removed, the water flows away rapidly.

Construct an expression for the velocity of water which leaves from the pipe T.

(Assume no loss of energy in flowing water from top to bottom of pipe T)

……

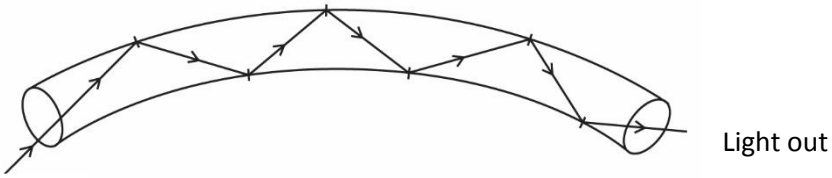
(B)(i) Refraction and reflection of light are usefully used in various functions.

Write the relevant device used in the following situations.

Situation	**Optic device**
a) Reflecting light and create an image that is larger than the object.	……
b) To observe inside the bus from the driver's seat.	……
c) Refracting light to form a large real image	……

(ii) Optical fiber is a type of flexible transparent fiber made of insulating material.

The following figure shows how light travels through an optical fiber.



a) What is the phenomenon related to the movement of light through optical fiber?

……

b) Name the medical device which contains fiber optics?

……

c) Write the advantage of using optical fiber technology in, in communication.

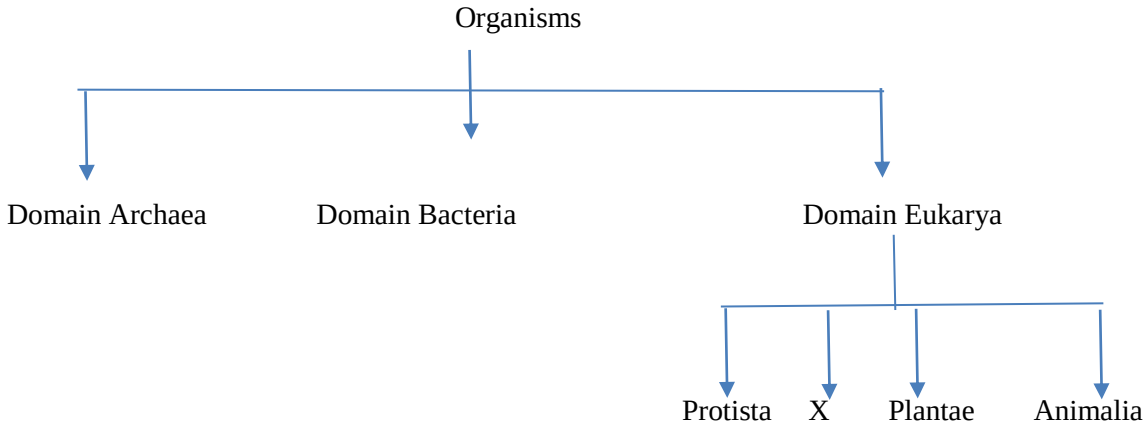
……

d) Complete the following ray diagrams.

Part B – Essay

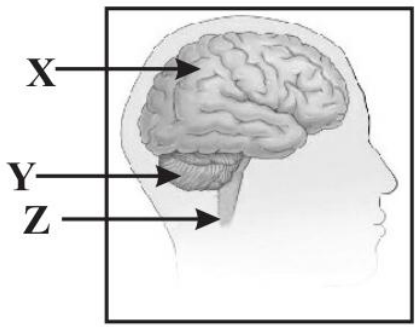
- **Write answers to <u>only</u> three questions from Part B**

(05) (A) A tree diagram used to classify organisms is given below.



(i) Write one feature that domain acteria differ from the other two domains.
(ii) What is the Domain shown as X?
(iii) Write an example for a photosynthetic organism belongs to the kingdom Protista.
(iv) Write a feature common only to the Kingdom Plantae.
(v) Which Phylum of kingdom animalia shows radial symmetry?
(vi) What are the two warm-blooded animal groups?
(vii) What is the invertebrate animal group with internally and externally segmented body? Give an example for an organism.
(viii) What is the vertebrate animal group which need water to complete their life cycle?
(ix) Mention an advantage of scientific nomenclature of organisms.

(B) A diagram of a human brain is shown below.



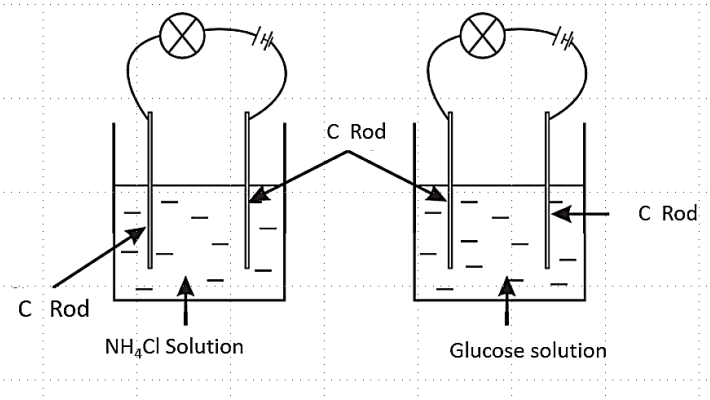
(i) Name parts X and Y.
(ii) Name two functions of Y.
(iii) Name two structures present for the protection of X.
(iv) What is the function of the part hypothalamus of the brain?

(v) Moving the hand away when it contacts with a hot surface is a reflex action.

(a) Write the receptor and the effector responsible for the above reflex action separately.
(b) Write the reflex arc for the above reflex action.

(06) (A) Some chemicals present in the laboratory are given below.
NaOH , KOH , $Ca(OH)_2$, NH_4Cl , HCl , CH_3COOH , $C_6H_{12}O_6$, Distilled water (H_2O).

(i) Select and write the chemical with the lowest pH value from the above chemicals.
(ii) What is the pH value of the solution prepared by dissolving glucose in distilled water?
(iii) Write a strong acid and a strong base from the above chemicals.
(iv) Name two chemicals that become pink with phenolphthalein.
(v) Two setups made to test the ability of flowing electricity through some liquids are shown below in diagrams A and B.



A **B**

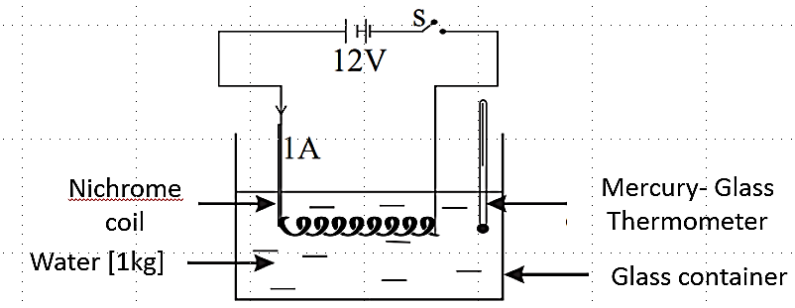
(a) Write the observations of the A and B setups separately.
(b) What is the conclusion can arrive from the above observations?

(vi) Draw the Lewis structure of H_2O molecule.
(vii) Write two special properties possessed by water due to intermolecular forces among the water molecule.

(B) Students are assigned to prepare 500 ml of 0.5 mol dm^{-3} NaOH solution.
(Na = 23, O = 16 , H = 1)

(i) Calculate the molar mass of NaOH.
(ii) How many grams of NaOH is required to prepare the above solution?
(iii) Write two accurate measurements that should be taken when preparing the above solution. .
(iv) Mention the reason for considering a NaOH solution as a homogeneous mixture.
(v) What is the mole fraction of NaOH in the mixture made by dissolving 40 g of NaOH in 90 g of water?

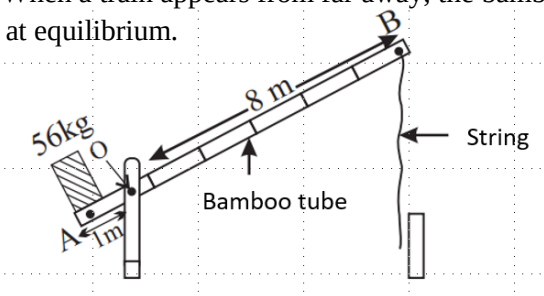
(07) (A) A diagram of a setup made to demonstrate the function of an immersion heater is given below. (Consider the initial temperature of water is 30 ^{0} C.)



(i) Write the energy transformation takes place when electric current flows through the coil.
(ii) What is the resistance of the coil if the current flow across the coil is 1 A?
(iii) What is the method of transmission of heat produced from the coil through water?
(iv) What is the principle used in the thermometer?
(v) What change must be done in this setup to speedup boiling of water?

(vi) What is the amount of heat energy generated when electric current flows 14 minutes through the coil?
(vii) Calculate the temperature of the water after 14 minutes.
(viii) Write two assumptions made in the above calculation.
(ix) Write 30 ^{0}C in Kelvin scale.

(B) A rough diagram of a bamboo gate fixed in a railway crossing is shown below. A permanent weight of 50 kg is placed at point A of the gate. When a train appears from far away, the bamboo tube is tied by pulling it from the string so that it will be at equilibrium.

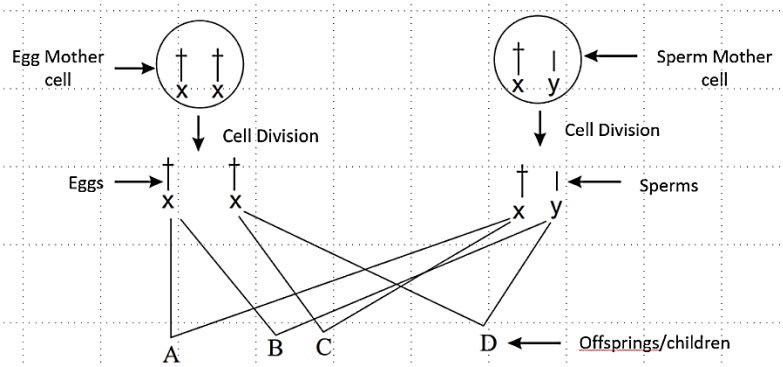


(i) What is the weight applied on A?
(ii) Calculate the anticlockwise moment of force act from point O in this position.
(iii) What is the force applied to tie the B end by pulling down the string till it becomes equilibrium?
(iv) Draw a rough diagram to show the action of forces when the bamboo tube is in equilibrium.

(08) (A) Flow diagram given below shows few functions take place in a plant body.

(i) Name one external factor and one internal factor required for photosynthesis separately.
(ii) What is the type of storage polysaccharide in plants?
(iii) Write the chemical used in laboratory to identify the above storage food and the colour resulted by the test separately.
(iv) Write two instances of usage of food produced in a plant leaf for the biological activities.
(v) What is the tissue that translocates the nutrients produced in plant leaves to the other parts of a plant?
(vi) Name a type of living cell present in the above tissue.

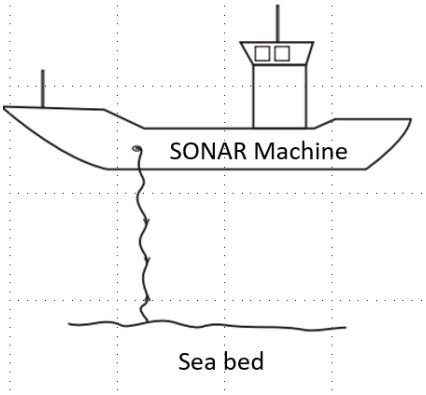
(B) The 23rd pair of chromosomes of human beings are known as sex chromosomes. Those pairs of chromosomes are indicated as (XX) in females and (Xy) in males. By the division of sperm mother cells and egg mother cells, haploid gametes are produced.



(i) What is the type of cell division takes place during the formation of gametes?
(ii) Write the two sons from A , B , C , D
(iii) From father or mother the factor that needs to determine a boy is received?

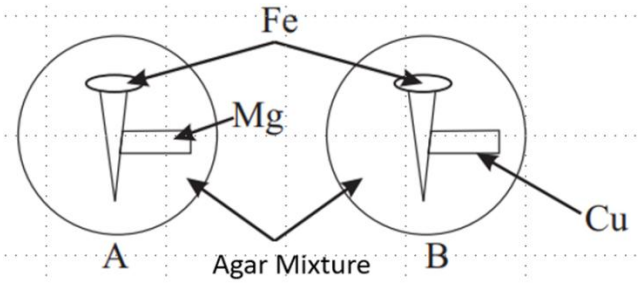
(iv) What is the probability of getting a boy?
(v) Name a genetic disorder occurs due to sex linked recessive genes.

(C) Reflection of ultrasound waves is used for various important tasks by human beings. The depth of the sea can be found by measuring the time taken by the ultra sound waves emit by the SONAR instrument fixed to the bottom of the ship to return after being reflected from the bottom of the sea.



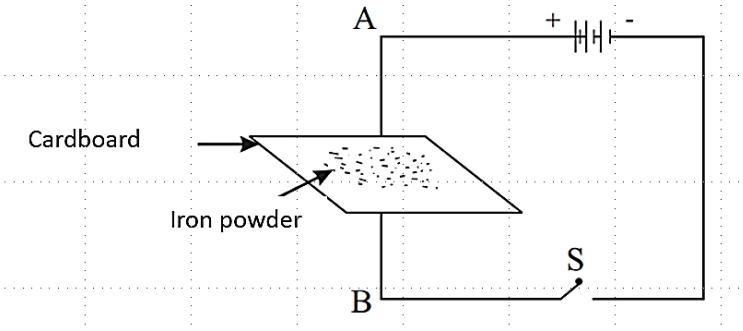
(i) What are "Ultrasound waves"?
(ii) The time taken by a wave emitted by the SONAR instrument to return after reflection from the sea bottom is 3 seconds. If the speed of sound in the sea water is 1500ms $^{-1}$, find the depth to the sea bed.
(iii) Name two features of Ultra sound waves that differ from Electromagnetic waves.
(iv) Which Electromagnetic wave has the highest frequency among electromagnetic waves?
(vi) Which colour of visible light has the highest wave length?

(09) (A) Two setups made to test the effect of other metals on corrosion of iron are given below.



(i) Name two chemicals used to make the agar mixture.
(ii) Write the colours separately near the Fe nails in A and B setups
(iii) Mention a precaution should be taken at the beginning of the experiment to get the above expected results.
(iv) Write two factors that effect on corrosion of iron.
(v) Mention two instances where cathodic protection is used to protect iron from rusting.
(vi) Write the half reaction related to the oxidation reaction takes places near the iron nail B.
(vii) Mention two raw materials fed into the furnace from the top during the extraction of iron.

(B) A simple setup made to identify the magnetic effect of electric current is shown below.



(i) Name the direction of the current flow in terms of the letters A and B when the switch S is closed.

(ii) What is the law applied to find the direction of the magnetic field formed around AB conductor when the switch S is closed.

(iii) Draw the magnetic field and their direction around the AB conductor according to the above law.

(iv) Name one factor that effect on the power of a electromagnet

(C) A motor vehicle travelled in 20 ms^{-1} velocity was stopped by applying brakes within 4 seconds after seeing a pedestrian crossing the road.

(i) Calculate the deceleration of the motor vehicle within this time period.

(ii) What is the displacement of the vehicle after applying brakes?

(iii) Give reasons to travel the motor vehicle in deceleration.

(iv) What can you say about the time taken to stop the vehicle if there was a rainy weather?