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**අධ්‍යයන පොළ සහතික පත්‍ර (සාමාන්‍ය පෙළ)**  
**கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தரம்)**  
**General Certificate of Education (Ord Level)**

**34 S 11**

**විෂය II**  
විஞිඟානම් II  
**Science II**

**පෙරහුරු ප්‍රශ්න පත්‍රය - 2018**  
பரீட்சை முன்னோடி வினாப்பத்திரம் - 2018  
**Pre-Practice Question paper - 2018**

**පැය තුනයි**  
மூன்று மணித்தியாலம்  
**Three hours**

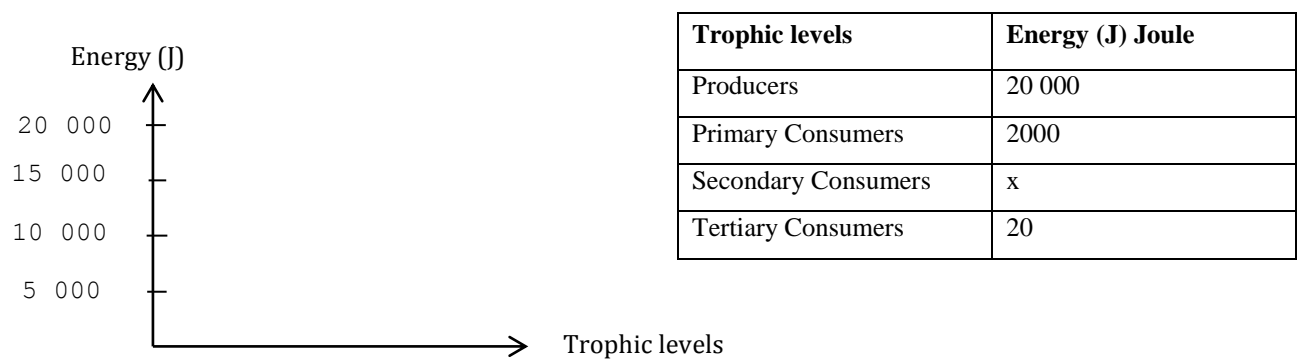
**Instructions:**

- 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.

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

(ii) Write two characteristics of organic pollutants/

Carbonic pollutants

(a) .....

(b) .....

(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.

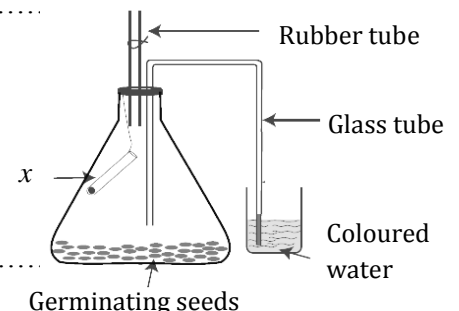
(a) Name solution 'x' in the test tube .....

(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.

.....

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.

.....

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

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 ?

.....

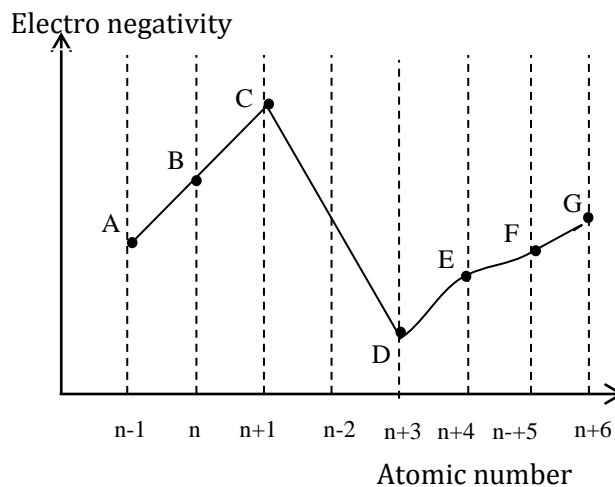
iii) Write the formula of the compound formed by element B and element D indicated in the above graph.

.....

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.



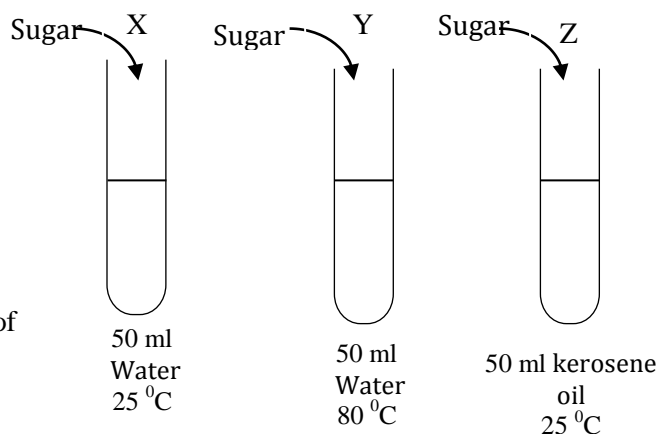
v) The boiling point and specific heat capacity of the compound mentioned in (iv) (b) has a high value. Explain the reason for it.

.....  
 .....

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

.....  
 .....

(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)

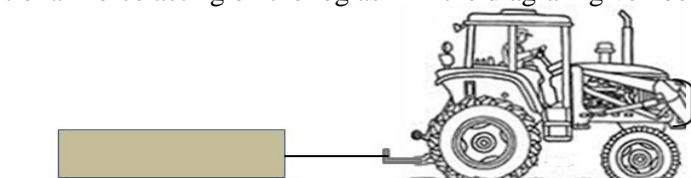
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04. (A)

i) Write Newton's second law of motion.

.....  
 .....

ii) A tractor is used 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?

.....

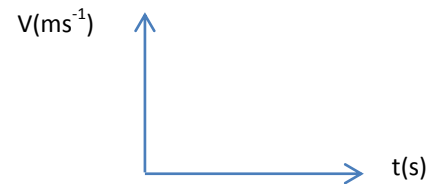
v) When the log is at rest, the cable applies a force of 1560 N on the log the frictional force acting on the log is 1500N. Find the acceleration of the log when it is moving.

.....  
.....

(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.

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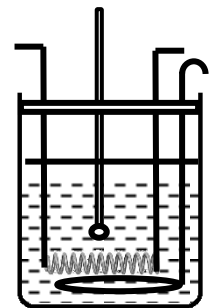
iii) Using the velocity time graph find the displacement of the log after 20s.

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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  $30 \text{ }^\circ\text{C}$  to  $100 \text{ }^\circ\text{C}$ .

.....  
.....



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

.....  
.....

iii) The thermo coil took 2 minutes to increase the temperature of water from  $30 \text{ }^\circ\text{C}$  to  $100 \text{ }^\circ\text{C}$ . 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.

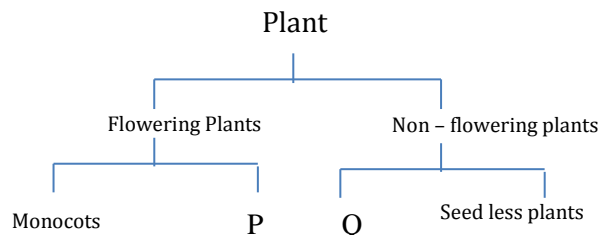
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## Part B

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

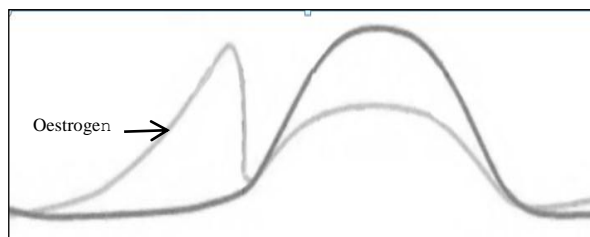
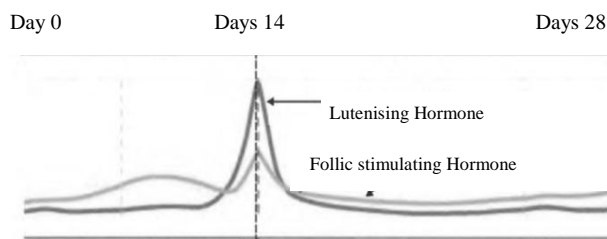
The chart shows a plant classification as such.

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



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

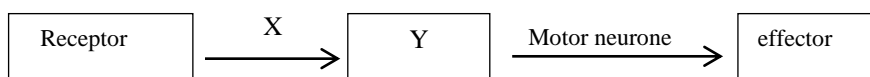
- i) What are the main parts of the androecium/ stamen.
- ii) During the menstrual cycle changes occur in two places of the female reproductive system. The following graphs show the variation of the hormones that cause those changes. Name the two places that the hormones shown in the graphs A and B are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



- iii) What is the other hormone acting in B?
- iv) Define the following items related to heredity.
  - (a) Gene Expression
  - (b) linked genes

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

- i) Write a main function in each of the following organs in the process of food digestion
  - a) Large intestine
  - b) Liver
- ii) Which enzyme produced by the salivary glands helps in the process of food digestion.
- iii) Name the two stages of the cardiac cycle after intervening (Atrial and Ventricular relaxation)
- iv) 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.

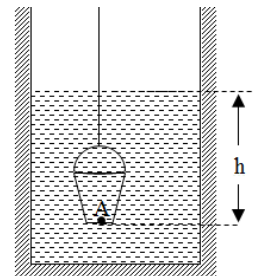
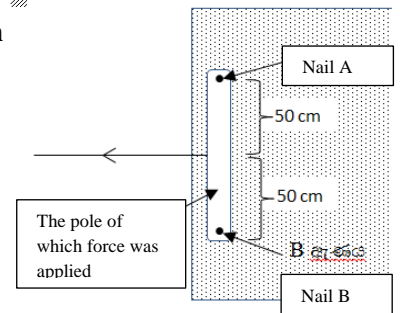
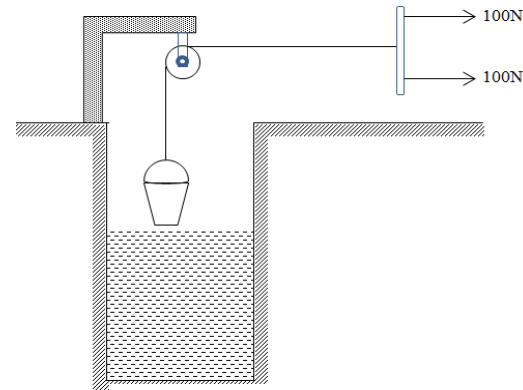
- i) What is the observation which will help the student to come to the conclusion that a chemical reaction took place in each of the test tube?
- ii) The students wanted to find how the temperature affects the rate of reaction between the copper sulphate solution and iron. Present the steps that has to be taken in the activity.
- iii) Write the balanced chemical equation between copper sulphate solution and magnesium metal with the physical states related to the reaction.
- iv) 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  $249.5 \text{ g mol}^{-1}$ )

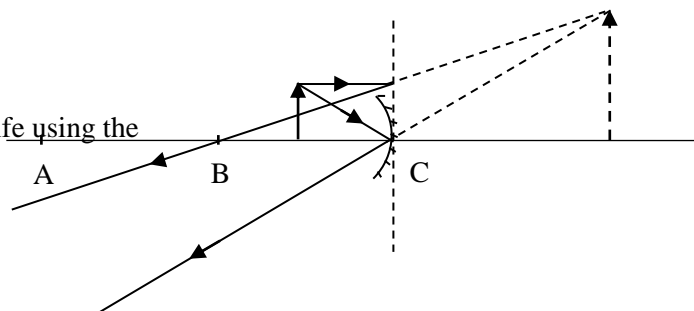
07. (A) The diagram shows a simple activity done by two students to lift a large bucket of water. A light pole, tied to the free end of the rope which is tied to the bucket was used to pull it.

- 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

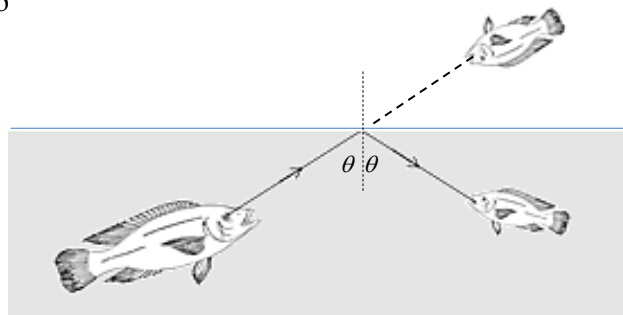


08. (A) A rough diagram of an aquatic eco system is shown below.

- 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.

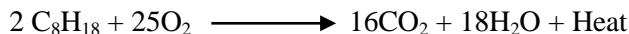


- (B). i) a) Name the type of waves that help bats to avoid obstacles when flying.  
b) Give two instances where humans use the waves mentioned in (a)
- ii) The mass of a fish is 1.4kg. The up thrust acting on the fish is 10N. Find the true weight and the apparent weight of the fish.
- iv) Fishermen 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 tetrafluro 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.

