

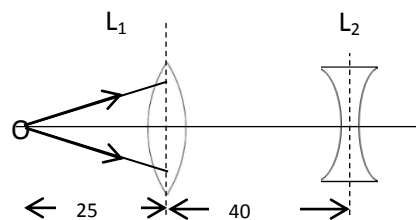
## Instructions

- *Answer All Questions*
- *In each of the questions 1 to 40, pick one of the alternatives to your choice (1), (2), (3), (4) which you consider is correct or most appropriate.*
- ***Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.***
- *Further instructions are given on the back of the answer sheet. Follow them carefully.*

- The standard international unit used to measure temperature is,  
(1)  $\Theta$ . (2) T. (3)  $^{\circ}\text{C}$ . (4) K.
- The physical quantity without a unit out of the following is,  
(1) amount of substance. (2) molecular mass.  
(3) Relative Atomic Mass. (4) concentration.
- The answer which includes seeds that are adapted to disperse through wind and water respectively is,  
(1) water lily, castor (2) milk weed, coconut  
(3) horra/ Lennei, rubber (4) horra/ lennei, castor
- Contraction of voluntary muscles is controlled by,  
(1) cerebrum. (2) cerebellum. (3) medulla oblongata. (4) spinal cord.
- The phylum that animals such as hydra and Sea anemone belong to,  
(1) Cnidaria. (2) Annelida. (3) Arthropoda. (4) Echinodermata.
- The gas used for reduction of hematite in the blast furnace in the process of extracting iron is  
(1) carbon dioxide (2) carbon monoxide (3) oxygen (4) water vapour
- What is the momentum of a body with a mass of 500g moving at a velocity of  $60\text{cm s}^{-1}$  ?  
(1)  $30000\text{kg m s}^{-1}$  (2)  $300\text{kg m s}^{-1}$  (3)  $30\text{kg m s}^{-1}$  (4)  $0.3\text{kg m s}^{-1}$
- The Specific Latent Heat of vaporization of water is  $2.260\text{ kJ kg}^{-1}$ . The quantity of heat required to bring  $10\text{g}$  of water at  $100^{\circ}\text{C}$  into water vapor at  $100^{\circ}\text{C}$  is,  
(1)  $22600\text{ J}$ . (2)  $2260\text{ J}$ . (3)  $226\text{ J}$ . (4)  $22.6\text{ J}$ .
- When a ceiling fan is connected to a  $12\text{ V}$  electric supply, A current of  $2\text{ A}$  flows through it. What is the power of the ceiling fan ?  
(1)  $6\text{ W}$  (2)  $12\text{ W}$  (3)  $24\text{ W}$  (4)  $48\text{ W}$
- The composition of a liquid – liquid solution is marked as  $12\% \text{ V/V}$ . The volume of solute in  $50\text{ cm}^3$  of the solution is,  
(1)  $6\text{ cm}^3$ . (2)  $12\text{ cm}^3$ . (3)  $44\text{ cm}^3$ . (4)  $88\text{ cm}^3$ .
- $7\%$  of the body weight of a human is by minerals. Out of them calcium and phosphorus are macro elements. A symptom of deficiency of calcium is,  
(1) weakening of muscles. (2) weakening of teeth and bones.  
(3) weakening of nerves. (4) Anaemia.

12.  $L_1$  and  $L_2$  are convex and concave lenses with focal lengths of 25 cm and 20 cm respectively. A point object 'O' is placed at a distance of 25 cm from  $L_1$ . The final image after refraction through both lenses is placed,

- (1) at Infinity left to the convex lens.
- (2) at a distance of 25 cm left to the convex lens.
- (3) at a distance of 20 cm left to the concave lens.
- (4) at infinity right to the concave lens.



13. Which of the following is a longitudinal wave?

- (1) Ripples on the surface of water.
- (2) Waves that come through the air from a violin to the ear.
- (3) Waves formed by the vibrations of a string of a guitar.
- (4) Heat waves that come to a person near a burning fire.

14. The four statements given below are regarding the **Lub – Dup** sound of the heart beat.

- (A) '**Lub**' sound is formed at the closure of bicuspid and tricuspid valves.
- (B) '**Lub**' sound is formed at the closure of semi-lunar valves.
- (C) '**Dup**' sound is formed at the closure of bicuspid and tricuspid valves.
- (D) '**Dup**' sound is formed at the closure of semi-lunar valves.

What is the answer with correct statements?

- (1) A and B
- (2) A and C
- (3) A and D
- (4) B and D

15. The compound that releases  $H^+$  ions through fractional ionization in an aqueous solution is,

- (1)  $HNO_3$ .
- (2)  $H_2CO_3$ .
- (3)  $H_2SO_4$ .
- (4)  $NaOH$ .

16. Which process is considered as an excretory activity occurring in plants is,

- (1) exhausting of water vapour through transpiration.
- (2) exhausting of minerals through guttation.
- (3) production of oxygen during photosynthesis.
- (4) exhausting of water drops through guttation.

17. Which of the following elements produces an amphoteric oxide?

**Na, Mg, Al, S, P**

- (1) Na
- (2) Mg
- (3) S
- (4) Al

18. Few statements are regarding inheritance are given below

- (A) Monohybrid cross is studying about the inheritance of only one characteristic of a single pair of contrasting characteristic.
- (B) Transmission of inherited characteristic to next generation is known as heredity.
- (C) Inherited characteristic **cannot** skip a few generations and transmit to another generation

The true statements of the above are

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

19. Metal 'X' reacts with diluted acids and emits Hydrogen. Where could it be placed in the active metal series ?

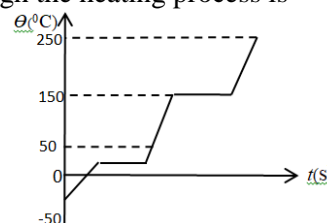
- (1) between Ag and Au
- (2) between Pb and Cu
- (3) between Cu and Hg
- (4) between Al and Fe

20. The Sodium (Na) atom has 11 protons, 12 neutrons and 11 electrons. The standard method of writing that atom is,

- (1)  $^{12}_{11}Na$ .
- (2)  $^{11}_{12}Na$
- (3)  $^{23}_{11}Na$ .
- (4)  $^{23}_{12}Na$ .

21. A solid was gradually heated and the temperature variation of the solid through the heating process is shown in the graph. The freezing point of the solid, is approximately

- (1)  $-50^\circ C$ .
- (2)  $25^\circ C$ .
- (3)  $150^\circ C$ .
- (4)  $250^\circ C$ .



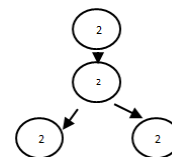
22. Select the **false** statement out of the followings.

- (1) Water and acid are essential components for rusting of iron.
- (2) Acids and minerals are factors that accelerate the process of rusting.
- (3) Bases decrease the speed of rusting.
- (4) Cathode protection prevents rusting.

23. The diagram shows how chromosomes are divided at a particular phase during cell division.

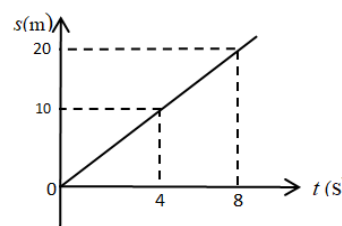
Which of the following is **not** an important feature of this type of cell division?

- (1) The affects to the growth of the bodies of multicellular organisms.
- (2) It can be considered as an asexual reproduction.
- (3) It creates new cells to replace dead cells.
- (4) It helps keep the number of chromosomes constant throughout generations.



24. The diagram shows the displacement time graph of the movement of a bicycle. According to the graph what is the velocity of the bicycle ?

- (1)  $0.4\text{ms}^{-1}$ .
- (2)  $2.5\text{ms}^{-1}$ .
- (3)  $5\text{ms}^{-1}$ .
- (4)  $20\text{ms}^{-1}$ .



25. Which of the following is a use of expansion ?

- (A) Fitting iron rims to wooden cart wheels.
- (B) Leaving a small gap between the rails on railways.
- (C) Fitting a bimetallic strip to an electric iron.
- (D) Loosely fitting the telephone wires and the cables carrying electricity between posts.

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

26. Which of the following is a mechanical method of separating the components in a mixture

- (1) Sifting
- (2) Sieving
- (3) Floating
- (4) all the above

27. Consider the following statements regarding water

- (A) An excellent solvent.
- (B) Important in regulating body temperature.
- (C) Acts as the medium of transporting substances within the body.
- (D) Important for the proper function of enzymes.

Select the answer which includes the unique features of water.

- (1) A,B,C
- (2) B,C,D
- (3) A,B,D
- (4) A,C,D

28. The rate of reaction depends on the collisions of particles per unit time. Consider the following statements regarding the above phenomenon.

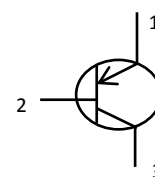
- (A) When the concentration of the reactants is increased the rate of collisions between particles increases.
- (B) When temperature of the medium is decreased the rate of collisions between the reactant particles decrease.
- (C) When the surface area of the reactants are increased the rate of collisions between particles decreases.

The true statements among these are,

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

29. Given below is a symbol of a transistor. Select the option which shows the correct type of transistor and its respective terminals.

Option	Type of transistor	Base	Emitter	collector
(1)	nnp	2	1	3
(2)	nnp	1	2	3
(3)	pnnp	2	1	3
(4)	pnnp	3	1	3



30. How many sodium carbonate molecules are found in 53 grams of sodium carbonate ( $\text{Na}_2\text{CO}_3$ )  
(Na = 23, C = 12, O = 16)

(1)  $\frac{6.022 \times 10^{23} \times 53}{106}$  (2)  $\frac{6.022 \times 10^{23} \times 106}{53}$  (3)  $\frac{106 \times 53}{6.022 \times 10^{23}}$  (4)  $\frac{53 \times 53}{6.022 \times 10^{23}}$

31. Consider the following statements on the reflection and refraction of light.

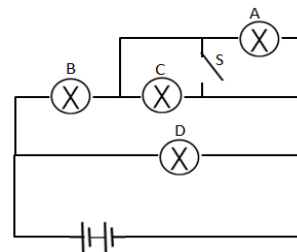
- A. All light rays that incident on the surface that separate the two transparent medium, with an incline is refracted.  
B. Light rays travelling from a dense medium to a rare medium when reflected back in to the same medium is called total internal reflection.  
C. Laws of refraction are called **Snell's Laws**.

Out of the above statements

- (1) only B is true. (2) only A and B are true.  
(3) All A, B and C are true. (4) all are **not true**.

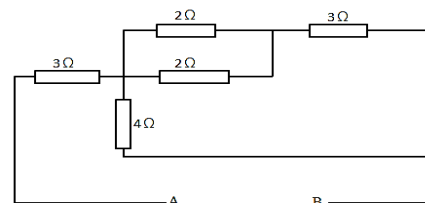
32. The following figure shows four identical Bulbs A, B, C and D connected to a circuit. When the switch "S" is 'on' / closed,

- (1) bulb A turns off and brightness of B and C increases.  
(2) bulb C turns off and the brightness of B and A decreases.  
(3) A and C turn off and the brightness of D increases.  
(4) A and C turn off and the brightness of B increases.



33. Out of the deaths occurred due to diseases in Sri Lanka about 60% had occurred due to non-contagious diseases. One of the main reasons for having non-contagious diseases is,

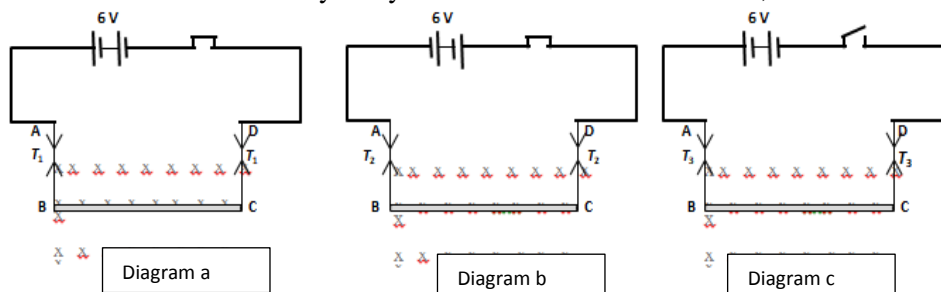
- (1) drinking contaminated water.  
(2) wrong food consumption patterns.  
(3) increase in the percentage of greenhouse gases in the atmosphere.  
(4) consumption of food grown **without** organic fertilizer.



34. What is the equivalent resistant between A and B in the given circuit?

- (1)  $5\ \Omega$  (2)  $7\ \Omega$  (3)  $9\ \Omega$  (4)  $11\ \Omega$

35. B C rod is hung horizontally by two lightweight conductive fibers AB and DC. A magnetic field is acting perpendicular the plane of the paper and into the paper. Electric circuits are connected across to A and D ends of the fibers. The three ways they are connected are shown as A, B and C in the diagrams.



Which answer shows the correct relationship of the tensions between the fibers.

- (1)  $T_1 > T_2 > T_3$  (2)  $T_1 > T_3 > T_2$  (3)  $T_1 = T_2 > T_3$  (4)  $T_2 > T_3 > T_1$

36. Given below are some statements about electro chemistry.

- A- The removal of electrons is oxidation.  
B- The electrode at which the oxidation occurs is the cathode.  
C- Electrons flow from the anode to the cathode through the external circuit.

Out of the above the true statements are,

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

37. Smoking causes many respiratory diseases. Consider the following statements on smoking  
**Statement 1** - The carrying capacity of oxygen in the blood of smokers reduces.  
**Statement 2** - Carbon monoxide in cigarette smoke is absorbed by blood and binds with hemoglobin in the lungs.

Select the correct answer from the answers given below.

- (1) Both 1 and 2 statements are **true**.  
 (2) Both 1 and 2 statements are **false**.  
 (3) Statement 1 is true but statement 2 is **false**.  
 (4) Statement 1 is false but statement 2 is **true**.

38. Following are the chemical equations related to the two types of cellular respiration.

(A) Glucose + oxygen  $\longrightarrow$  carbon dioxide + water + energy

(B) Glucose  $\longrightarrow$  Lactic acid + Energy

Select the correct answer relevant to the above equations

- (1) (A) is aerobic respiration and it incompletely breaks down the glucose molecules.  
 (2) (B) is anaerobic respiration and it completely breaks down the glucose molecules.  
 (3) (B) is anaerobic respiration and it incompletely breaks down the glucose molecules.  
 (4) (B) is anaerobic respiration and it completely breaks down glucose molecules.

39. Following are rough sketches of three types of muscle tissues. Select the correct answer relevant to the tissues.



Diagram a



Diagram b



Diagram c

	a	b	c
(1)	Found in the walls of the digestive tract.	Found in the bicep muscles.	Found in the heart.
(2)	These cells are spindle shaped.	cylindrical in shape. Branched.	Branched.
(3)	Voluntary.	Voluntary.	In voluntary.
(4)	Uni nucleate. The nucleus is in the middle of the cell.	Uninucleate. The nucleus is located peripherally.	Uninucleate. The nucleus Is located without a specific place.

40. Given below are some unfavorable effects of environmental pollution.

- (a) Increase in the global warming.  
 (b) Reduction of crop yield.  
 (c) Occurrence of acid rains.  
 (d) Introduction of invasive species.

Select the answer which consists facts that could be divided as the direct and the indirect effects of environmental pollution.

	Direct effects	Indirect effects
(1)	a,b	c,d
(2)	a,c	b,d
(3)	b,c	a,d
(4)	a,d	b,c

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**Paper 1 - Answer Sheet**

<b>Question No</b>	<b>Correct Option</b>	<b>Question No</b>	<b>Correct Option</b>	<b>Question No</b>	<b>Correct Option</b>	<b>Question No</b>	<b>Correct Option</b>
1	4	11	2	21	2	31	4
2	3	12	3	22	1	32	4
3	2	13	2	23	4	33	2
4	1	14	3	24	2	34	1
5	1	15	2	25	3	35	4
6	2	16	3	26	4	36	3
7	4	17	3	27	1	37	1
8	1	18	1	28	1	38	3
9	3	19	4	29	3	39	1
10	3	20	3	30	1	40	2

<b>අධ්‍යාපන අමාත්‍යාංශය/கல்வி அமைச்சு/Ministry of Education</b>		
<b>අධ්‍යයන පොළ සහතික පත්‍ර (සාමාන්‍ය පෙළ)</b> <b>கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தரப்)</b> <b>General Certificate of Education (Ord Level)</b>		
<b>විෂය II</b> <b>விஞ்ஞானம் II</b> <b>Science II</b>	<b>පෙරහුරු ප්‍රශ්න පත්‍රය - 2018</b> <b>பரீட்சை முன்னோடி வினாப்பத்திரம் - 2018</b> <b>Pre-Practice Question paper - 2018</b>	<b>පැය තුනයි</b> <b>மூன்று மணித்தியாலம்</b> <b>Three hours</b>

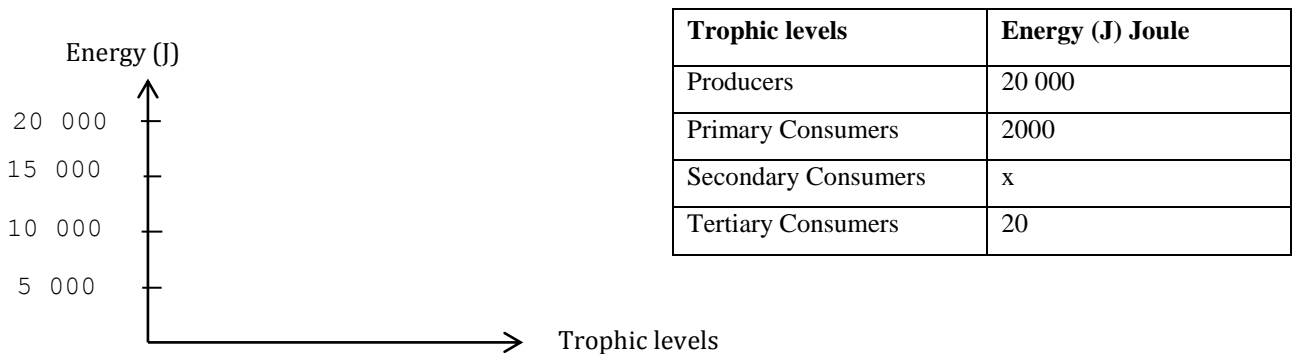
**Instructions:**

- Write your answers in neat hand writing
- Answer four questions in part A, in the space provided.
- Answer three questions in part B out of the 5 questions given.
- After answering tie Part A and answer script of Part B together and hand over.

**Part A**

01. (A) Data of a energy pyramid in a certain terrestrial environment is given below.

(i) Draw a bar graph depicting the energy of producers and primary consumers using the following axis.



(ii) According to the pattern of wasting of energy in the chart find the value for x .....

(iii) Energy is lost during the flow of energy from one trophic level to the next. Why ? .....

(iv) What is meant by natural environmental balance .....

(B) Greenhouse gases are a main factor affecting the increasing of global warming. Persistent organic pollutants too are a threat to the environment.

(i) Fill the chart by writing an occasion where the greenhouse gases are released. Also organic pollutants in the environment for a long time period is threat to the environment.



(ii) Write two characteristics of organic pollutants/

Carbonic pollutants

(a) .....

.....

(b) .....

Green house gas	Occation of release
Carbon dioxide	
Methane	
Chloro fluoro carbon	

(C) Multiple cropping and biological pest control are two sustainable agricultural uses.

(i) Write an advantage of multiple cropping .....

(ii) Give an example where biological pest control is used.....

(iii) Write a sustainable agricultural use other than the two mentioned above .....

.....

02. (A) Bodies of all organisms are composed of a variety of chemical compounds. These chemical compounds are formed by the bonding of a various elements.

(i) What are the four (4) most common elements in the living body ?

.....

(ii) What is the name given to the proteins which catalyze the bio –chemical reactions within the organisms?

.....

(iii) Given below is the chemical reaction that shows the digestion of starch



What is the substance denoted as P.....

(iv) The structural unit of living body is the cell. There are many similarities as well as dissimilarities between the structure of plant cells and animal cells.

(a) Name an organelle found in the plant cell but not in the animal cell

.....

(b) Write the function of the organelle mentioned in (a)

.....

(v) The process by which energy is produced inside the living cell is known as cellular respiration. The diagram shows an activity done to show absorption of oxygen in respiration.

(a) Name solution 'x' in the test tube .....

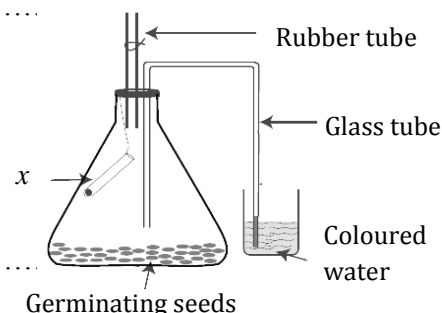
(b) What is the function of solution 'x'?

.....

(c) What is the observation that helps to come to the conclusion that oxygen is used in respiration?

.....

.....





(B) A group of cells modified to perform a specific function in a multicellular organism is a tissue. Some animal tissues and their functions are shown in the chart below.

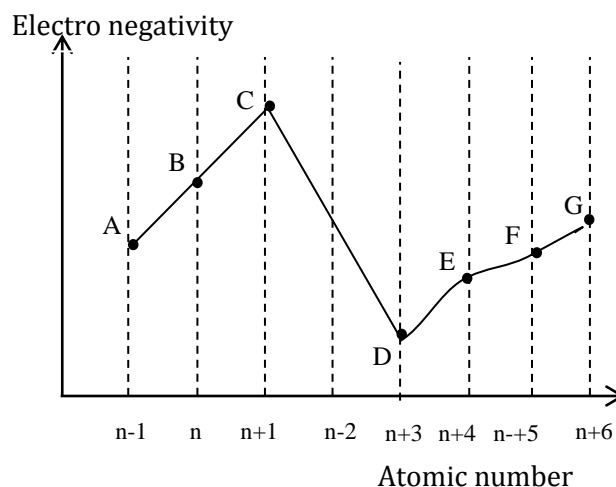
- i) Name the tissue Y in the above chart.  
 .....  
 ii) Write an example for the above type of tissue in the human body.  
 .....  
 iii) Name the tissue found inside the nasal cavity which prevents dust and bacteria entering the respiratory system.  
 .....

Animal Tissue	Function
Epithelial Tissue	Lining of free surfaces
Connective Tissue	Provides connection between tissues and organ
Y	Gives force for movements
nerve Tissue	Transmits impulses

- iv) Write two changes that take place when inhaled air passes through the nasal cavity.  
 ' .....  
 .....  
 v) The main organ that carries out nitrogenous excretion in the human body is the kidney.  
 (a) Urine formation in Kidney follows three main processes. Write one of them.  
 .....  
 (b) Write one nitrogenous excretory substance in urine.  
 .....

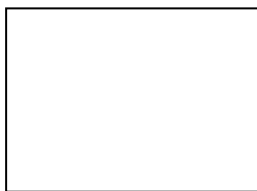
03. (A) The following graph shows the variations of electro negativity of some subsequent elements C is an element in the second period. (The symbols given are not the standard symbols)

- i) (a) what is the element that belongs to the fifth group out of the elements shown in the graph?  
 .....  
 (b) Write the electronic configuration of the element mentioned above in (a)  
 .....  
 ii) What element has the lowest first ionization energy from the elements indicated in the graph ?  
 .....  
 iii) Write the formula of the compound formed by element B and element D indicated in the above graph.  
 .....



- iv) Element B indicated in the above paragraph forms a compound when it is bonded with Hydrogen.  
 a) Write the type of that bond.  
 .....

b) Draw the Lewis structure of the molecule of the compound formed in (a) in the given space.



v) The boiling point and specific heat capacity of the compound mentioned in (iv) (b) has a high value. Explain the reason for it.

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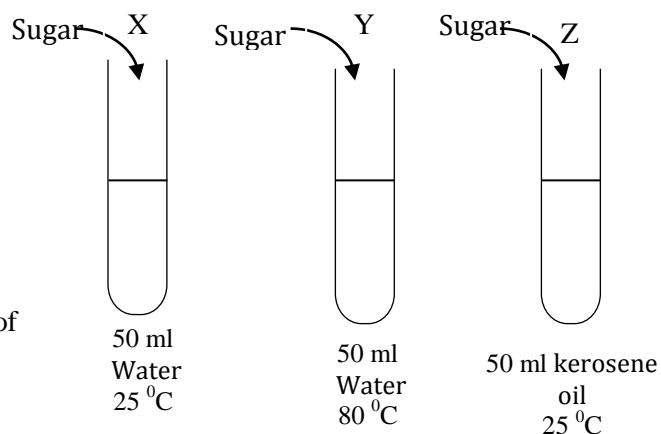
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vi) Hydrogen has three isotopes. Write them in the standard form.

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(B) Below is an activity to identify the factors affecting the solubility. 50g of sugar was dissolved in test tubes X,Y and Z. When sugar stopped dissolving the solutions were strained, dried and weighed.



i) Name the test tubes which show that the nature of the solvent affects solubility.

.....

ii) (a) Out of X and Y test tubes which test tube will retain more sugar as residue ?

.....

(b) Explain the reason for the observation given in (a)

.....

.....

04. (A)

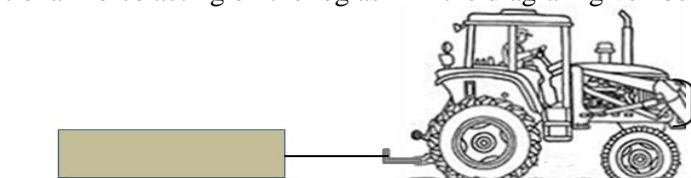
i) Write Newton's second law of motion.

.....

.....

.....

ii) A tractor is used to try to pull a log along a horizontal road is shown in the diagram. The cable connected to the log remains horizontal. Draw the frictional force acting on the log as F in the diagram given below.



iii) If the mass of the log is 400kg, what is the value of the normal reaction by the road on the log?

.....

- iv) When the cable applies a force of 1200 N on the log. What is the frictional force acting on the log?

.....

- v) When the log is at rest, the cable applies a force of 1560 N on the log the frictional force acting on the log is 1500N. Find the acceleration of the log when it is moving.

.....

.....

- (B) i) Draw the velocity time graph on the axis given. The log starts moving from rest.

- ii) As per the graph in A (v), find the velocity of the log after 20s.

.....

.....

.....



- iii) Using the velocity time graph find the displacement of the log after 20s.

.....

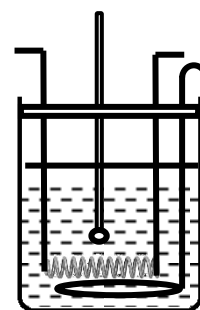
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- (C) A Polystyrene cup with 200g of water is heated by a thermo coil as shown in the diagram. Specific heat capacity of water is  $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$ .

- i) Find the quantity of heat required to increase the temperature from  $30^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ .

.....

.....



- ii) Although the current was passing through the coil the temperature of water reading did not change after the reading reached  $100^{\circ}\text{C}$ . What will be the reason for it ?

.....

.....

- iii) The thermo coil took 2 minutes to increase the temperature of water from  $30^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ . Considering that no heat was wasted to the environment or the heat absorbed by the cup was minimum, find the power of the thermo coil.

.....

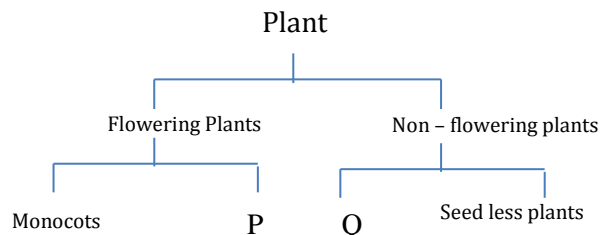
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## Part B

05. (A) Organisms are classified using various methods.

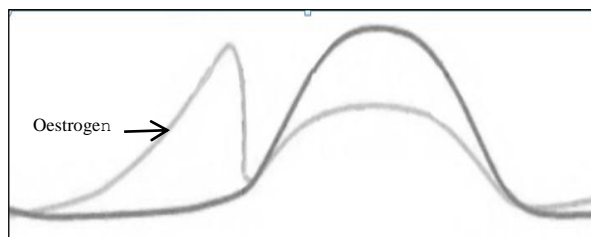
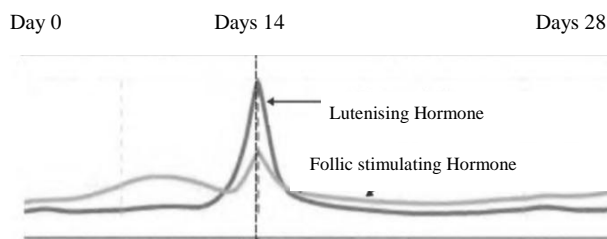
The chart shows a plant classification as such.

- What is the name of the kingdom of plants?
- Write the name of the group P.
- Give an example for the group Q.
- Name the animal group possessing a heart with 3 chambers.



(B) Life process that gives rise to a new generation from an exiting generation is reproduction. Chemical co – ordination is important in animal reproduction. The structure that bears sexual parts of a plant is the flower

- What are the main parts of the androecium/ stamen.
- During the menstrul cycle changes occur in two places of the female reproductive system. The following graphs show the variation of the hormones that cause those changes. Name the two places that the hormones shown in the graphs A and B are effective respectively.



- What is the other hormone acting in B?
- Define the following items related to heredity.
  - Gene Expression
  - linked genes

(C) Blood transports the end products of food digestion to relevant organs.

- Write a main function in each of the following organs in the process of food digestion
  - Large intestine
  - Liver
- Which enzyme produced by the salivary glands helps in the process of food digestion.
- Name the two stages of the cardiac cycle after intervening (Atrial and Ventricular relaxation)
- Given below is a flow chart of a reflex arc.



X is a neuron, Y is a part of the nervous system. Identify X and Y.

06. (A) A student added equal volumes of copper sulphate to four test tubes and added equal amount of iron, magnesium, copper and zinc pieces to each test tube separately.

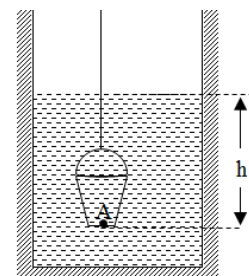
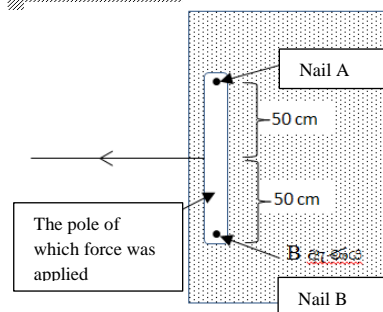
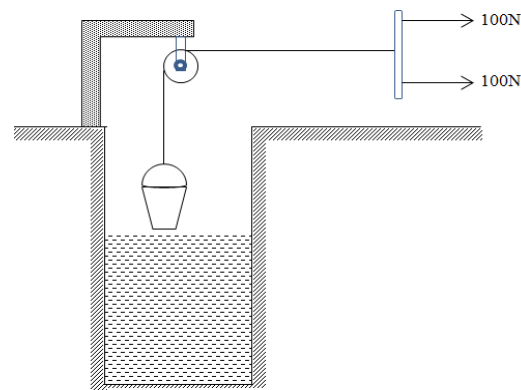
- What is the observation which will help the student to come to the conclusion that a chemical reaction took place in each of the test tube?
- The students wanted to find how the temperature affects the rate of reaction between the copper sulphate solution and iron. Present the steps that has to be taken in the activity.
- Write the balanced chemical equation between copper sulphate solution and magnesium metal with the physical states related to the reaction.
- According to the nature of the classification of chemical reactions you have learned, what type of reaction is the above reaction in (iii)

(B) The molar mass of magnesium metal is  $24 \text{ g mol}^{-1}$

- What is meant by the statement the molar mass of Magnesium is  $24 \text{ g mol}^{-1}$ ?
- Calculate the mass of a magnesium atom (Avogadro number is  $6 \times 10^{23}$  approximately).
- How many Mg atomic moles of magnesium are in a piece of Mg with a mass of 6g?
- Composition of a solution can be expressed as concentration. Calculate the amount of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  needed to prepare  $100 \text{ cm}^3$   $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  solution with the concentration of  $0.1 \text{ mol dm}^{-3}$ . (Molar mass of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  is  $249.5 \text{ g mol}^{-1}$ )

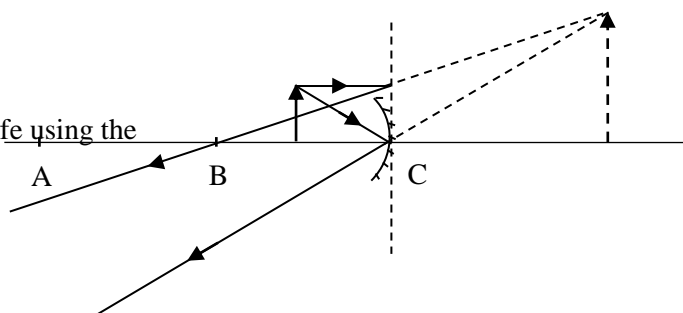
07. (A) The diagram shows a simple activity done by two students to lift a large bucket of water. A light pole, tied to the free end of the rope which is tied to the bucket was used to pull it.

- What is the magnitude of the resultant force of the forces used by the two students?
- What are the advantages of participation of two students and using a pulley in this activity?
- After, the bucket was pulled up by the light pole, it was fixed on a vertical board with two nails A and B as shown in the diagram.
  - What is the state of the forces exerted on the pole?
  - As you stated above, write two conditions that has to be satisfied in order to maintain the action of three forces.
- If the nail B which fixed the pole in (iii) came off ,
  - Calculate the initial moment on the pole.
  - What would be the direction of the moment?
- The weight of the empty bucket is  $50 \text{ N}$ . Before water is filled the bucket was immersed in water  $\frac{1}{3}$  of its volume. The force exerted by one student was  $15 \text{ N}$ .
  - What is the upthrust acting on the bucket in the above condition?
  - A is a point at the bottom of the bucket. It is immersed in water at a depth of  $h$ . If atmospheric pressure is  $\pi$  , density of water is  $d$ , gravitational acceleration is  $g$ , and the total pressure at point A is  $P$ , write an expression for  $P$  using the symbols given.
  - If the depth of point A at the bottom of the bucket in v(b) is  $4 \text{ m}$ , find the pressure at point A.



(B) The ray diagram shows the formation of an image by an object placed in front of a mirror.

- Name A, B and C of the ray diagram.
- Write two characteristics of the image formed as in the ray diagram.
- Write two applications in day to day life using the phenomenon in the ray diagram

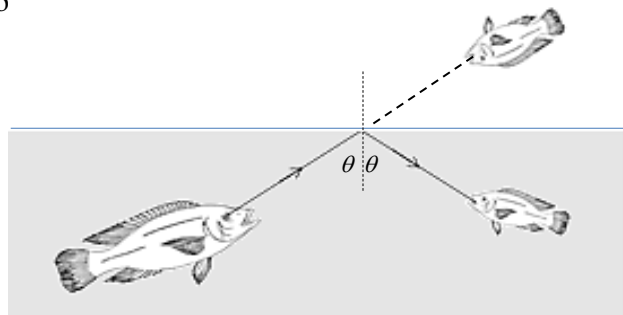


08. (A) A rough diagram of an aquatic eco system is shown below.

- i) When classifying the organisms in the above environment evolutionary relationships were found among them, what is the method of classification applied.
- ii) a) Some organisms seen here can live in extreme environments. To which domain do these organisms belong?  
b) Name two places where extreme environments can be seen.
- iii) Name two groups of organisms that can be seen in the aquatic environment as in this diagram.
- iv) a) A sample of water obtained from the above aquatic environment was observed through a light microscope. Organisms were found with the following locomotive organelles. X- Cilia, Y- Flagella Z- pseudopodia. Name three organisms with X,Y,Z locomotive organelles respectively.  
b) Name an emergent plant that could be seen in the above mentioned aquatic environment.

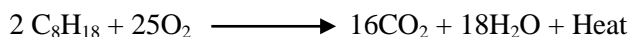


- (B). i) a) Name the type of waves that help bats to avoid obstacles when flying.  
b) Give two instances where humans use the waves mentioned in (a)
- ii) The mass of a fish is 1.4kg. The up thrust acting on the fish is 10N. Find the true weight and the apparent weight of the fish.
- iv) Fishermen use fishing nets to catch fish. Lead balls are fixed to the bottom of the net and Styrofoam balls are fixed to the top of the net. Explain scientifically why those lead balls and Styrofoam balls are used
- iv) A fish in water sees a clear image of a fish in front of it above incident is shown in the diagram.  
a) Is the angle  $\theta$  in the diagram more or less than the critical angle?  
b) Write two instances humans make use of the Phenomenon in (a)



09. (A) Most of the organic compounds are extracted from petroleum.

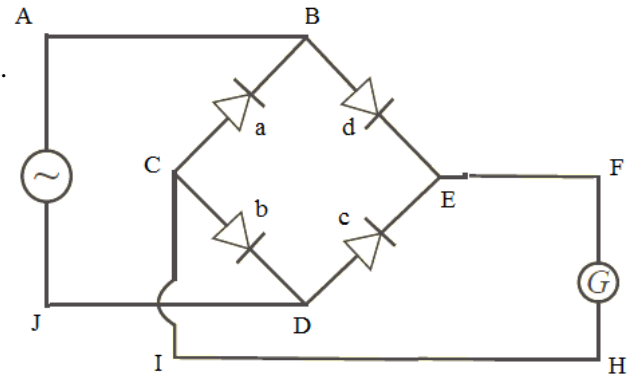
- i) What is the method of extraction is used to separate the compounds of petroleum.
- ii) Octane ( $C_8H_{18}$ ) is one of the compounds extracted from petroleum. The chemical reaction of burning octane in air is given below



Is the reaction endothermic or exothermic?

- iii) Draw an energy level diagram for reactants and products for the above reaction.
- (B) Many polymers are produced using derivatives of ethene which is a hydrocarbon.
  - i) Which is more reactive, ethene or the relative alkane ethane?
  - ii) Give reasons to explain your answer.
  - iii) Write the monomer of poly tetrafluoro ethene.
- (C) According to the ability to conduct electricity, material can be categorized as conductors, semi conductors and Insulators. Shown below is an electrical circuit made by a student using semi-conductors.
  - (i) a,b,c,d are components made of using semi-conductors. Name the components?

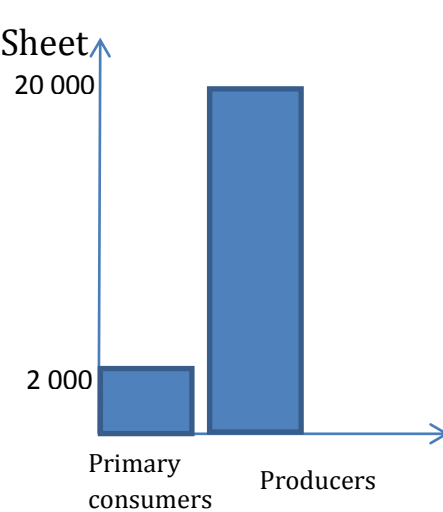
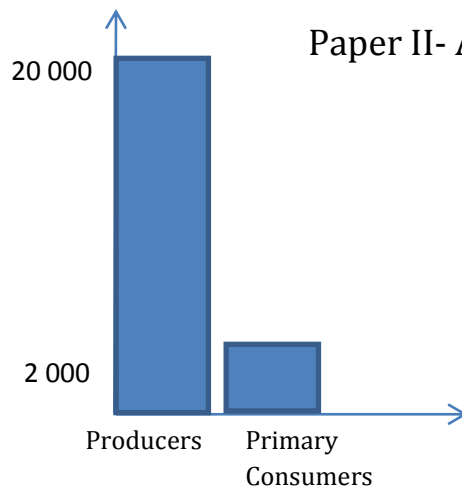
- (ii) When the alternative current supplied to the input circuit is flowing in the JA direction name the components which are forward bias of out of a, b, c, d.
- (iii) When an alternative current is flowing through the input circuit what will be observed in the action of G.
- (iv) Draw the waves of the electric currant flowing through the output circuit when an alternative current is flowing through the input circuit.





## Paper II- Answer Sheet

1. (A) i).



**For one of the above graphs**

- 02

ii)  $x = 200$  J **(Without the unit 01 mark)**

- 02

iii) Respiration / energy is spent on biological activities

- 01

iv) The balanced relationship between organisms and the physical environment

- 02

(B) i) a – burning of fossil fuel / respiration

b- decomposition in the marshy lands

c – cooling equipment/ by using aerosole sprayers

- 03

ii) Persist in the environment for a long time period

Accumulate in the body of organisms along food chains

Widely dispersed in the environment

Highly toxic

**(For any two facts)**

- 02

(C) i. reduce pests/ minimizing the formation of pests with high resistancy/

minimizing the spreading of diseases

- 01

ii. To successfully control the coconut caterpillar which was a major coconut pest

(*Promethocha cumingi*) / using BTI bacteria to control dengue mosquitos

- 01

iii Use of organic fertilizer/ Reforestation for environmental balance/ waste

Management/ carbon foot print and shortening the food milel using traditional methods and technology

- 01

<b>15</b>
-----------

02. (A) i. carbon, hydrogen, oxygen, nitrogen **(For 03 or 04)**

- 01

ii. Enzymes

- 01

iii. Amylase/ Ptayalin

- 01

iv. (a) Cell wall/ chloroplasts/ A large vacuole **(for one)**

- 01

(b) Cell wall – to maintain the shape of the cell/ support and protection of the cell

Larg vacuole – support / water balance

Chloroplasts- photosynthesis **(For one fact)**

- 01

v. (a) KOH / potassium hydroxide

- 01

(b) Absorbing carbon di oxide

- 01

(c) rising of the coloured water through the glass tube

- 01

(B) i. Muscle tissue

- 01

ii. Skeletal muscles/ Heart muscles/ smooth muscles

- 01

iii. Epithelial tissue

- 01

iv.

- Moisturizing/ Humidifying inhaled air

- Warming up of inhaled air up to body temperature

- Removal of foreign matter from inhaled air **(For 2 facts)**

- 02

- v. (a) Ultra filtration/ selective reabsorption/ secretion - 01  
 (b) Urea/ Uric acid/ kreatin - 01

**15**

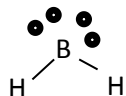
03. (A) i. (a) A - 01  
 (b) 2 , 5 - 01

ii. D - 01

iii. D<sub>2</sub>B - 01

iv. (a) covalent - 01

(b) - 02



v. (Electron distribution is not symmetrical in the bond of the molecule so polarization occurs)

Because of polarization intermolecular bonds are formed. Due to intermolecular bonds high boiling point and high specific heat capacity occur

- 03

vi.  ${}^1_1\text{H}$ ,  ${}^2_1\text{H}$ ,  ${}^3_1\text{H}$  - 02

(B) i. x , z - 01

ii. (a) In test tube 'X' - 01

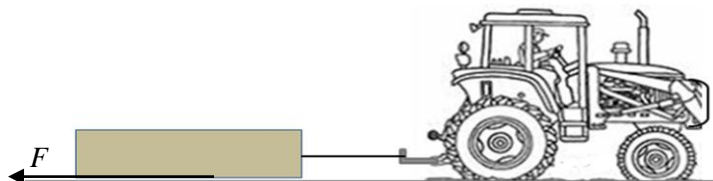
(b) When the temperature is high/ low solubility of sugar is high/ low - 01

**15**

4. (A) i. The acceleration of a body is directly proportional to the unbalanced force acting on it, while it is inversely proportional to its mass

- 01

ii. For marking the force (F) - 01



iii. 4 000 N - 01

iv. 1 200 N - 01

v.  $F = ma$   $1\,560\text{ N} - 1\,500\text{ N} = 400\text{ kg} \times a$  - 01

$$a = 60/400\text{ m s}^{-2}$$

$$= 0.15\text{ m s}^{-2}$$

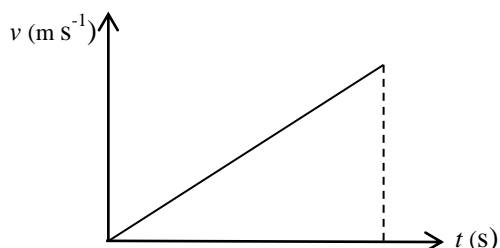
**(without unit -00)**

- 01

(B) i.

**(For the graph)**

- 01



ii. Acceleration = Change of velocity

Time

$$0.15 = (v - 0) / 20\text{ s} \quad \text{for applying}$$

- 01

$$v = 3\text{ m s}^{-1} \quad \textbf{(with unit)}$$

- 01

iii. Difference in displacement =  $20\text{ s} \times 3\text{ m s}^{-1} = 60\text{ m}$

- 01

- (C) i. Quantity of heat =  $\frac{200}{1000} \times 4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1} \times (100^{\circ}\text{C} - 30^{\circ}\text{C})$  - 01  
 $= 58800 \text{ J}$  - 01  
 ii. Water changes its state from water (liquid) to water vapour at that point - 01  
 iii. Power of the thermal coil =  $58800 \text{ J} / 2 \times 60 \text{ s}$  - 01  
 $= 490 \text{ W}$  - 01

15

5. (A) i. Plantae - 01  
 ii. Dicotyledonae (Dicots) - 01  
 iii. Cycas/ Pinus - 01  
 iv. Amphibians - 01  
 (B) i. anther, filament - 02  
 ii. (a) Ovary (b) Uterus - 02  
 iii. Progesterone - 01  
 iv. (a) The combination of a gene pair for a particular character - 02  
 (b) The genes that present in the same chromosome which are not segregated independently - 02  
 C) i. (a) absorbing water - 01  
 (b) production of bile/ converting excess glucose to glycogen - 01  
 ii. Ptyalin/ salivary amylase  
 iii. Diastole/ Atrial contraction - 01  
 Systole/ Ventricular contraction - 01  
 iv. X – Sensory Neuron - 01  
 y – motor Neuron Brain( in cranial reflexes) - 01

20

- 06 (A) i. Colour change/ Blue colour solution becomes colourless - 01  
 ii.  
 • Take equal volume of copper sulphate with equal concentration to two equal test tubes  
 • Take equal amount of Mg in the same physical condition and put in to the two test tubes separately  
 • Keep one test tube in a beaker with  $0^{\circ}\text{C}$  water and the other test tube in a beaker with  $100^{\circ}\text{C}$  water at the same time and observe - 03  
 iii.  $\text{CuSO}_4(\text{aq}) + \text{Mg}(\text{s}) \longrightarrow \text{MgSO}_4(\text{aq}) + \text{Cu}(\text{s})$  - 03  
**(for the correct equation - 02 for the correct physical states - 01)**  
 iv. Single displacement - 01  
 (B) i. Mass of an atomic mole of Magnesium =  $24\text{g}$  - 02  
 ii. Mass of an atom of Mg =  $24 / 6 \times 10^{23} = 4 \times 10^{-23} \text{ g}$  - 02  
 iii. Number of atomic moles =  $\text{Mass} / \text{Molar Mass} = \frac{6\text{g}}{24 \text{ g mol}^{-1}}$  - 01  
 $= 0.25 \text{ mol}$  - 02  
 iv.  $C = \frac{m}{vM}$   
 $m = CvM$  - 01  
 $= \frac{0.1 \text{ mol dm}^{-3} \times 100 \text{ dm}^{-3} \times 249.5 \text{ mol}^{-1}}{1000}$  - 01  
 $= 2.495 \text{ g}$   
 $= 2.5 \text{ g} - \text{(01 mark)}$  - 03

20

7. (A) i.  $100\text{ N} + 100\text{ N} = 200\text{ N}$  ..... - 01
- ii. To decrease the amount of force applied by a single person  
To change the direction of force - 02
- iii. (a). In Equilibrium / balanced - 01  
(b).  
• The three forces must be coplanar  
• The resultant of any two of the forces should be equal to the third force  
in magnitude and opposite in direction - 02
- iv. (a).  $\frac{50}{100} \times 200\text{ N} = 100\text{ Nm}$  - 02  
(b). Clockwise - 01
- v. (a).  $50\text{ N} - (15 + 15\text{ N}) = 20\text{ N}$  - 02  
(b).  $P = \pi + h d g / \pi + h p g$  - 01  
(c).  $P = 4\text{ m} \times 1000\text{ kg m}^{-3} \times 10\text{ ms}^{-1} = 40000\text{ N m}^{-2}$  - 02

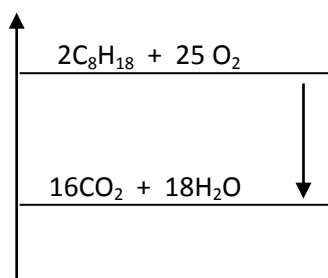
- (B) i. (a) centre of curvature  
(b) focal point  
(c) pole - 03
- ii. upright/ virtual/ large (Magnification more than 01) - 01
- iii. By dental doctors to examine teeth of patients/ to see the face when shaving  
the beard - 02

**20**

08. (A) i. Natural classification - 01
- ii. (a) Archaea - 01  
(b) polar ice caps/ volcanoes/ ocean beds/ deep inside the earth/  
hot water spring - 02
- iii. Amphibians, Pisces, Arthropoda, Mollusca - 02
- iv. (a) x – paramecium y – chlamydomonas z – Amoeba - 03  
(b) Hydra/ Keleti/ Valisneria - 01
- (B) i. (a) Ultra sound waves - 01  
(b) To mix xhoxolate/ to scan internal organs of the human body/ to detect  
fine fractures in boilers, air planes/ to find the depth of the sea/  
to solder metals - 02
- ii. Real depth - 14 N Apparent depth - 4 N - 02
- iii. Density of lead is more relative to the density of water. Density of Styrofoam  
is less relative to the density of water. Therefore lead balls sink in water  
Styrofoam balls float in water - 02
- iv. (a) Increases - 01  
(b) Optical fibres/ cutting of gems/ optical telephone wires/ In binoculars - 02

**20**

09. (A) i. Fractional distillation - 02
- ii. Exothermic - 01
- iii. - 02



(B) i. Ethene

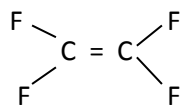
- 02

ii. Ethane – no double bonds, Ethene – has double bonds

- 02

iii.

- 02



(C) i. Rectifying diodes

- 02

ii. d , b

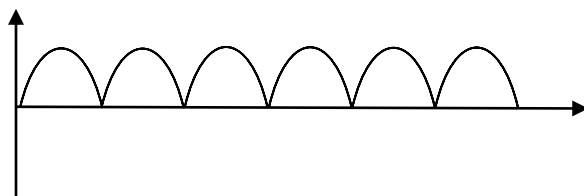
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iii. Indicator deflects in the same direction

- 02

iv.

- 03



20