

Answer all the questions

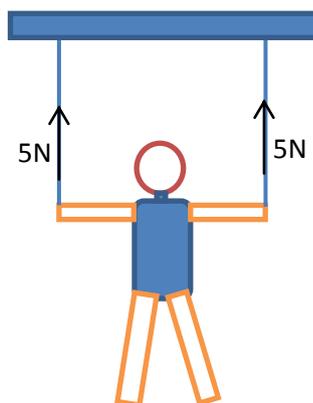
Select the correct or most suitable answer for the questions 1=40 out of the given answers of (1), (2), (3) or (4)

Put an **X** inside the circle corresponding to the answer you select in the answer sheet provided to you.

- Which of the following is a main bio molecule of living matter?  
(1) water.                      (2) vitamin.                      (3) lipids.                      (4) minerals.
- .....is a disease related to the respiratory system.  
(1) Malaria.                      (2) Dengue.                      (3) Tuberculosis.                      (4) Diabetes.
- The standard unit of measuring moment of force is  
(1) N.                      (2) J.                      (3)  $\text{m s}^{-1}$ .                      (4) N m.
- Indicator that can be used to distinguish concentrated acids from dilute acids easily is  
(1) litmus paper.                      (2) pH paper.                      (3) phenolphthalein.                      (4) methyl orange
- What is the Standard International unit of measuring concentration?  
(1)  $\text{mol cm}^{-3}$                       (2)  $\text{mol l}^{-1}$                       (3)  $\text{mol m}^{-3}$                       (4)  $\text{kg dm}^{-3}$
- What is the speed of electromagnetic waves in a vacuum?  
(1)  $2 \times 10^8 \text{ ms}^{-1}$                       (2)  $3 \times 10^8 \text{ ms}^{-1}$                       (3)  $4 \times 10^8 \text{ ms}^{-1}$                       (4)  $5 \times 10^8 \text{ ms}^{-1}$

7. The picture shows a doll hanging vertically. The weight of the doll is

- (1) 5 N.                      (2) 10 N.  
(3) 25 N.                      (4) 50 N.



8. The most suitable way to relieve uncomfortable sensations caused by the acidity of stomach is
- (1) drinking water.                      (2) drinking milk of magnesia.  
(3) drinking lime juice.                      (4) drinking asamodagam.

9. A place where ciliated epithelium tissue can be found is the wall of  
 (1) blood vessels.      (2) urinary bladder.      (3) larynx .      (4) uterus.
10. Speed of sound differs from medium to medium. If media are arranged in the descending order of the speed of sound through them, the sequence will be  
 (1) solid, liquid, gas      (2) gas, liquid, solid      (3) solid, gas, liquid      (4) liquid, gas , solid
11. The density of a liquid is  $1200 \text{ kg m}^{-3}$ . The pressure exerted by the liquid on a point at a 15m depth is ( $g= 10 \text{ ms}^{-2}$ )  
 (1) 1800 Pa.      (2) 18000 Pa.      (3) 180000 Pa.      (4) 1800000 Pa.
12. The fruits and seeds of a certain plant possess the following features.  
 a. fibrous and porous pericarps to facilitate floating  
 b. air filled shells.

These fruits and seeds are dispersed by

- (1) air.      (2) water.      (3) animals.      (4) explosion.
13. Select the correct order of connecting the components of a household electric circuit.  
 (1) service meter, service fuse, main switch, trip switch  
 (2) service fuse, service meter, trip switch, main switch  
 (3) service fuse, service meter, main switch, trip switch  
 (4) service meter, main switch, trip switch, service fuse

14. The apparatus shows a model of the human respiratory mechanism. The membrane A denotes,

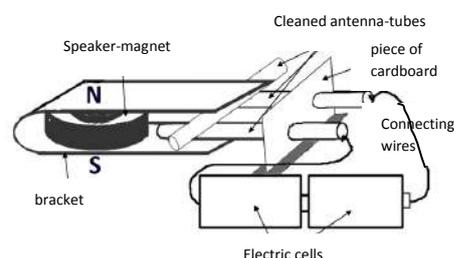
- (1) inter –costal muscles.      (2) diaphragm.  
 (3) pleura of the lung.      (4) muscles of the stomach.



15. The atomic number of a certain element is 16. The respective number of electrons that each energy level K, L, M, and N contains;  
 (1) 2, 6, 4, 2.      (2) 2, 8, 2, 4.      (3) 2, 8, 6, 0.      (4) 8, 2, 6, 0.

16. The apparatus shown in the diagram demonstrates,

- (1) electromagnetic induction.  
 (2) direction of induced electromotive force  
 (3) force acting on a conductor placed in a magnetic field  
 (4) the action of an alternating current dynamo



17. A method used to separate the components from a solution of chlorophyll is  
(1) Filtering. (2) crystallization. (3) distillation. (4) chromatography.
18. A practice that should be followed when using a glass-mercury thermometer is,  
(1) placing the thermometer in a way that it touches the bottom of a hot water vessel.  
(2) keeping the eye level in par with the meniscus of the expanded mercury column.  
(3) holding the thermometer by the mercury bulb.  
(4) when measuring the temperature of hot water, taking the reading of the thermometer after removing it from the vessel.
19. Both A and B solid materials conduct electricity.
- When the temperature of A is increased, its ability of conducting electricity is increased.
  - When the temperature of B is increased, its ability of conducting electricity is decreased.

According to the above statements which of the following is most correct about A and B?

- (1) A is a conductor while B is a semi- conductor.  
(2) Both A and B are conductors.  
(3) Both A and B are semi- conductors.  
(4) A is a semi- conductor while B is a conductor.
20. The following are four main steps followed in tissue culture.
- A. Placing the part of the tissue in the culture medium
  - B. Adapting the buds to the natural environment
  - C. Separating the buds and enabling them to grow in test tubes
  - D. Letting the callus to grow with new roots and buds
- The correct order of the above steps is
- (1) A, B, C, D. (2) A, B, D, C. (3) A, D, B, C. (4) A, D, C, B.
21. What is the true statement made regarding the electric current produced by a dry cell and that in a domestic circuit?
- (1) A direct current is produced by both the dry cell and the domestic supply.
  - (2) An alternating current is produced by both the dry cell and the domestic supply.
  - (3) The dry cell produces a direct current and the domestic supply produces an alternating current.
  - (4) A domestic supply produces a direct current and a dry cell produces an alternating current.
22. A mole is
- (1) the amount of substance that contains as many particles as there are atoms in 12 grams of  $^{12}\text{C}$  isotope.
  - (2) the amount of substance that contains as many particles as there are atoms in 12 grams of any element.
  - (3) the amount of substance that contains as many particles as there are atoms in 2 grams of  $\text{H}_2$ .
  - (4) the amount of substance that contains as many molecules as there are carbon molecules in  $^{12}\text{C}$  isotope.

23. It is easier to burn split firewood than a log. The factor affecting the difference in the rate of reaction here is

- (1) temperature.      (2) surface area.      (3) pressure.      (4) light.

24. The following are three processes occurring in human body.

- A. Transporting of end products of fat digestion to the circulatory system.
- B. Transporting of urea produced in the liver to the kidneys.
- C. Adding fluids accumulated around tissues into the blood circulatory system.

Of the above, processes related to the lymphatic system are

- (1) A and B.      (2) B and C.      (3) B and C.      (4) A, B and C.

25. A coordinating process effected by the autonomic nervous system is

- (1) the movements in the digestive system.
- (2) taking the hand away when a hot matter is touched.
- (3) lifting a weight by hand.
- (4) moving the body according to a musical rhythm.

26. It is stated 230 V, 5A in the nameplate of an electric motor. The power of the motor under these conditions is

- (1) 46 W.      (2) 115 W.      (3) 1150 W.      (4) 1500 W.

27. An unbalanced force P is applied on an object of mass X. Select the correct statement in relation to this situation.



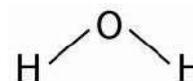
- (1) Acceleration is reduced when X is increased keeping P constant.
- (2) Acceleration is reduced when P is increased keeping X constant.
- (3) Acceleration is increased when X is increased keeping P constant.
- (4) It moves with a uniform velocity when both P and X are constant.

28. Select the statement which is not related to gene technology

- 1. Removal of certain DNA parts from genes
- 2. Inclusion of additional DNA parts into genes
- 3. Crossing a high yielding variety of Rambutan
- 4. Production of insulin using E-coli bacteria

29. Given below are the structure of a water molecule and three statements related to it.

- A. The water molecule is of angular shape
- B. The water molecule polarizes as  $H^+$  and  $O^-$
- C. Water is a compound consisting of polar covalent bonds.



Of these, the true statements are

- (1) Only A and C.      (2) only B and C.      (3) only A and B.      (4) all A, B and C.

30. When preparing the mortar, water is added to slaked lime. Which statement about the reaction taking place here is correct?

- (1) It is an exothermic reaction.
- (2) It is an endothermic reaction.
- (3) There is no heat change taking place in the reaction.
- (4) The data provided are not adequate to say anything.

31. An electromagnetic wave is resulted

- (1) by electric and magnetic fields oscillating perpendicularly to each other.
- (2) by electric and magnetic fields oscillating parallel to each other.
- (3) by electric and magnetic fields oscillating opposite to each other.
- (4) due to permanent electric and magnetic fields.

32. Which of the following is **not** a characteristic of a homogeneous mixture?

- (1) Density being identical everywhere.
- (2) Colour being identical everywhere.
- (3) Distribution of particles being identical everywhere.
- (4) Being always transparent.

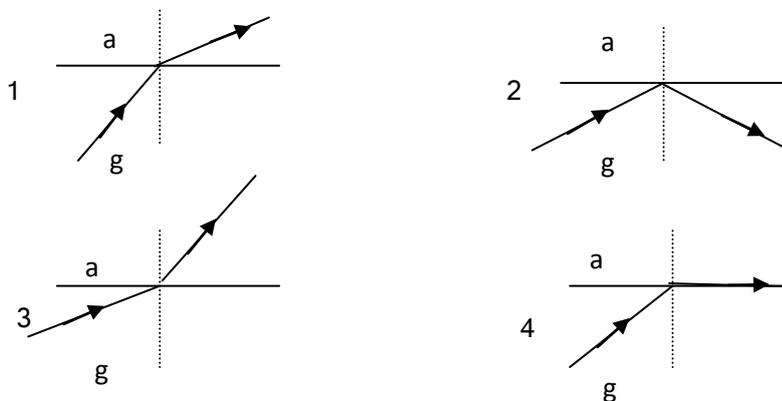
33. If an object is in equilibrium under two forces acting upon it, those two forces are

- (1) collinear; differ in magnitude; opposite in direction.
- (2) not collinear; differ in magnitude; opposite in direction.
- (3) collinear; differ in magnitude; similar in direction.
- (4) collinear; similar in magnitude; opposite in direction.

34. Which of the following is **not** a use of the classification of organisms?

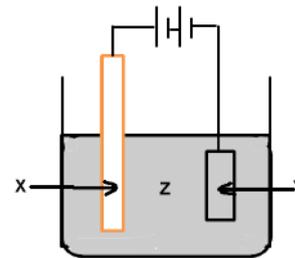
- (1) It facilitates the study of organisms.
- (2) It reveals the relationships between different groups of organisms.
- (3) It enables to understand the living environment of the organisms.
- (4) It enables to identify the organisms with an economic value to human.

35. The following diagrams show how a ray of light strikes an interface between glass and air. Which of the following ray diagram is not possible?



36. The picture shows the set up for plating copper on an iron plate. The parts denoted by X, Y and Z of it are

- (1) X- iron, Y- copper, Z-  $\text{CuSO}_4$  solution.
- (2) X- copper, Y- iron, Z-  $\text{CuSO}_4$  solution.
- (3) X-iron, Y- copper, Z- NaCl solution.
- (4) X- iron, Y- copper, Z- AgCl solution.



37. Two parts of a vehicle made of iron are connected by two copper screw nails. What is the observation that **cannot** be made at those points of contact after some time?

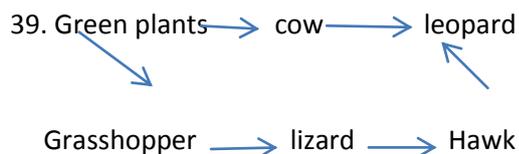
- (1) Speeding up of rusting in iron parts.
- (2) Tarnishing of the copper nail.
- (3) Loosening of the joint due to detachment of nail.
- (4) Depletion of the copper nail.

38. The following are three statements on division and growth of cells.

- A. The dry weight of the cell increases with cell growth.
- B. There is no maximum limit to cell growth.
- C. For the completion of eukaryotic cell division, nuclear division should take place first.

Of the above, the true statements are

- (1) A and B.    (2) A and C.    (3) B and C.    (4) A, B and C.



The animal that belongs to the trophic level with the lowest energy is

- (1) grasshopper.                      (2) leopard.                      (3) cow.                      (4) hawk.

40. Select the set which contains only non -communicable diseases.

- (1) chronic renal failure, diabetes, hepatitis, coronary diseases.
- (2) chronic renal failure, diabetes, cataract , coronary diseases.
- (3) tuberculosis , diabetes, cataract, coronary diseases.
- (4) AIDS , diabetes, cataract, coronary diseases.

N.B.

- Write answers in clear handwriting.
- For the 4 questions in Part A, write answers in the spaces provided.
- From Part B, answer any three questions of your choice.
- After answering, attach the answer scripts of Part A and B together and handover.

**Part A – Structured Essay**



01. A). In a village adjoining a jungle, close to a stream, there is a factory which operates using firewood as fuel. The waste water from the factory is released into the stream. At a certain instant death of fishes was noticed at the lower part of the stream.

Students in a school in the area intervened to investigate into this. Some equipment and materials they used for the experiment they conducted were as follows.

- two fish tanks
- samples of water taken from two places of the stream
- two aerating pumps

i. Write a possible cause for the death of the fishes.

.....

ii. It has been planned to experiment by taking the two water samples into the two tanks and putting healthy fishes into them. From which places of the stream would the two water samples have been obtained?

.....

iii. If the reason for the death of the fishes is a waste product released from the factory, what is the observation of your experiment?

.....

iv. Write two facts that should be taken into consideration when selecting fishes for the experiment.

.....  
.....

v. Write an assumption that could have been made in this experiment?

.....

B)

i. Write a food chain with three links connected with this jungle.

.....

ii. Indicate by an energy pyramid the flow of energy for the existence of the living organisms living in this jungle.

.....

iii. In which level of living organisms are affected by accumulation of heavy metals?

.....

C) The administrative authority of the factory suggests that coal be used as an alternative fuel for the factory.

i. What is carbon foot print?

.....

ii. What change in the carbon foot print would occur if coal is used instead of firewood?

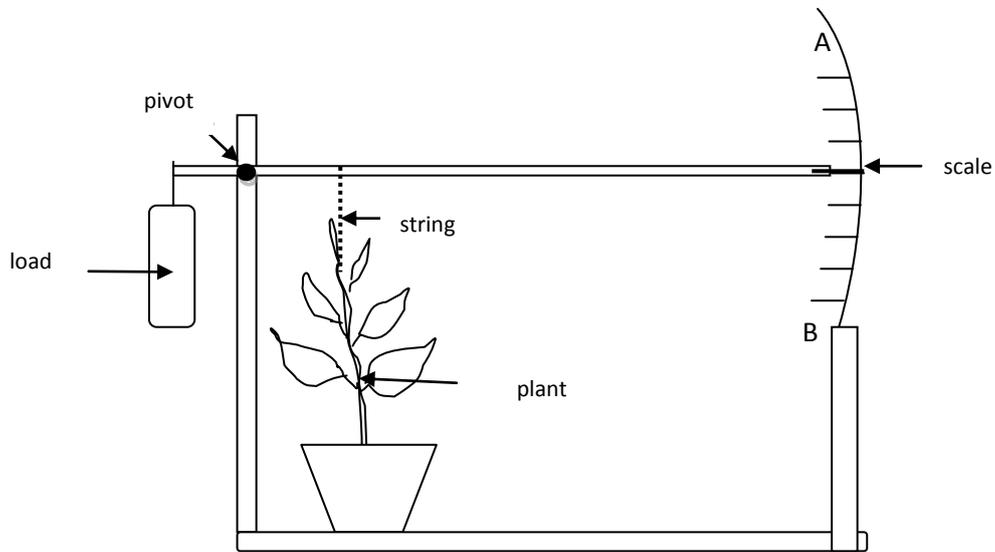
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iii. If this factory receives water from an urban water supply scheme instead of a natural source of water, write two reasons for the increase in water foot print.

.....

.....

02. A) Given below is a set up related to an experiment conducted by a student to identify a characteristic of living organisms.



- i. What living characteristic is identified by the above set up?  
.....
- ii. Write two observations that helped to identify the characteristic you stated above?  
.....

B). The reaction relevant to the process of food production taking place in a plant leaf as follows.



- I. What is the compound represented by **B** and is necessary for all types of living organisms?  
.....
- II. Balance and rewrite the above equation inserting the compounds that correspond to **A** and **B**.  
.....

C). **X, Y** and **Z** indicate three main bio-molecules.  
**X** - contains nitrogen. contributes to the growth of the body.  
**Y** - digested by the enzyme lipase.  
**Z** - contains nitrogen. transmits genetic characteristics of living beings.

- I. Complete the following table in relation to **X, Y** and **Z**.

Symbol	X	Y	Z
Bio-molecule			

II. The substances indicated as **X** and **Y** also acts as nutrients in the human body. What are the end products formed by their digestion?

From **X**: .....

From **Y** : .....

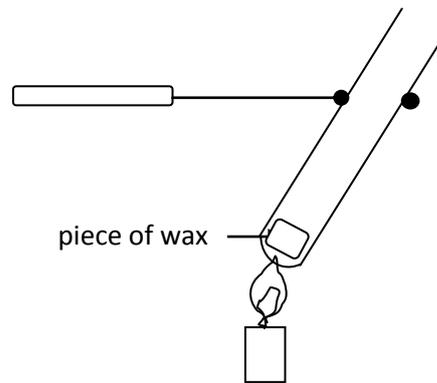
III. As what structures do the bio-molecules named **Z** exist in the nucleus of a living cell?

.....

03. A) Given below is a demonstration of an experiment conducted in a laboratory to identify chemical and physical changes.



Lighted candle



I. What type of a change in matter is illustrated by figures **A** and **B**?

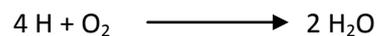
**A** : .....

**B** : .....

- ii. a) What is the gas that is liberated during the combustion of wax and turn lime water milky?  
b) Write two uses gained by man from that gas?

.....  
.....

c) Of the component elements in wax, the reaction of hydrogen atoms with oxygen is as follows.



To which type of chemical reaction does this reaction belong?

iii. Write two factors which affect the rate of a reaction.

.....  
.....  
.....



B) Force contributes to most of the movements.

- I. Write the two major factors (quantities) affecting the acceleration of a moving object. Write separately the relationships they have with acceleration.

Quantity	Relationship with acceleration

II. Write Newton's third law of motion.

.....  
 .....

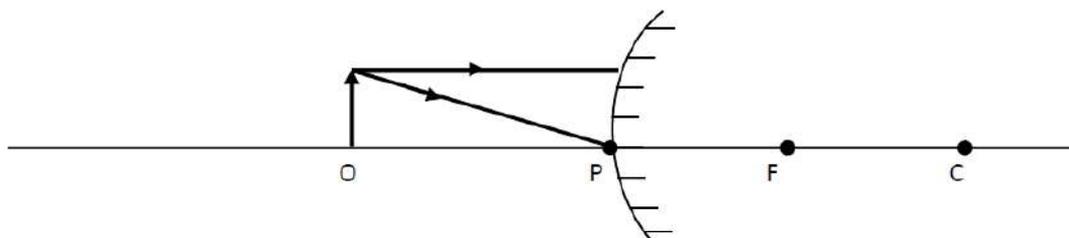
III. A varying horizontal force is applied on an object placed on a rough horizontal surface. What is the relationship between the force applied and the static frictional force before it starts sliding?

.....  
 .....  
 .....

IV. Write an example for an instance where frictional force is made use of.

.....

C) The following diagram shows an object placed in front of a motor cycle mirror used to view the rear.



- i. Complete the ray diagram to show how the image of the objects (O) placed in front of the above mirror is formed.

- ii. State the type of lens that forms images with characteristics similar to the image in i above?

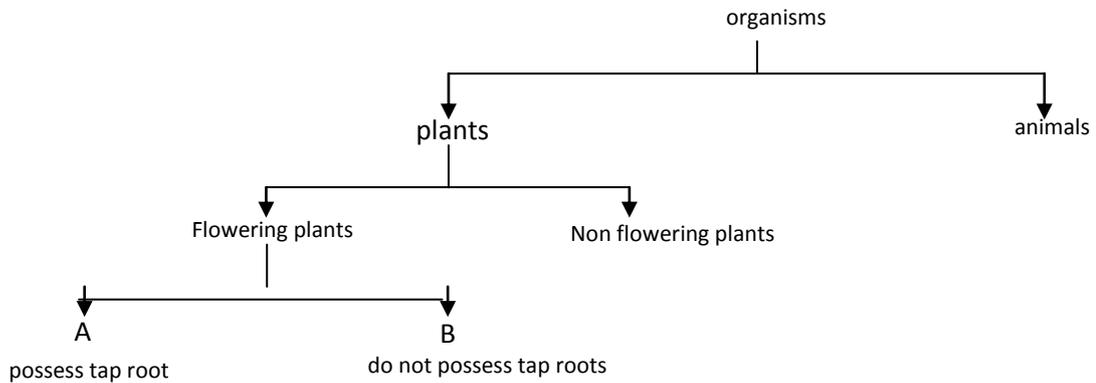
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- iii. Write an optical instrument that can be used to obtain a magnified, virtual image of an object.

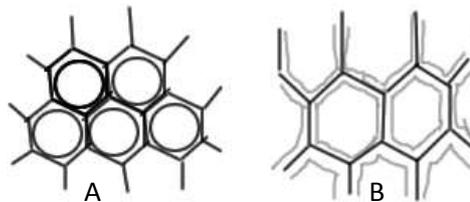
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**PART B**

05. A) The following scheme was constructed using the information collected during a study conducted to inquire into the classification of living organisms.



- To which group of plants do **A** and **B** belong?
  - What differences can be seen in the flowers belonging to the two groups?
  - Write an advantage of the natural classification.
  - Write two facts presented by the cell theory put forward by Schlden, Schwan and Radolf.
- B) Several cells assemble to form a tissue. Given below are diagrams of two types of tissues which can be seen in plants.

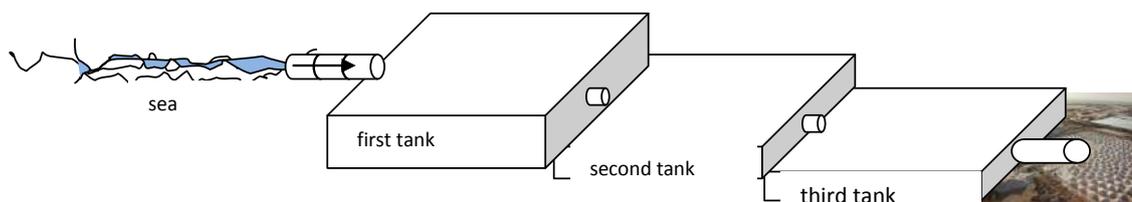


- Name the tissues **A** and **B**.
  - Write a characteristic that helped identify those tissues as above.
  - Write a difference and a similarity between smooth muscles and cardiac muscles.
- C) Blood is the fluid connective tissue present in the human body.
- Write a function carried out by red blood corpuscles and white blood corpuscles in blood.
  - Haemophilia is one disease connected with the tissue of blood. Marriages between blood relatives has led to an increase in this condition. Explain.
  - What are the two hormones that regulate the glucose concentration in blood?

- v. What is the endocrine (ductless) gland that secretes the hormones relevant to the regulation in (iii) above?

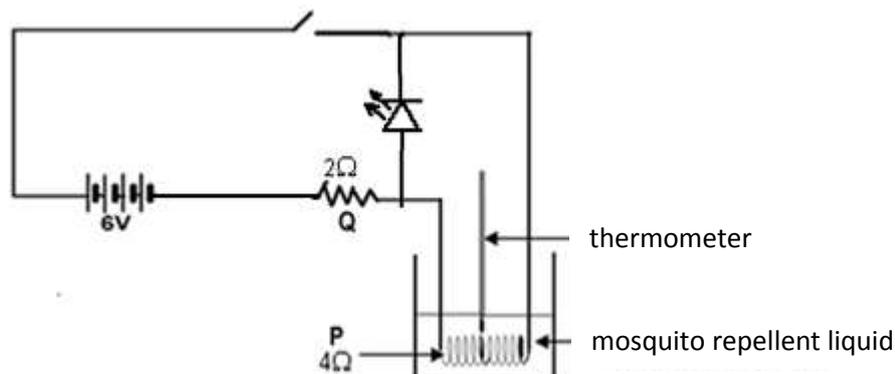
06.

A) The main function of a saltern is the production of salt. A simplified diagram of a saltern is illustrated below.



- What is the process that causes the increase in concentration of brine here?
  - According to the above figure, in which tank does salt crystallize?
  - Of the compounds, dissolved in sea water, which crystallize out first? Give reasons for it.
- B) The parts made of iron in ships and boats transporting goods in sea rust more than those in ships and boats sailing in fresh water.
- Explain reasons for it.
  - Define corrosion.
  - When an electrochemical cell is constructed using copper and iron, write the ionic equation for the reaction taking place at its anode.
- C) Element X contains 20 protons.
- How many electrons does a neutral atom of X have?
  - Write the electronic configuration of X.
  - Write the number of the group and the number of the period in the Periodic Table to which X belongs, in order.
- Another element Y is accommodated in group vii of the Periodic Table. Write the formula of the compound formed by the reaction between X and Y.
- D) One method of expressing the composition of a solution is indicating it as concentration.
- If the amount of moles of a solute is  $n$  and the volume of the solution is  $V$ , write an expression for the concentration of that solution.
  - If 20g of NaOH were dissolved in water and diluted to  $500\text{ cm}^3$ , what is the concentration of the resulting solution? ( $\text{Na} = 23$ ,  $\text{O} = 16$ ,  $\text{H} = 1$ )

07. The schematic diagram given below represents a mosquito repellent vaporizer.



A.

Though the apparatus worked LED didn't light.

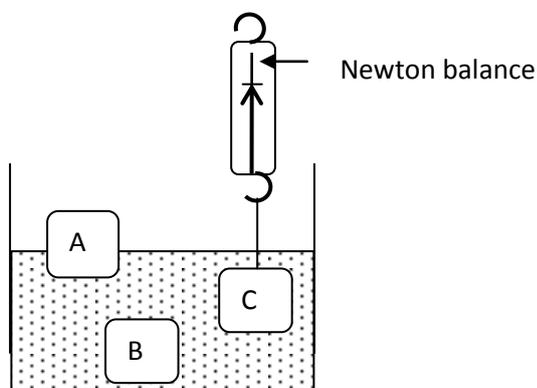
- i. What is the purpose of using LED in such an apparatus?
- ii. Write a change that should be made in the circuit to light the LED.
- iii. When forward biased, if the LED's resistance is  $36\Omega$ , find the equivalent resistance of P, Q and LED
- iv. When the switch is turned on to connect the 6V supply across the circuit with the combined resistance calculated in iii above, what is the total current drawn?

B.

- i. Name a thermometric liquid which can be used in a glass-liquid thermometer.
- ii. What is the reason for the rise of the thermometric liquid when the temperature increases?
- iii. The thermometer reading does not change from the moment the liquid starts to evaporate. Explain the reason for this.

C.

True weights of 3 cubes A, B and C which are immersed in a liquid are 40N, 50N and 70 N respectively. The cubes A, B and C are equal in volume.



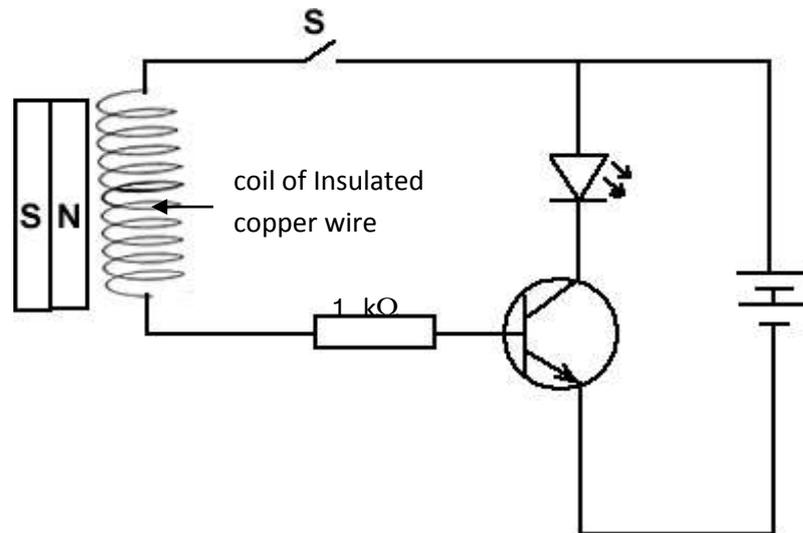
- i. Which cube/cubes displace(s) a volume of liquid equal to the volume of the cube?
- ii. Which cube/cubes displace(s) a volume of liquid that has an equal weight to that of the cube?
- iii. What is the reading of the Newton Balance?
- iv. What is the upthrust acting upon the cube C?
- v. Pressure at a point on the bottom of cube B is greater than that of a point on the bottom of cube C. What is the reason for this?

08. A. Human is a unisexual organism. Human reproductive process is entirely controlled by hormones.

- i. Explain the term unisexual organism.
- ii. Write a hormone each which causes secondary sexual characteristics both in males and females.
- iii. Follicle Stimulating Hormone (FSH) influences series of changes that takes place during the menstrual cycle. What change takes place in the ovary due to increase in the concentration of this hormone?

B. Red-Green colour blindness is a human inherited disorder. This is caused by a sex linked recessive gene. A woman who suffers from this disease is married to a normal male. If the recessive gene is represented by  $c$  and the dominant gene by  $C$ ,

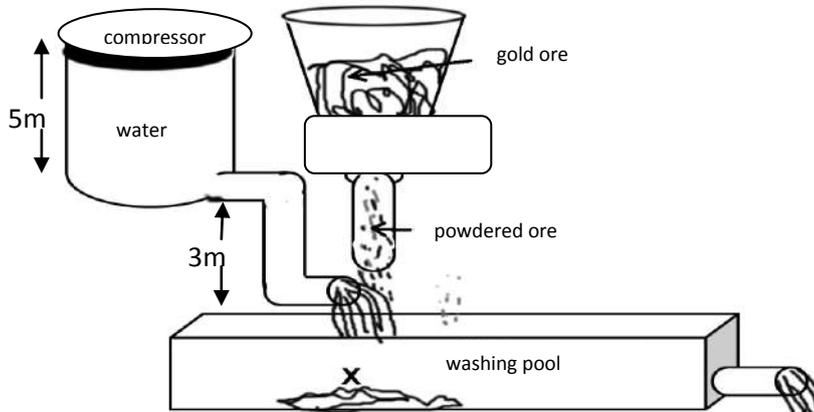
- i. write the genotype of the above male and the female.
  - ii. write the genotype and the phenotype of the children born to them.
  - iii. mention a symptom of this disease.
- C. Given below is an apparatus used to demonstrate the action of a transistor.



- i. Write two main semi conductors used to produce electronic appliances like transistors and diodes.
  - ii. What is the reason for not illuminating the LED when the S switch is open?
- D. i. The switch was closed and the magnet near the insulated wire coil was moved. Then write an observation that can be seen in the LED.
- ii. Write a change in the above observation if a more powerful magnet is used.
  - iii. Explain the reason for the difference in the observation in (ii).

- E. i. Draw the relevant circuit if the above circuit should be converted to a light-sensitive circuit.  
 ii. Which action of the transistor can be demonstrated by the circuit which you drew in E (i) above?

09.



- A. The above diagram shows an apparatus used to extract gold as a small scale industry.
- Which component of the mixture settles at X when powdered ore is mixed into the drain of water?
  - Explain the reason for that.
  - Which method is used to extract gold here?
  - Explain scientifically why gold is used in jewellery-industry.
- B. Some information about 3 metals is given below.  
 O- Does not react with water or oxygen.  
 P –Does not react with cold water but reacts with hot water and steam.  
 Q- The metal can be obtained by the reduction of the metallic oxide.
- List the above metals in descending order of the reactivity.
  - Mention a suitable method of extraction for each metal.
- C. The height of the water tank of the above diagram is 5 m. The vertical gap between the bottom the tank and the point where water is released is 3m. (density of water=  $1000\text{kgm}^{-3}$ ,  $g = 10\text{ms}^{-1}$ )
- What is the pressure exerted by water on its releasing point?
  - Calculate the kinetic energy of water flowing out in 2 s if water is released at the open end of the tube at a rate of 1kg per second when the tank is full.
  - If a mass of 100kg is kept on the water tank to create pressure when the water level goes down,
    - What is the force exerted by the mass on water in the tank?
    - If the surface area of the tank is  $3\text{m}^2$ , find the extra pressure exerted by it on water.
  - Though gold is a good conductor of electricity, it is not used as a conductor. Give two reasons for this.

Answers  
Multiple Choice Questions

1	3	11	3	21	3	31	1
2	3	12	2	22	1	32	4
3	4	13	3	23	2	33	4
4	2	14	2	24	3	34	4
5	4	15	3	25	1	35	3
6	2	16	3	26	3	36	3
7	2	17	4	27	1	37	4
8	2	18	2	28	3	38	2
9	3	19	4	29	4	39	2
10	1	20	4	30	1	40	2

Structured Essay

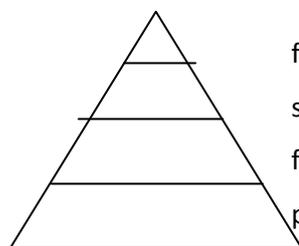
01. A.

- i. Fish died because of waste water/ or any correct answer. (1 mark)
- ii. Above and below the waste water releasing point. (1 mark)
- iii. Fish in the tank which contain waste water dying/showing discomfort. (2 marks)
- iv. Fish being identical/same size/healthy/same age/two answers like that. (2 marks)
- v. Fish being identical/other environmental factors do not affect the experiment/  
an answer like that. (1 mark)

B.

- i. plants → deer → leopard/  
plants → deer → jackal/ for any correct food chain. (1 mark)

ii.



final level consumers

second level consumers

first level consumers

producers

for the correct shape

(2 marks)

iii. Within final level consumers.

(1 mark)

C.

- i. Mass of CO<sub>2</sub> released to the environment for a production unit. (1 mark)
- ii. Carbon foot print increases. (1 mark)
- iii. Water wastes when urban water is delivered to the tanks/ around the town/

purification for using in machines/ using as a coolant/ labourers work in the process using water/two such answers. (2 marks)

02. A.
- i. Growth/growth of a plant. (1 mark)
  - ii. Indicator moves up/ towards A. The mass moves downwards. (2 marks)
- B.
- i. H<sub>2</sub>O/water (1 mark)
  - ii.  $6 \text{ CO}_2 + 6 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ CO}_2$  (2 marks)
- C.
- i. X – protein            Y- Lipid            Z – Nucleic acid (1x3 marks)
  - ii. X – Protein  $\rightarrow$  amino acids (2 marks)
  - Y – Lipids  $\rightarrow$  glycerol and fatty acids (2 marks)
  - iii. chromosomes (2 marks)
03. A.
- i. A - chemical reaction/change    B – Physical change (2 marks)
  - ii. a. carbondioxide / CO<sub>2</sub> (1 mark)
  - b. extinguishing fire/ soft drink production/ forming artificial rain/  
as a coolant/ 2 such answers (2 marks)
  - c. chemical combination (1 mark)
  - iii. temperature/ pressure/ nature of the substance/ concentration/  
surface area of reactions/ particle size/ catalysts/ any two answers. (2 marks)
- B.
- i. natural – rubber/ protein/ starch (2 marks)
  - artificial – polythene/ polypropylenes/ polytetrafluoroethane (2 marks)
  - ii. hydrocarbon (1 mark)
  - iii. DRAW THE DIAGRAM HERE (2 marks)
- iv.  $12 + (1 \times 4) = 12 + 4 = 16$  (2 marks)
04. A.
- i.  $Average\ speed = \frac{Total\ distance\ travelled}{Total\ time\ taken} = \frac{(200+200)m}{40\ s} = 10\ ms^{-1}$  (2 marks)
  - ii.  $Average\ velocity = \frac{Displacement}{Time\ taken} = \frac{200\ m}{15\ s} = 40/3\ ms^{-1}$  (2 marks)
  - iii. DRAW THE DIAGRAM HERE (2 marks)
- B.
- i.
- | <b>Factor</b>      | <b>Relationship with acceleration</b> |
|--------------------|---------------------------------------|
| Unbalanced force   | Directly propotional                  |
| Mass of the object | Indirectly propotional                |
- (2 marks)
- ii. For every action, there is an equal and opposite reaction. (1 mark)
  - iii. Applied force is equal to static frictional force. (1 mark)
  - iv. Walking/ running a vehicle on road/ holding an object. (1 mark)

- C.
- i. Drawing the diagram (2 mark)
  - ii. concave lens (1 mark)
  - iii. concave mirror/convex lens (1 mark)

05. A.
- i. A – dicot                      B – monocot
  - ii. Monocot – trimerous flowers      dicot – tetra or pentamerous flowers (2 marks)
  - iii. Explains the natural relationships among organisms of the same species. (2 marks)  
Explains the evolutionary relationships among different organisms.
  - iv. Cell is the structural and functional unit of organisms. (2 marks)  
All organisms are made up of one or more cells.  
New cells are formed from pre - existing cells. (1 mark for an answer= 2 marks)

- B.
- i. A – collenchyma                      B – sclerenchyma (2 marks)
  - ii. collenchyma – corners of the cell walls are thickened/ living cells/ posses a cytoplasm, nucleus .  
sclerenchyma – cell wall is evenly thickened/ dead cells/ no nucleus, cytoplasm (2 marks)
  - iii. similarity – involuntary function  
difference – cardiac muscles are branched, smooth muscles are unbranched.  
Cardiac muscles are striated, smooth muscles are not striated. (2 marks)

- C.
- i. Red blood cells – transport O<sub>2</sub>  
White blood cells – destroy foreign bodies. (2 marks)
  - ii. Haemophilia occurs due to a sex linked recessive gene. There is more chance to appear recessive gene characteristics by the marriage between blood relations. (2 marks)
  - iii. Insulin, Glucogen (1 mark)
  - iv. Islets of langerhans in pancreas (1 mark)

06. A.
- i. Evaporation of sea water (1 mark)
  - ii. Third tank/ Last tank (1 mark)
  - iii. Calcium carbonate (2 marks)  
Less soluble than other compounds.
- B.
- i. Salt accelerate the rate of rusting. Therefore sea water influences rusting than fresh water. (1 mark)
  - ii. Atoms of the surface of a metal release electrons to form positive ions. (1 mark)
  - iii.  $\text{Fe} \rightarrow \text{Fe}^{+2} + 2\text{e}^-$  for balanced equation. (2 marks)

- C.
- i. 20 (1 mark)
  - ii. 2, 8, 8, 2 (1 mark)
  - iii. 4<sup>th</sup> period, 2<sup>nd</sup> group (2 mark)
  - iv. XY<sub>2</sub> (1 mark)
- D.
- i. Concentration = n/v (2 marks)
  - ii. Relative molecular mass of NaOH = 23+16+1 = 40 (2 marks)

Number of moles in 20g of NaOH =  $20/40 = 0.5\text{mol}$   
 Concentration =  $\frac{0.5}{500} \times 1000 = 1 \text{ moldm}^{-3}$  (3 marks)

07. A.
- i. To observe whether the apparatus works. (1 mark)
  - ii. Fix by changing the terminals of LED. (2 marks)
  - iii. COPY THE ANSWER (4 marks)
  - iv. COPY THE ANSWER (3 mark)
- B.
- i. Mercury/Alcohol (1 mark)
  - ii. The volume increased due to expansion rises up through the tube. (1 mark)
  - iii. At the boiling point a liquid evaporates without changing its temperature. (2 marks)
- C.
- i. B and C (1 mark)
  - ii. A and B (1 mark)
  - iii.  $70 \text{ N} - 50 \text{ N} = 20 \text{ N}$  (2 marks)
  - iv.  $20 \text{ N}$  (1 mark)
  - v. Liquid pressure increases with depth (1 mark)

08. A.
- i. Organisms which possess only one of the male or female reproductive systems. (2 marks)
  - ii. Female – Oestrogen/ Progesteron  
 Male – testosterone (2 marks)
  - iii. Primary follicles convert into Graafian follicles. (1 mark)
- B.
- i. Mother -  $X^cX^c$       Father -  $X^cY$  (2 marks)
  - ii.

Phenotype	$X^cX^c$	$X^cY$
Genotype	carrier female	diseased male

- iii. Can not distinguish red colour from green colour. (2 marks)
- C.
- i. Si, Ge (2 marks)
  - ii. Current does not flow through the base of the transistor/ current does not flow through input. (1 mark)
- D.
- i. Brightness of LED changes. (1 mark)
  - ii. Variation of brightness increases further. (1 mark)
  - iii. When the magnet is more powerful a greater current is induced in the coil. Therefore the variation of current increases. (1 mark)
- E.
- i. drawing the diagram

(For correct circuit diagram -2 marks)

- ii. Switching action of a transistor. (1 mark)

09. A.
- i. Gold metal (1 mark)
  - ii. The density of gold is greater than that of the other impurities. So that it moves downwards faster. (2 marks)
  - iii. Sitting/physical method (1 mark)
  - iv. Gold is less reactive than other metals. So it does not react with water, oxygen or acids. So the lustre does not reduce. (2 marks)
- B.
- i. O, Q, P (1 mark)
  - ii. O – Physical methods  
Q – Reduction  
P – Electrolysis (1 X 3= 3)
- C.
- i.  $h\rho g = 5\text{m} \times 1000 \times 10 = 50\,000\text{Pa}$  (2 marks)
  - ii. Potential energy of releasing water = kinetic energy  
 Mass of water released in 2s = 2kg  
 Height of water column = 8m  
 $g = 10\text{ms}^{-2}$   
 $mgh = 2 \times 10 \times 8 = 160\text{J}$  (3 marks)
  - iii.a.  $100\text{kg} \times 10 = 1000\text{N}$  (1 marks)
  - b.  $1000\text{ N}/3\text{m}^2 = 333.33\text{ Pa}$  (2 marks)
  - iv. Expensive/not strong/rare (two such answer 2 marks)

