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இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

34 E I

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2019 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2019 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2019

07.12.2019 / 1300 - 1400

විද්‍යාව I
விஞ்ஞானம் I
Science I

පැය එකයි
ஒரு மணித்தியாலம்
One hour

Note :

* *Answer all questions.*
* *In each of the questions* **1** *to* **40**, *pick one of the alternatives* (1), (2), (3), (4) *which you consider is correct or most appropriate.*
* ***Mark a cross*** (×) ***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.*

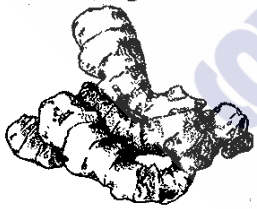
1. Liver is a
(1) cell. (2) tissue. (3) organ. (4) system.

2. To maintain the balance of which following cycle is biological fixation important?
(1) carbon cycle (2) nitrogen cycle
(3) phosphorus cycle (4) water cycle

3. Which following quantity is a vector?
(1) displacement (2) distance (3) pressure (4) work

4. Which following molecule is composed of the highest number of atoms?
(1) CH_3CHO (2) CCl_4 (3) H_2SO_4 (4) $CO(NH_2)_2$

5. A rough sketch drawn by a student by observing an underground stem during a field study is shown below. To which type of underground stems does this belong?
(1) rhizome
(2) corm
(3) bulb
(4) stem tuber



6. Which of the following structure – function pairs indicates the correct relationship?

	Structure	Function
(1)	blood platelets	production of antibodies
(2)	white blood cells	transport of oxygen
(3)	red blood cells	phagocytosis
(4)	blood plasma	transport of hormones

7. The relative atomic mass of iron is 56. Thus, which of the following statements is the correct statement?
(1) The mass of an iron atom is 56 g.
(2) A mole of iron contains 56 iron atoms.
(3) The mass of 6.022×10^{23} iron atoms is 56 g.
(4) The mass of 56 iron atoms is 6.022×10^{23} g.

8. Which of the following molecules is made of two covalent bonds?
(1) Cl_2 (2) CH_4 (3) HCl (4) H_2O

9. Coordination of movements and equilibrium of the human body are maintained by the
(1) cerebellum. (2) cerebrum.
(3) medulla oblongata. (4) spinal cord.

[See page two

10. Consider the following statements on various processes taking place in a plant.

A - Plants emit carbon dioxide only during night.
B - Plants emit only oxygen during the day time.
C - Gaseous exchange in plant leaves mainly occurs through stomata.
D - Gases entering the plant leaves diffuse into the cells through intercellular spaces.

Of the statements *A*, *B*, *C* and *D* above, the true statements are,

(1) only *A* and *B*. (2) only *A* and *D*.
(3) only *B* and *C*. (4) only *C* and *D*.

11. The acceleration due to gravity on the Earth's surface is 10 $m s^{-2}$. The acceleration due to gravity on the surface of the moon is $\frac{1}{6}$ the acceleration due to gravity of the Earth. If the weight of a man on the Earth is 600 N, how much is his weight on the moon?

(1) 60 N (2) 100 N (3) 360 N (4) 600 N

12. The deficiency of which following vitamin causes anaemia?

(1) vitamin A (2) vitamin B (3) vitamin E (4) vitamin K

13. In which part of the female reproductive system does fertilization occur in human reproduction?

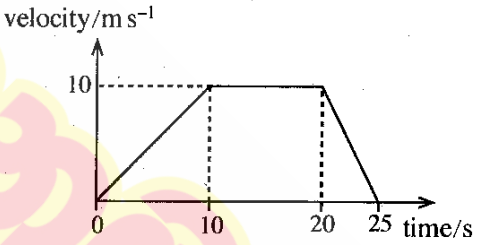
(1) vagina (2) uterus (3) fallopian tube (4) ovaries

14. What is the mass of glucose required to make 500 cm^3 of a glucose solution of concentration 1.0 mol dm^{-3}? (Relative molecular mass of glucose = 180)

(1) 45 g (2) 90 g (3) 180 g (4) 360 g

15. The movement of an object during 25 seconds is illustrated by the velocity-time graph given. Select the correct statement about the movement of the object.

(1) The retardation of the object is 2 $m s^{-2}$.
(2) The displacement of the object is zero.
(3) The acceleration of the object is 10 $m s^{-2}$.
(4) The object has moved 20 seconds at a velocity of 10 $m s^{-1}$.



16. In which part of the alimentary canal is the enzyme lipase added to food?

(1) duodenum (2) stomach (3) oesophagus (4) large intestine

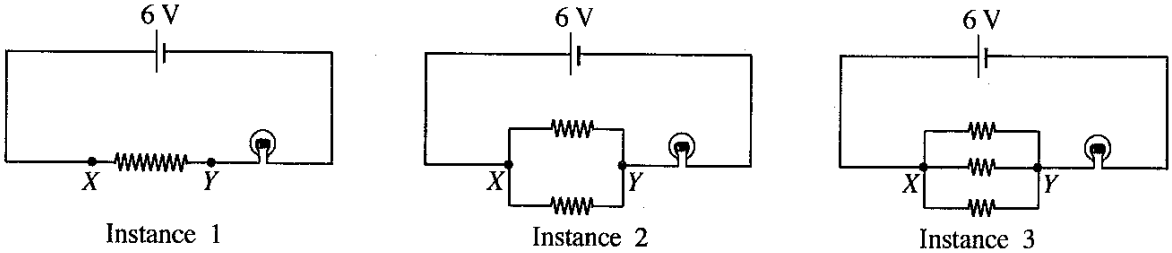
17. Given below is the balanced equation, relating to the decomposition of potassium permanganate ($KMnO_4$).

$$2KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$$

How much is the amount of moles of potassium permanganate that should be decomposed to produce 3 moles of oxygen gas?

(1) 1 (2) 2 (3) 4 (4) 6

18. There are three wires of equal length with uniform resistance. Illustrated below are three instances in which the three wires are connected between the points *X* and *Y* in the same circuit where the first wire is connected as it is, the second wire cut into two equal parts and the third cut into three equal parts. (Assume the voltage of battery stays constant.)



Instance 1 Instance 2 Instance 3

The bulb connected to the circuit lights brightest in

(1) instance1. (2) instance 2. (3) instance 3. (4) instances 2 and 3.

[See page three

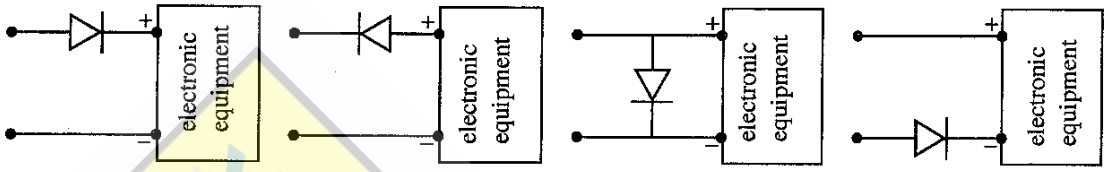
19. Consider the following substances.

A - solid sodium chloride crystals
B - molten sodium chloride
C - aqueous sodium chloride solution

Which of the above conduct electricity?

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

20. When supplying electricity to an electronic equipment, it may get damaged if the source of electricity is connected to it with the terminals reversed. Which diagram illustrates correctly how a diode should be connected to it to protect the equipment from such a damage?



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

21. It was found that an aqueous solution of the compound HA contains H^+ ions, A^- ions, OH^- ions as well as undissociated HA molecules. The pH value of this solution is less than 7. Which of the following statements is true about HA?

(1) HA is a strong acid. (2) HA is a weak acid.
(3) HA is a weak base. (4) HA is an acidic salt.

22. Several species of animals and the number of animals belonging to each species identified by a group of students in a environmental study are as follows.

Animal Species	snail	butterfly	spider	leech	scorpion
Number	5	4	3	2	1

What is the number of animals identified by the students which belong to phylum Arthropoda?

(1) 7 (2) 8 (3) 9 (4) 10

23. The atmospheric pressure at the sea level is 1×10^5 N m^{-2}. The area of the tympanic membrane of a man is about 5×10^{-5} m^2. What is the force exerted by the atmospheric pressure on the tympanic membrane?

(1) 5 N (2) $\frac{1}{5}$ N (3) $\frac{1}{5} \times 10^{10}$ N (4) 5×10^{-10} N

24. The power supplied to the primary coil of a transformer of 100% efficiency is 200 W. If the voltage across its secondary coil is 10 V, what is the current flowing through the secondary coil?

(1) 10 A (2) 20 A (3) 40 A (4) 50 A

25. Which polysaccharide contained in plant cells helps prevent constipation?

(1) starch (2) glycogen (3) cellulose (4) lactose

26. What is the constituent mostly present in the urine of a healthy person?

(1) water (2) urea (3) uric acid (4) salts

27. What is the polymer that contains carbon and hydrogen only as the constituent elements?

(1) vulcanized rubber (2) polythene
(3) teflon (4) cellulose

28. What is the equipment that works using the force exerted on a current carrying conductor placed in a magnetic field?

(1) moving coil microphone (2) electric bell
(3) transformer (4) direct current motor

29. Select the **false** statement from the following statements.

(1) Fractional distillation is used to refine mineral oils.
(2) Steam distillation is used to extract cinnamon oil.
(3) Solvent extraction is used to extract medicinal extracts and potions.
(4) Chromatography is used to separate a mixture of volatile components.

[*See page four*

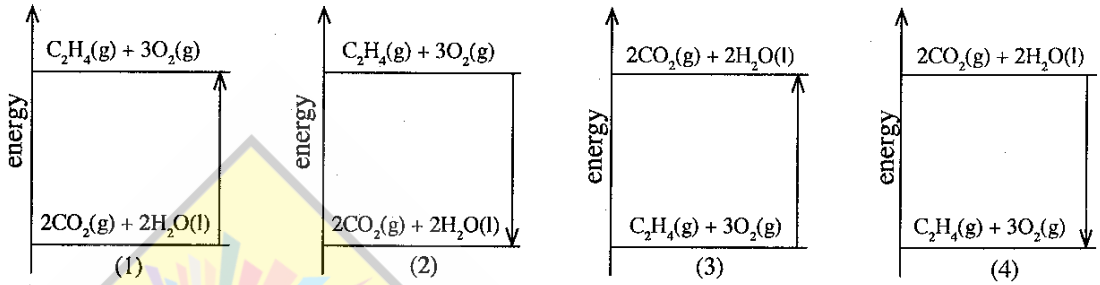
● Question numbers **30** and **31** are based on the following balanced equation relating to the complete combustion of ethene (C_2H_4).

$$C_2H_4(g) + 3O_2(g) \longrightarrow 2CO_2(g) + 2H_2O(l) + 1400\,kJ$$

(H = 1, C = 12, O = 16)

30. What is the mass of water formed when one mole of ethene is subjected to complete combustion?
(1) 2 g (2) 18 g (3) 36 g (4) 44 g

31. What is the correct energy level diagram for the complete combustion of ethene?



32. There is a greater chance for a man swimming in the water with gas bubbles at the base of a water fall to drown. What is the reason for this?
(1) increase in the upthrust exerted by water (2) decrease in the upthrust exerted by water
(3) dissolving of a greater amount of gas in water (4) decrease in the temperature of water

33. When a sound wave emitted by a loudspeaker propagates through air its
(1) frequency decreases. (2) velocity decreases.
(3) wave length decreases. (4) amplitude decreases.

34. Why is limestone added to the blast furnace during iron extraction?
(1) to reduce the iron ore to iron (2) to increase the temperature in the blast furnace
(3) to remove certain impurities in the iron ore (4) to decrease the melting point of iron

35. Which of the following has the greatest effect on ozone layer depletion?
(1) CFC gases (2) NO_2 gas (3) CH_4 gas (4) CO_2 gas

36. What is the true statement about the $^{20}_{10}Ne$ atom and the $^{23}_{11}Na^+$ ion?
(1) The number of electrons in both is equal.
(2) The number of protons in both is equal.
(3) The number of neutrons in both is equal.
(4) The number of protons in both is greater than the number of neutrons.

37. Which following factor affects the pressure exerted by water on the bottom of a vessel filled with water to a certain height?
(1) volume of water (2) shape of the vessel
(3) area of the bottom of the vessel (4) vertical height of the water column

38. Which of the following cells are multi-nucleate?
(1) red blood cells (2) white blood cells
(3) skeletal muscle cells (4) cardiac muscle cells

39. Boiling and evaporation are the two ways by which liquid water moves into the air as water vapour. Of the following statements connected with them, which is **false**?
(1) Temperature remains constant during boiling as well as during evaporation.
(2) Boiling is a visible process while evaporation is an invisible process.
(3) Speed of wind affects evaporation but does not affect boiling.
(4) Temperature of water remains constant during boiling while decreases during evaporation.

40. The aim of shortening the food mileage is to
(1) direct people more to consume native food.
(2) get an opportunity to consume quality food.
(3) create a greater demand for the locally produced food.
(4) minimize the amount of fuel spent during transport of food.

* * *

සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka
Department of Examinations, Sri Lanka

34 | E | II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2019 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2019 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2019

විද්‍යාව II
விஞ்ஞானம் II
Science II

07.12.2019 / 0830 - 1140

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

අමතර කියවීම් කාලය - මිනිත්තු 10 යි
மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்
Additional Reading Time - 10 minutes

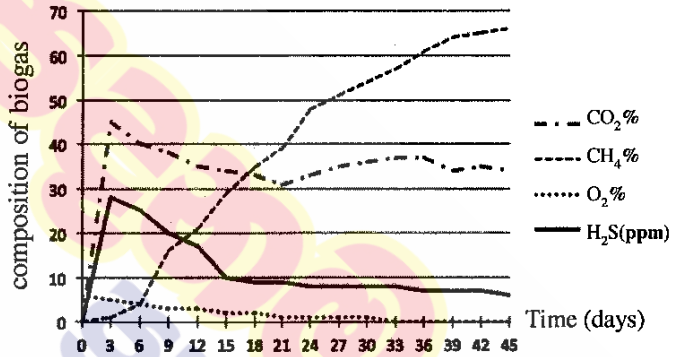
Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Index Number: .....

Instructions:
- ✳ ***Write your answers in neat handwriting.***
- ✳ *Answer the **four** questions in* **Part A**, *in the space provided.*
- ✳ *Of the five questions in* **Part B** *answer **three** questions only.*
- ✳ ***After answering, tie** **Part A** **and the answer script of** **Part B** **together and hand over.***

Part A

1. (*A*) Gaseous fuel essential for the laboratory of a school is obtained from a biogas generator. Once in every three days, the composition of four types of gases contained in the biogas produced by it was determined. Those information are presented by the graph.



(i) In which gas has the production gradually increased during the relevant period?

.....

(ii) How much hydrogen sulphide was present in the gaseous mixture as per the composition on the 15th day?

.....

(iii) Biogas is produced by the action of anaerobic bacteria on plant and animal waste. By the variation of the composition of which gas indicated in the graph is this justified?

.....

(iv) Of the types of gases shown in the graph, which gas acts as a fuel? .....

(v) Of the waste management principles known as 4R, for which principle is the maintenance of the biogas generator an example? .....

(*B*) (i) Fixing of a larger number of windows is a noticeable feature of the above laboratory building. State **two** aspects each by which it contributes to maintain the conditions (a) and (b) given below.

(a) Creating a favourable environment for the laboratory users

- .....
- .....

(b) Minimizing electricity consumption

- .....
- .....

[*See page two*

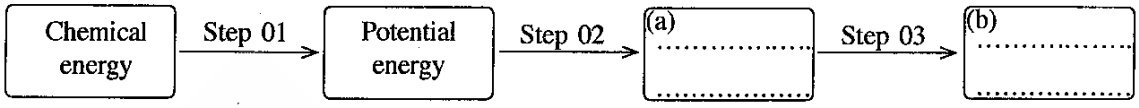
(ii) In this laboratory, electricity is produced as follows to light the electric bulbs.

Step 1: Maintaining under high pressure the steam produced by boiling water by burning biogas.

Step 2: Operating a turbine by spurting steam kept under high pressure.

Step 3: Operating an electric generator by the running turbine.

Complete the following schematic diagram on the conversion of energy relating to the above process.



(C) Given below are some compounds disposed to the draining gutter and the outer atmosphere during laboratory activities in a certain week.

$Ca(OH)_2$, $K_2Cr_2O_7$, Na_3PO_4, NO_2, SO_2

Of the above compounds, write the compound which is most relevant to each of the following statement on the dotted line given opposite to them.

(i) Contributes to increase the soil pH value .....

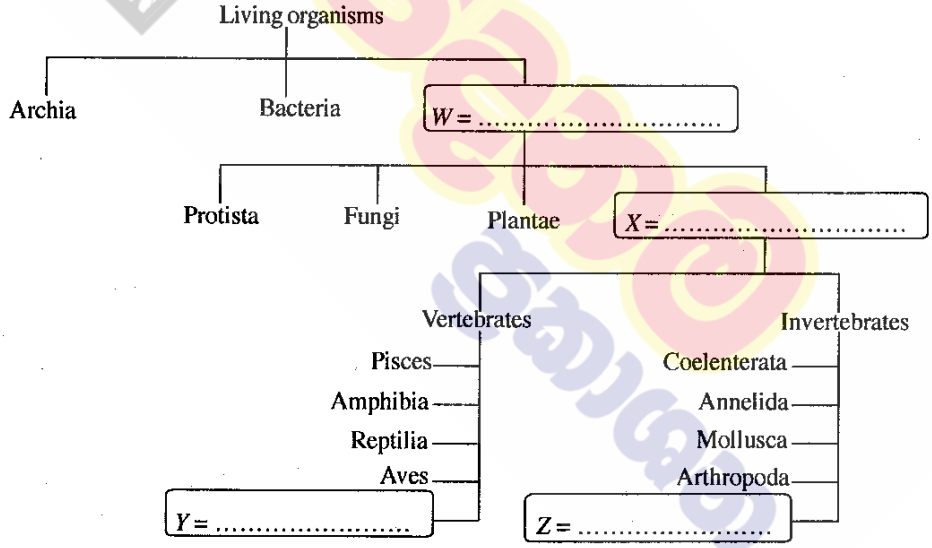
(ii) Causes an increase in the heavy metal composition in underground water .....

(iii) Contributes to create an eutrophication state when accumulated in a water body .....

(iv) Contributes to produce photochemical smog as well as acid rain .....

15

2. (A) An outline of the classification of living organisms is given below:



Answer the following questions using the above chart.

(i) Complete the above chart by writing the relevant group of living organisms on the dotted line in the boxes *W*, *X*, *Y* and *Z*.

(ii) Name the domain to which living organisms **not** sensitive to antibiotics belong.

.....

(iii) To which kingdom do algae belong? .....

(iv) A characteristic specific to each group of invertebrate animals shown in the above classification chart is given below. Opposite each characteristic, write the group of animals having that characteristic on the dotted line given.

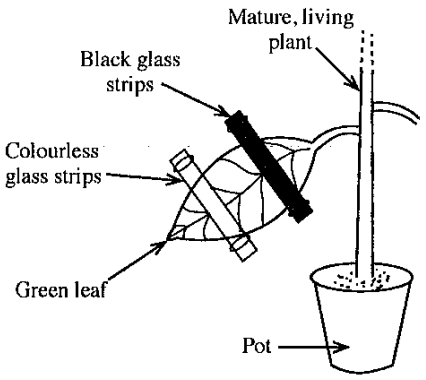
(a) Bearing soft bodies .....

(b) Division of the body into equal segments .....

(c) Existing in two forms polyp and medusa .....

[*See page three*

(*B*) A set up arranged by a student to study a factor essential for the photosynthetic process is shown in the diagram. This set up was kept in the dark for 48 hours and then was exposed to light for 5 hours. Afterwards the glass strips covering the leaf were removed and the leaf was tested for starch.



(i) To test which factor essential for photosynthesis was this set up used?

.....

(ii) What is the reason for keeping the set up in the dark for 48 hours?.....

.....

(iii) Write the colour that can be seen in each of the following parts of the leaf during the test for starch.

Part covered with the black glass strips .....

Part covered with the colourless glass strips .....

Part exposed to direct light .....

15

3. (*A*) The symbols of the elements in the second period of the Periodic Table are given in the following table in respective order.

Li	Be	B	C	N	O	F	Ne

(i) Select the symbol of the element relevant to each of the following statements from the above table and write on the dotted line given opposite.

(a) Has the maximum first ionisation energy .....

(b) Has the minimum electronegativity .....

(c) Diamond is one allotropic (polymorphic) form .....

(d) Exists as diatomic molecules with a triple bond between the atoms .....

(e) Exists as diatomic molecules as well as triatomic molecules in the atmosphere .....

(ii) Write the formula of the compound formed by the combination of the elements Li and O.

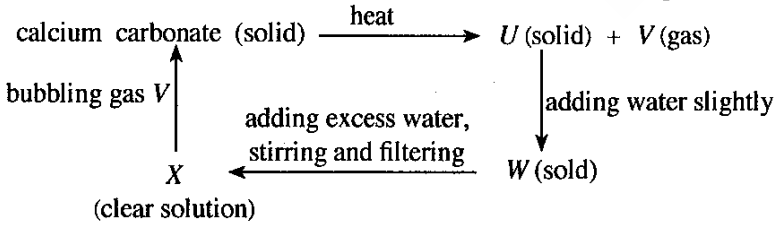
.....

(iii) From the ions given below, select the cation and anion which the compound formed by the combination of Li and O contains and underline them.

Li^+ Li^{2+} Li_2^{2+} O^- O^{2-} O_2^{2-}

(iv) Draw the structure of the simplest monomer molecule which can polymerize and contains only the elements C and F.

(*B*) The following flow chart shows a series of reactions carried out starting with calcium carbonate.



When gas *V* is bubbled through *X*, the solution turns milky because calcium carbonate is formed as a suspension. This observation is also used as a test to identify gas *V*.

(i) Write the chemical formulae of the compounds *U* and *W*.

U: ..... *W*: .....

[See page four

(ii) Delete one word printed in bold so that a correct idea is expressed by each of the following sentences.

(a) Solid *U* is **acidic** / **basic**. (b) The bond in the solid *U* is **ionic** / **covalent**.

(c) The pH value of an aqueous solution of the gas *V* is **lower** / **higher** than 7.

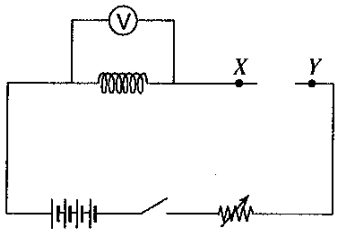
(iii) What can be seen when excess of the gas *V* is bubbled through the milky solution formed by the reaction between *X* and *V*?

.....

15

4. (*A*) A teacher provided the following materials and equipment to students.

a nichrome wire coil, four dry cells, an ammeter, a switch, a voltmeter, a rheostat, connecting wire



The Figure shows an incomplete circuit diagram of a set up arranged by those students to examine the relationship between the potential difference between the two ends of the nichrome wire coil and the electric current flowing through it.

(i) By what name is the way the dry cells are connected to the circuit known?

.....

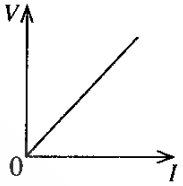
(ii) Draw in the circuit diagram the standard symbol of the equipment that should be connected between the terminals *X* and *Y*.

(iii) Why is a rheostat connected to this circuit? .....

(iv) State a condition that would result if the switch is kept closed for a long time after completing the circuit correctly.

.....

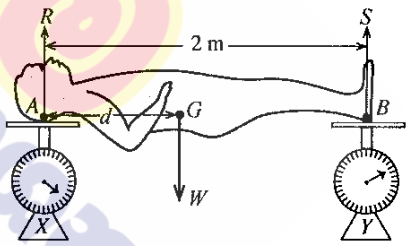
(v) Given here is the graph of *V* against *I* drawn using the readings obtained by the experiment. What is the physical quantity represented by the gradient of the graph?



.....

(*B*) The following activity was done by a group of students to find the centre of gravity of a metal statue.

The head and the two feet of the statue were placed on the smooth pans of two identical balances *X* and *Y* kept on a horizontal floor as shown in the Figure. The reading in balance *X* was 250 N and the reading in balance *Y* was 150 N.



(i) What are the forces acting with regard to the equilibrium of the statue?

.....

(ii) What is the reaction *R* through the point *A* and the reaction *S* through the point *B* of the statue?

R: ..... *S*: .....

(iii) What is the weight (*W*) of the statue? .....

(iv) The distance from *A* to the centre of gravity of the statue *G* is *d*. Write the moment of the weight of the statue around point *A* in terms of *d*.

.....

(v) What is the moment of the reaction *S* around point *A*?

.....

(vi) The anti-clockwise moment of *S* around point *A* is equal to the clockwise moment of weight *W* around point *A*. Find the value of *d*.

.....

.....

15

* *

|See page five

Part B

● Answer only **three** questions from the questions No. **5**, **6**, **7**, **8** and **9**.

5. (*A*) Figure I presents a sketchy line diagram which shows the internal structure of the human heart.

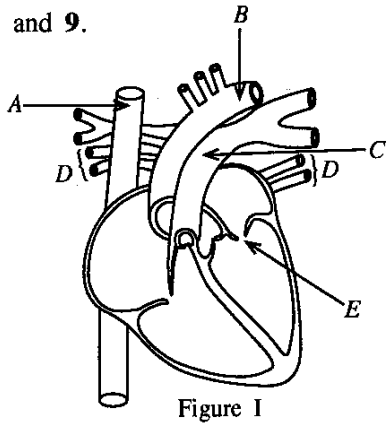


Figure I

(i) Name the blood vessels *A*, *B*, *C* and *D* in Figure I.

(ii) When comparing with the composition of the blood flowing through *D*, what is the main difference in the composition of blood flowing through *C*?

(iii) What is the valve named *E*?

(iv) Describe briefly how the characteristic 'lub' and 'dup' sounds heard during the heart beat are generated.

(v) Figure II indicates the changes in the potential corresponding to the three stages of the cardiac cycle of a healthy person's E.C.G. Which stage of the cardiac cycle is denoted by *T* in that Figure?

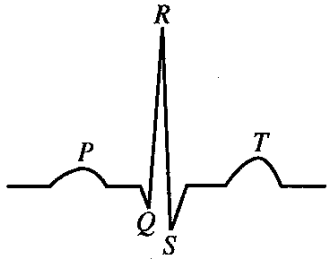


Figure II

(vi) Heart muscles are weakened by the blockage of the blood vessel supplying blood to them by blood clots. By what name is this ailing condition known?

(*B*) The number of chromosomes in a somatic (body) cell of a mammalian animal species *X* is 40.

(i) What is the number of chromosomes contained in the daughter cells produced by the meiotic division of gamete mother cells of *X*?

(ii) Name a daughter cell type formed by the meiotic division of gamete mother cells of *X*.

(iii) How does a daughter cell formed by the mitotic division differ from a daughter cell formed by meiotic division?

(*C*) (i) The garden pea plant seeds have two shapes, round and wrinkled. The gene giving rise to round seeds is *R* while the gene giving rise to wrinkled seeds is *r*. The genotype of the plant with dominant, homozygous genes for the seed shape is *RR*. Write the genotype for each of the following plant with regard to the seed shape.

(a) Plant with recessive, homozygous genes

(b) Plant with heterozygous genes

(ii) When a pure breeding garden pea plant with round seeds was crossed with a pure breeding garden pea plant with wrinkled seeds, all the F_1 generation plants had round seeds. In the F_2 generation obtained by crossing two plants in the F_1 generation, the ratio of the plants with round seeds to the plants with wrinkled seeds was 3:1.

(a) Write the genotype of the F_1 generation plants.

(b) Construct the Punnett square to indicate the genotype of the plants of the F_2 generation.

(c) Write the genotype ratio of the F_2 generation plants.

(*Total marks* 20)

6. (*A*) Acids, bases and salts are three main groups of compounds found in the laboratory.

(i) Explain what an acid is based on how it behaves in water.

(ii) Hydrochloric acid (HCl) is a strong acid while acetic acid (CH_3COOH) is a weak acid. What is the difference between a weak acid and a strong acid?

(iii) By what name is the process of forming a salt and water by the reaction of an acid and a base known?

(iv) (a) Write the balanced chemical equation for the reaction between the base sodium hydroxide and hydrochloric acid.

(b) Write an observation that can be made when the above reaction occurs.

[*See page six*

(*B*) Gastric juice contains hydrochloric acid. Antacid tablets given to relieve the discomforts caused by the high acidity in the stomach contain the base magnesium hydroxide ($Mg(OH)_2$).

(i) What is the salt formed during the reaction between hydrochloric acid and magnesium hydroxide base?

(ii) What is the amount of moles of water formed when one mole of magnesium hydroxide completely reacts with hydrochloric acid?

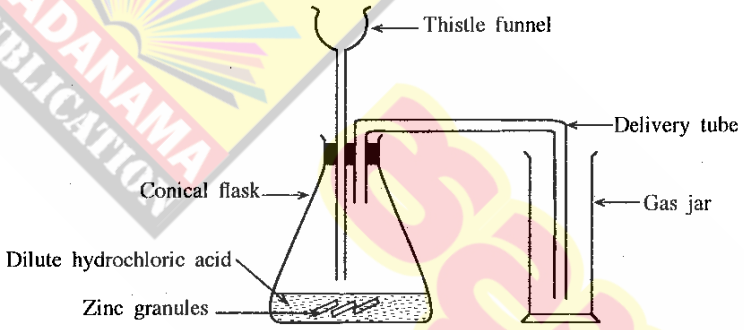
(*C*) A bottle contains 500 cm^3 of an acetic acid solution. The density of the solution is 1.04 g cm^{-3} and the mass of acetic acid contained in this solution is 26 g.

(i) Calculate the mass of the acetic acid solution contained in the bottle.

(ii) Calculate the percentage of acetic acid by mass in the above solution.

(iii) Vinegar is an aqueous solution which contains about 5% acetic acid by mass. The boiling point of acetic acid is 118 °C. Name a technique that can be used to obtain a solution that contains about 10% acetic acid by mass using a sample of vinegar.

(*D*) A set of apparatus arranged by a student to prepare a sample of hydrogen gas using dilute hydrochloric acid and zinc (Zn) metal is shown below.



(i) Write **two** errors that can be seen in the above set up.

(ii) Suggest **two** measures that can be adopted to increase the rate of the reaction taking place in the conical flask.

(iii) State a test and the relevant observation to confirm that the gas produced by the reaction is hydrogen. (*Total marks* 20)

7. (*A*) Figure I below illustrates how a ray of light coming parallel to the principal axis of a glass convex lens travels after refraction. The points *A*, *B*, *C*, *D*, and *E* are marked on the principal axis of the lens so that $AB = BC = CD = DE$.

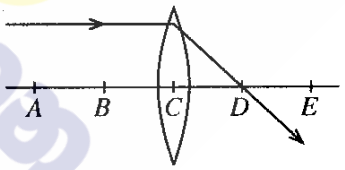


Figure I

(i) Name point *C* and point *D*.

(ii) Copy the Figures II and III below in your answer script and complete the ray diagrams.

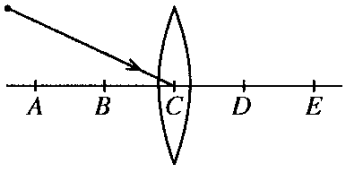


Figure II

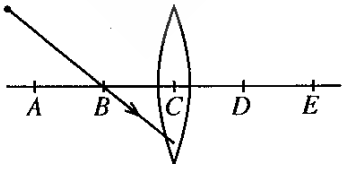


Figure III

(iii) Consider the image formed of an object placed between the points *A* and *B* in the principal axis of the lens. State **two** characteristics of that image.

(iv) Describe briefly an activity that could be done to find the focal length of a convex lens approximately.

|*See page seven*

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(*B*) A domestically used filament electric lamp is marked 240 V, 60 W while an LED electric lamp lighting with equal brightness to it is marked 240 V, 10 W.

(i) Calculate in joules (J) the amount of electrical energy consumed if the filament electric lamp was switched on for 10 hours.

(ii) How much is the electrical energy in joules (J) consumed if the LED lamp was switched on for 10 hours?

(iii) From the above calculations show that the LED lamp is more advantageous for domestic use.

(iv) The LED lamp mentioned above was lighted for 30 days 10 hours each. Find in kilowatt hours (kWh) the amount of electrical energy supplied to the lamp during this period. ($1\,kWh = 3.6 \times 10^6\,J$)

(v) Of the electrical energy supplied to a filament electric lamp, 40% is lost as heat. In that case what is the efficiency of the lamp? (*Total marks* 20)

8. (*A*) The following observations were recorded by a group of students conducting a field study on a sunny day in relation to a pond ecosystem.

* The aquatic plants *Hydrilla, Vallisnaria, Aponogeton* (Kekatiya) and *Salvinia* are found in abundance in the pond.
* Gas bubbles are liberated by plants growing submerged in water.
* Fish in the pond swim moving their fins.
* A kingfisher catches a fish and flies.
* A species of small insects comes to the water surface from time to time and moves down again.

(i) Name **two** characteristics of the living organisms according to the above observations.

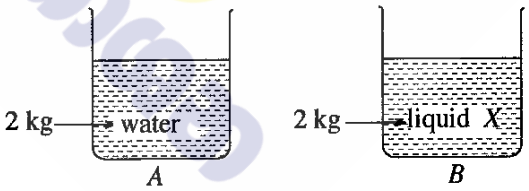
(ii) (a) Name the gas present in abundance in the gas bubbles liberated by the plants growing submerged in water.
(b) What is the process relevant to the production of that gas?

(iii) (a) Of the aquatic plants observed, which is the dioecious plant?
(b) Why is it called a dioecious plant?
(c) What is the pollinating agent of that plant?

(iv) From the interactions observed by the students, construct a food chain with three links.

(v) As regards the above observations, present **two** facts to justify that the pond can be considered an ecosystem.

(*B*) *A* and *B* are two identical vessels of negligibly small thermal capacity. *A* contains 2 kg of water of specific heat capacity $4200\,J\,kg\,°C^{-1}$ while *B* contains 2 kg of a liquid *X* of specific heat capacity $2100\,J\,kg\,°C^{-1}$. Each vessel is supplied with 8400 J of heat.



(i) Calculate how much will be the increase in the temperature of water contained in vessel *A* when supplied with the above amount of heat?

(ii) How much will be the increase in the temperature of liquid *X* contained in vessel *B* when supplied with the above amount of heat?

(iii) Which of the above liquids is more suitable to be used as a cooling agent? Give reasons for your answer.

(iv) A thermometer was introduced into the vessel *A*. Later, when the vessel was heated continuously, the thermometer reading stopped rising further after the water reached a certain temperature.
(a) By what name is that constant temperature known?
(b) At that instance, what can be observed in the water?
(c) What is the change of state occurring at that instance?
(d) By what name is the heat absorbed at that instance known?
(e) State the reason why the temperature of the liquid stopped rising though heat was supplied continuously. (*Total marks* 20)

[*See page eight*

9. (*A*) Figure I and II below illustrate two electrolytic cells arranged to electrolyse fused sodium chloride and an aqueous solution of sodium chloride respectively using carbon (graphite) electrodes.

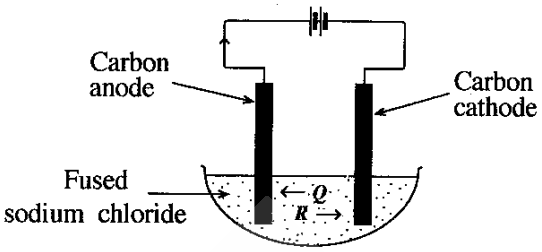


Figure I

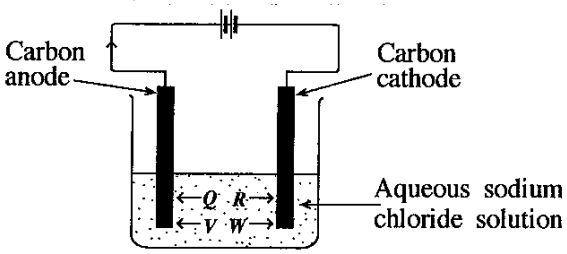


Figure II

The ions *Q*, *R*, *V* and *W* move in the directions indicated by the arrows during electrolysis. Of these the ions *Q* and *R* are common to both cells.

(i) Write the chemical symbols of the ions *Q*, *R* and *W* in order.

(ii) (a) Write the half reaction occurring at the cathode of the cell in Figure I.

b) Why is that reaction known as a reduction?

(iii) Write the half reaction occurring at the anode of the cell in Figure II.

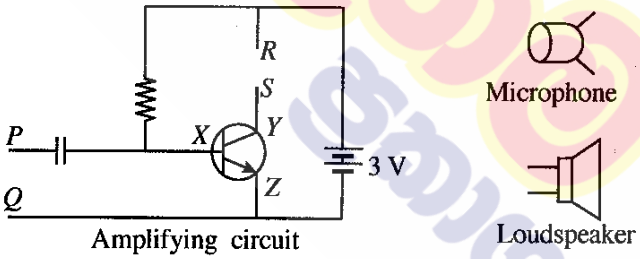
(iv) What metallic electrode can be used instead of the carbon electrodes in the above cells?

(v) In the cell indicated by which Figure does the reaction taking place in the Down's cell during the extraction of sodium happen?

(vi) (a) A few drops of phenolphthalein were added to the solution contained in the cell in Figure II when electrolysis happens in it. State the observation that can be made at that moment.

(b) Explain the reason for the observation you stated.

(*B*) Parts of a public address system are given below.



(i) What type of transistor is connected to the amplifying circuit?

(ii) Name the terminals marked *X*, *Y* and *Z* in the transistor.

(iii) To which terminals of the amplifying circuit should the microphone be connected?

(iv) Name the phenomenon which converts the sound waves received by the microphone to an electrical signal.

(v) To which points of the amplifying circuit should the loudspeaker be connected?

(vi) What physical quantity connected with the signal given by the microphone is amplified by the amplifying circuit?

(vii) Briefly explain how sound is produced by the loudspeaker when the amplified signal is given to the loudspeaker.

(*Total marks* 20)

* * *

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்

අ.පො.ස. (සා.පෙළ) විභාගය - 2019
க.பொ.த (சா.தர)ப் பரீட்சை - 2019

විෂයය අංකය
பாட இலக்கம் 34

විෂයය
பாடம் Science

I පත්‍රය - පිළිතුරු
I பத்திரம் - விடைகள்

ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.
01.	3	11.	2	21.	2	31.	2
02.	2	12.	2	22.	2	32.	2
03.	1	13.	3	23.	1	33.	4
04.	4	14.	2	24.	2	34.	3
05.	1	15.	1	25.	3	35.	1
06.	4	16.	1	26.	1	36.	1
07.	3	17.	4	27.	2	37.	4
08.	4	18.	3	28.	4	38.	3
09.	1	19.	3	29.	4	39.	all
10.	4	20.	1	30.	3	40.	4

විශේෂ උපදෙස් } එක් පිළිතුරකට ලකුණු **02** බැගින්
விசேட அறிவுறுத்தல் } ஒரு சரியான விடைக்கு புள்ளி வீதம்

මුළු ලකුණු / மொத்தப் புள்ளிகள் **02 × 40 = 80**

පහත නිදසුනෙහි දැක්වෙන පරිදි බහුවරණ උත්තරපත්‍රයේ අවසාන තීරුවේ ලකුණු ඇතුළත් කරන්න.
கீழ் குறிப்பிடப்பட்டிருக்கும் உதாரணத்திற்கு அமைய பல்தேர்வு வினாக்களுக்குரிய புள்ளிகளை பல்தேர்வு வினாப்பத்திரத்தின் இறுதியில் பதிக.

නිවැරදි පිළිතුරු සංඛ්‍යාව சரியான விடைகளின் தொகை	25 40
I පත්‍රයේ මුළු ලකුණු பத்திரம் I இன் மொத்தப்புள்ளி	50 80

සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

34 | E | II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2019 දෙසැම්බර்
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2019 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2019

විද්‍යාව II
விஞ்ஞானம் II
Science II

07.12.2019 / 0830 - 1140

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

අමතර කියවීම් කාලය - මිනිත්තු 10 යි
மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்
Additional Reading Time - 10 minutes

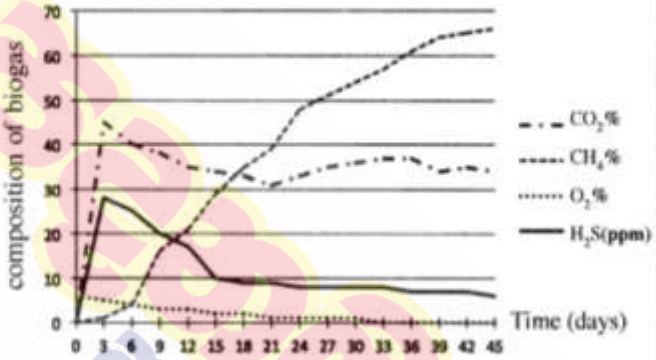
Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Index Number: .....

Instructions:
* *Write your answers in neat handwriting.*
* *Answer the four questions in* Part A, *in the space provided.*
* *Of the five questions in* Part B *answer three questions only.*
* *After answering, tie* Part A *and the answer script of* Part B *together and hand over.*

Part A

1. (A) Gaseous fuel essential for the laboratory of a school is obtained from a biogas generator. Once in every three days, the composition of four types of gases contained in the biogas produced by it was determined. Those information are presented by the graph.



(i) In which gas has the production gradually increased during the relevant period?
CH_4 / methane (01)

(ii) How much hydrogen sulphide was present in the gaseous mixture as per the composition on the 15th day?
10 ppm (No marks if ppm is not mentioned) / 10 parts per million (01)

(iii) Biogas is produced by the action of anaerobic bacteria on plant and animal waste. By the variation of the composition of which gas indicated in the graph is this justified?
O_2 / Oxygen (01)

(iv) Of the types of gases shown in the graph, which gas acts as a fuel? **CH_4 / methane** (01)

(v) Of the waste management principles known as 4R, for which principle is the maintenance of the biogas generator an example? **Recycle** (01)

(B) (i) Fixing of a larger number of windows is a noticeable feature of the above laboratory building. State **two** aspects each by which it contributes to maintain the conditions (a) and (b) given below.

(a) Creating a favourable environment for the laboratory users
- **ensuring proper ventilation – (relevant idea)**
- **lighting the room well (01) or any specific usage of it**
- **Maintaining a favourable temperature (relevant idea)** *any 2 of them* (02)

(b) Minimizing electricity consumption
- **Minimizing the usage of electric bulbs (01)**
- **Minimizing the usage of fans / Minimizing the usage of air conditioners. (01)** (02)

[See page two]

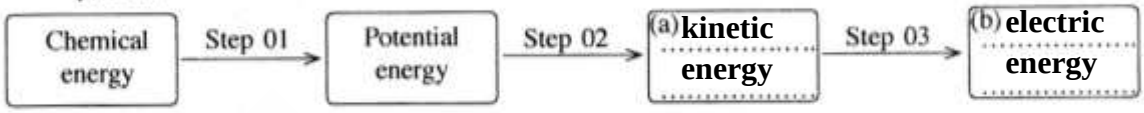
(ii) In this laboratory, electricity is produced as follows to light the electric bulbs.

Step 1: Maintaining under high pressure the steam produced by boiling water by burning biogas.

Step 2: Operating a turbine by spurting steam kept under high pressure.

Step 3: Operating an electric generator by the running turbine.

Complete the following schematic diagram on the conversion of energy relating to the above process.



(02)

(C) Given below are some compounds disposed to the draining gutter and the outer atmosphere during laboratory activities in a certain week.

$Ca(OH)_2$, $K_2Cr_2O_7$, Na_3PO_4, NO_2, SO_2

Of the above compounds, write the compound which is most relevant to each of the following statement on the dotted line given opposite to them.

(i) Contributes to increase the soil pH value ..... $Ca(OH)_2$ / calcium hydroxide ..... (01)

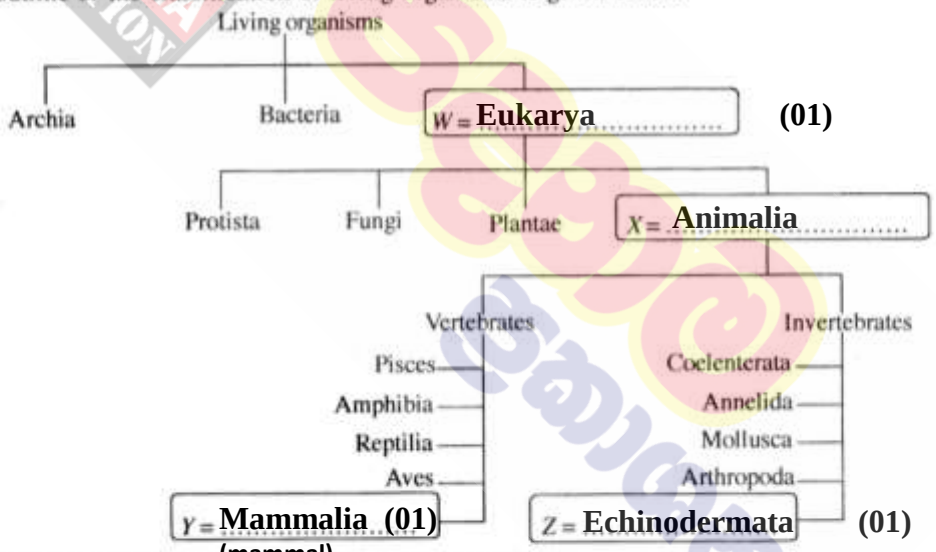
(ii) Causes an increase in the heavy metal composition in underground water ..... $K_2Cr_2O_7$ / potassium dichromate (01)

(iii) Contributes to create an eutrophication state when accumulated in a water body ..... Na_3PO_4 / sodium phosphate (01)

(iv) Contributes to produce photochemical smog as well as acid rain ..... NO_2 / nitrogen dioxide (01)

15
15

2. (A) An outline of the classification of living organisms is given below:



(01) (01) (01) (01) (04)

Answer the following questions using the above chart.

(i) Complete the above chart by writing the relevant group of living organisms on the dotted line in the boxes *W*, *X*, *Y* and *Z*.

(ii) Name the domain to which living organisms **not** sensitive to antibiotics belong.

Archea / Eukarya ..... (01)

(iii) To which kingdom do algae belong? Protista ..... (01)

(iv) A characteristic specific to each group of invertebrate animals shown in the above classification chart is given below. Opposite each characteristic, write the group of animals having that characteristic on the dotted line given.

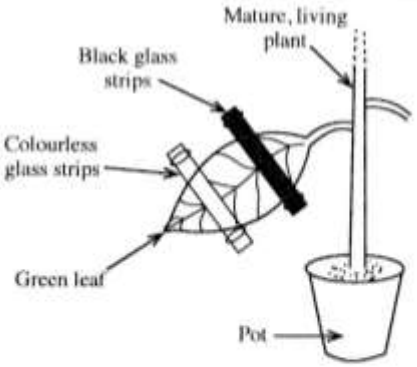
(a) Bearing soft bodies — Mollusca ..... (01)

(b) Division of the body into equal segments — Annelida ..... (01)

(c) Existing in two forms polyp and medusa — Coelenterata ..... (01)

(03)

(B) A set up arranged by a student to study a factor essential for the photosynthetic process is shown in the diagram. This set up was kept in the dark for 48 hours and then was exposed to light for 5 hours. Afterwards the glass strips covering the leaf were removed and the leaf was tested for starch.



(i) To test which factor essential for photosynthesis was this set up used?
light (Give marks even for sunlight) (01)

(ii) What is the reason for keeping the set up in the dark for 48 hours? to remove starch / to destarch (02) / 00

(iii) Write the colour that can be seen in each of the following parts of the leaf during the test for starch.

Part covered with the black glass strips (light) yellow / (light) brown (01)
Part covered with the colourless glass strips purple / blackish blue/ violet (01)
Part exposed to direct light purple / blackish blue / violet (01) (03)

15
15

3. (A) The symbols of the elements in the second period of the Periodic Table are given in the following table in respective order.

Li	Be	B	C	N	O	F	Ne

(i) Select the symbol of the element relevant to each of the following statements from the above table and write on the dotted line given opposite.

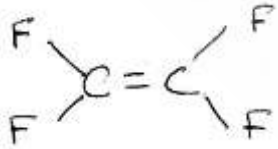
(a) Has the maximum first ionisation energy Ne (01)
(b) Has the minimum electronegativity Li (01)
(c) Diamond is one allotropic (polymorphic) form C (01)
(d) Exists as diatomic molecules with a triple bond between the atoms N (01)
(e) Exists as diatomic molecules as well as triatomic molecules in the atmosphere O (01) (05)

(ii) Write the formula of the compound formed by the combination of the elements Li and O.
Li_2O (01)

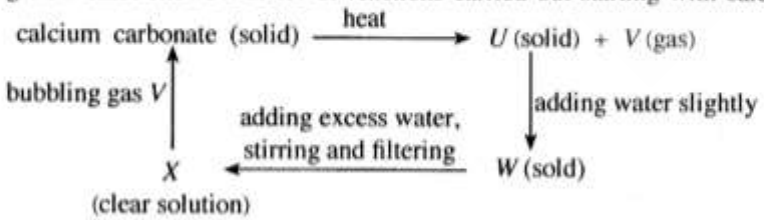
(iii) From the ions given below, select the cation and anion which the compound formed by the combination of Li and O contains and underline them.

$\underline{Li^+}$ (01) Li^{2+} Li_2^{2+} O^- $\underline{O^{2-}}$ (01) O_2^{2-} (02)

(iv) Draw the structure of the simplest monomer molecule which can polymerize and contains only the elements C and F. (01)



(B) The following flow chart shows a series of reactions carried out starting with calcium carbonate.



When gas V is bubbled through X, the solution turns milky because calcium carbonate is formed as a suspension. This observation is also used as a test to identify gas V.

(i) Write the chemical formulae of the compounds U and W. (02)

U: CaO (01) W: $Ca(OH)_2$ (01)

(ii) Delete one word printed in bold so that a correct idea is expressed by each of the following sentences.

(a) Solid U is ~~acidic~~ / **basic**. (01) (b) The bond in the solid U is **ionic** / ~~covalent~~ (01) (03)

(c) The pH value of an aqueous solution of the gas V is **lower** / ~~higher~~ than 7. (01)

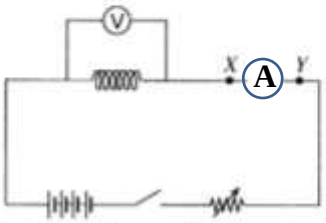
(iii) What can be seen when excess of the gas V is bubbled through the milky solution formed by the reaction between X and V?

becomes colourless (Give a free mark) (01)

15/15

4. (A) A teacher provided the following materials and equipment to students.

a nichrome wire coil, four dry cells, an ammeter, a switch, a voltmeter, a rheostat, connecting wire



The Figure shows an incomplete circuit diagram of a set up arranged by those students to examine the relationship between the potential difference between the two ends of the nichrome wire coil and the electric current flowing through it. (01)

(i) By what name is the way the dry cells are connected to the circuit known?

In series (01)

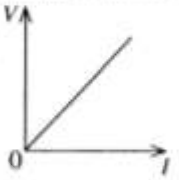
(ii) Draw in the circuit diagram the standard symbol of the equipment that should be connected between the terminals X and Y.

(iii) Why is a rheostat connected to this circuit? **to change or control the current / potential difference / voltage** (01)

(iv) State a condition that would result if the switch is kept closed for a long time after completing the circuit correctly.

discharging of the battery/ heating of the coil / increase in temperature / decreasing the electromotive force of the battery / increase in resistance (01)

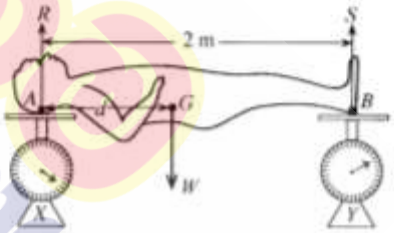
(v) Given here is the graph of V against I drawn using the readings obtained by the experiment. What is the physical quantity represented by the gradient of the graph? (01)



R / resistance

(B) The following activity was done by a group of students to find the centre of gravity of a metal statue.

The head and the two feet of the statue were placed on the smooth pans of two identical balances X and Y kept on a horizontal floor as shown in the Figure. The reading in balance X was 250 N and the reading in balance Y was 150 N.



(i) What are the forces acting with regard to the equilibrium of the statue?

W / weight/ gravitational force / perpendicular reaction at A / R, perpendicular reaction at B / S (01) (01) (01) (03)

(ii) What is the reaction R through the point A and the reaction S through the point B of the statue? (02)

R: **250 N** (01) S: **150 N** (01)

(iii) What is the weight (W) of the statue? **400 N** (01)

(iv) The distance from A to the centre of gravity of the statue G is d. Write the moment of the weight of the statue around point A in terms of d. (01)

W d / 400(N) x d / weight x d (01)

(v) What is the moment of the reaction S around point A?

150 N x 2m / 300 Nm (02)

(vi) The anti-clockwise moment of S around point A is equal to the clockwise moment of weight W around point A. Find the value of d.

400 (N) x d = 300 (Nm) / Wd = 300 (Nm) / d = $\frac{300\,(Nm)}{400\,(N)}$ (01)

d = 0.75 m / ¾ m/ 75 cm (01)

15/15

Part B

● Answer only **three** questions from the questions No. **5**, **6**, **7**, **8** and **9**.

5. (*A*) Figure I presents a sketchy line diagram which shows the internal structure of the human heart.

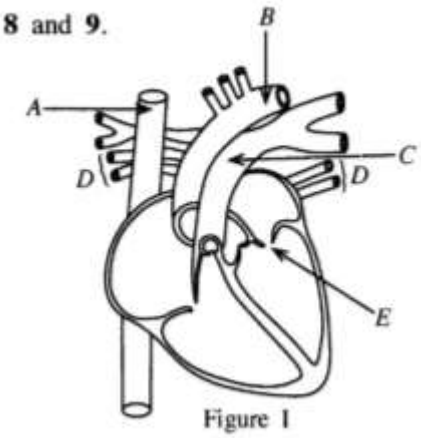


Figure I

(i) Name the blood vessels *A*, *B*, *C* and *D* in Figure I.

(ii) When comparing with the composition of the blood flowing through *D*, what is the main difference in the composition of blood flowing through *C*?

(iii) What is the valve named *E*?

(iv) Describe briefly how the characteristic 'lub' and 'dup' sounds heard during the heart beat are generated.

(v) Figure II indicates the changes in the potential corresponding to the three stages of the cardiac cycle of a healthy person's E.C.G. Which stage of the cardiac cycle is denoted by *T* in that Figure?

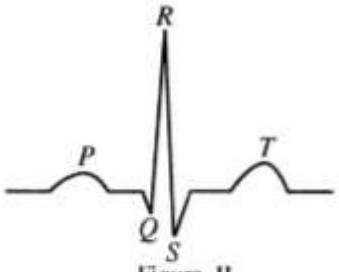


Figure II

(vi) Heart muscles are weakened by the blockage of the blood vessel supplying blood to them by blood clots. By what name is this ailing condition known?

(*B*) The number of chromosomes in a somatic (body) cell of a mammalian animal species *X* is 40.

(i) What is the number of chromosomes contained in the daughter cells produced by the meiotic division of gamete mother cells of *X*?

(ii) Name a daughter cell type formed by the meiotic division of gamete mother cells of *X*.

(iii) How does a daughter cell formed by the mitotic division differ from a daughter cell formed by meiotic division?

(*C*) (i) The garden pea plant seeds have two shapes, round and wrinkled. The gene giving rise to round seeds is *R* while the gene giving rise to wrinkled seeds is *r*. The genotype of the plant with dominant, homozygous genes for the seed shape is *RR*. Write the genotype for each of the following plant with regard to the seed shape.

(a) Plant with recessive, homozygous genes

(b) Plant with heterozygous genes

(ii) When a pure breeding garden pea plant with round seeds was crossed with a pure breeding garden pea plant with wrinkled seeds, all the F_1 generation plants had round seeds. In the F_2 generation obtained by crossing two plants in the F_1 generation, the ratio of the plants with round seeds to the plants with wrinkled seeds was 3:1.

(a) Write the genotype of the F_1 generation plants.

(b) Construct the Punnett square to indicate the genotype of the plants of the F_2 generation.

(c) Write the genotype ratio of the F_2 generation plants.

(Total marks 20)

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	(A)	(i)		A- Superior vena cava - (01) B- Aorta - (01) C- Pulmonary artery - (01) D- Pulmonary veins - (01)	04
		(ii)		O_2 concentration is low / CO_2 concentration is high / deoxygenated blood (in blood flowing through C)	01
		(iii)		bicuspid valve / mitral valve	01
		(iv)		'lub' sound – when bicuspid and tricuspid valves close - 01 'dub' sound – when semilunar valves close - 01	02
		(v)		atrial ventricular relaxation / complete cardiac diastoale / intervennig	01
		(vi)		(coronory) thrombosis	01
	(B)	(i)		20	01
		(ii)		Sperm / ovum (egg)	01
		(iii)		(In mitotic cell division) number of chromosomes in daughter cells is equal to that of the mother cell / daughter cells are identical with the mother cells / the changes in chromosomes are rare.	01
	(C)	(i)		a) rr (01) b) Rr (01)	02
		(ii)		a) Rr (01) b) <table><tr><td>♀ \ ♂</td><td>R</td><td>r</td></tr><tr><td>R</td><td>RR</td><td>Rr</td></tr><tr><td>r</td><td>Rr</td><td>rr</td></tr></table> • **for mentioning gametes (01)** • **for completing the table correctly(01)** c) RR : Rr : rr (01) 1: 2 : 1 (01) (If the Punnett square is written correctly award two marks for the ration)	03
				Total marks	20

6. (*A*) Acids, bases and salts are three main groups of compounds found in the laboratory.

(i) Explain what an acid is based on how it behaves in water.

(ii) Hydrochloric acid (HCl) is a strong acid while acetic acid (CH_3COOH) is a weak acid. What is the difference between a weak acid and a strong acid?

(iii) By what name is the process of forming a salt and water by the reaction of an acid and a base known?

(iv) (a) Write the balanced chemical equation for the reaction between the base sodium hydroxide and hydrochloric acid.

(b) Write an observation that can be made when the above reaction occurs.

(*B*) Gastric juice contains hydrochloric acid. Antacid tablets given to relieve the discomforts caused by the high acidity in the stomach contain the base magnesium hydroxide ($Mg(OH)_2$).

(i) What is the salt formed during the reaction between hydrochloric acid and magnesium hydroxide base?

(ii) What is the amount of moles of water formed when one mole of magnesium hydroxide completely reacts with hydrochloric acid?

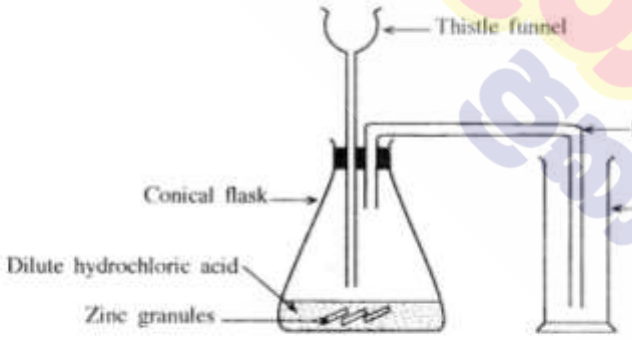
(*C*) A bottle contains 500 cm^3 of an acetic acid solution. The density of the solution is 1.04 g cm^{-3} and the mass of acetic acid contained in this solution is 26 g.

(i) Calculate the mass of the acetic acid solution contained in the bottle.

(ii) Calculate the percentage of acetic acid by mass in the above solution.

(iii) Vinegar is an aqueous solution which contains about 5% acetic acid by mass. The boiling point of acetic acid is 118 °C. Name a technique that can be used to obtain a solution that contains about 10% acetic acid by mass using a sample of vinegar.

(*D*) A set of apparatus arranged by a student to prepare a sample of hydrogen gas using dilute hydrochloric acid and zinc (Zn) metal is shown below.



(i) Write **two** errors that can be seen in the above set up.

(ii) Suggest **two** measures that can be adopted to increase the rate of the reaction taking place in the conical flask.

(iii) State a test and the relevant observation to confirm that the gas produced by the reaction is hydrogen. (*Total marks* 20)

⑥	**(A)**	**(i)**	compounds that release H^+ / compounds which ionise giving H^+ / dissociate giving H^+ (in an aqueous medium)	**01**
		(ii)	Strong acids ionise / dissociate completely (in water) 01 Weak acids ionise / dissociate incompletely / partially / slightly (in water) (01)	**02**
		(iii)	Neutralisation	**01**
		(iv)	a) $NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l)$ **01** **01** Physical states are not necessary.	**02**
			b) increase in temperature / heating of the vessel / emission of heat	**01**
	(B)	**(i)**	$MgCl_2$ / magnesium chloride	**01**
		(ii)	2 (mol)	**01**
	(C)	**(i)**	d = — or x = 1.04 (g cm^{-3}) x 500 (cm^3) = 520 g (01) (01)	**02**
		(ii)	$\frac{26(g)}{520(g)}$ (01) (%) (01)	**02**
		(iii)	vapourisation / evaporation/ simple distillation / fractional distillation	**01**
	(D)	**(i)**	• thistle funnel is not immersed in the solution / above the liquid level • Keeping the gas jar upright / using upward displacement of air (downward delivery)	**02**
		(ii)	• increasing the concentration of acid • using Zn powder instead of Zn granules / increasing the surface area of Zn • heating (the vessel) • using a catalyst *any 2 of them*	**02**
		(iii)	• Inserting a lighted ekel / lighted splinter (01) • Burns with a 'pop' sound / the flame blows off with a 'pop' sound (01)	**02**
			Total marks	**20**

7. (*A*) Figure I below illustrates how a ray of light coming parallel to the principal axis of a glass convex lens travels after refraction. The points *A*, *B*, *C*, *D*, and *E* are marked on the principal axis of the lens so that $AB = BC = CD = DE$.

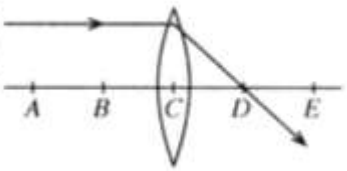


Figure I

(i) Name point *C* and point *D*.

(ii) Copy the Figures II and III below in your answer script and complete the ray diagrams.

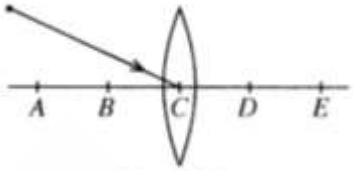


Figure II

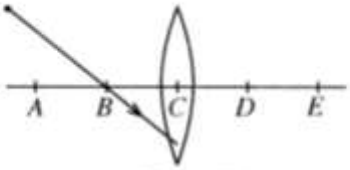


Figure III

(iii) Consider the image formed of an object placed between the points *A* and *B* in the principal axis of the lens. State **two** characteristics of that image.

(iv) Describe briefly an activity that could be done to find the focal length of a convex lens approximately.

(*B*) A domestically used filament electric lamp is marked 240 V, 60 W while an LED electric lamp lighting with equal brightness to it is marked 240 V, 10 W.

(i) Calculate in joules (J) the amount of electrical energy consumed if the filament electric lamp was switched on for 10 hours.

(ii) How much is the electrical energy in joules (J) consumed if the LED lamp was switched on for 10 hours?

(iii) From the above calculations show that the LED lamp is more advantageous for domestic use.

(iv) The LED lamp mentioned above was lighted for 30 days 10 hours each. Find in kilowatt hours (kWh) the amount of electrical energy supplied to the lamp during this period. ($1\,kWh = 3.6 \times 10^6\,J$)

(v) Of the electrical energy supplied to a filament electric lamp, 40% is lost as heat. In that case what is the efficiency of the lamp?

(*Total marks* 20)

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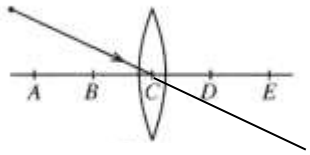
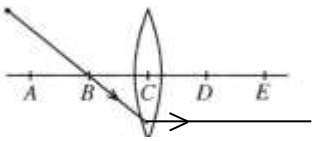
⑦	**(A)**	**(i)**	C- Optical centre (01) D – Focus (01)	**02**
		(ii)	 **(02/00)**  **(02/00)**	**04**
		(iii)	• Inverted / magnified / real / located beyound E or beyond 2f or beyond twice the focal length Any 2 of them	**02**
		(iv)	• Obtain a clear image (01) of a distant object (01) on to a wall / screen. Measure the distance between wall / screen and the lens (01) or • Focus a beam of sunlight (01) until you get a small sharp patch of light on to a paper (01) Measure the distance between the lens and the patch. (01) (if this is illustrated by a diagram give marks for parallel rays, (01) focusing rays (01) and marking the focal lenght (01)	**03**
	(B)	**(i)**	$E = Pt$ (01) = 60 x 60 x 60 x 10 / 60W x 10h (01) = 2160000(J) (01) (give all 3 marks for the answer and the substitution without the equation)	**03**
		(ii)	10 x 10 x 3600 / 10W x 10h (01) = 360000 (J) (01) (Give 02 marks even for the final answer)	**02**
		(iii)	LED consumes less electrical energy.	**01**
		(iv)	——————/—— (01) = 3 (kWh) (01)	**02**
		(v)	60%	**01**
			Total marks	**20**

8. (*A*) The following observations were recorded by a group of students conducting a field study on a sunny day in relation to a pond ecosystem.

* The aquatic plants *Hydrilla*, *Vallisnaria*, *Aponogeton* (Kekatiya) and *Salvinia* are found in abundance in the pond.
* Gas bubbles are liberated by plants growing submerged in water.
* Fish in the pond swim moving their fins.
* A kingfisher catches a fish and flies.
* A species of small insects comes to the water surface from time to time and moves down again.

(i) Name **two** characteristics of the living organisms according to the above observations.

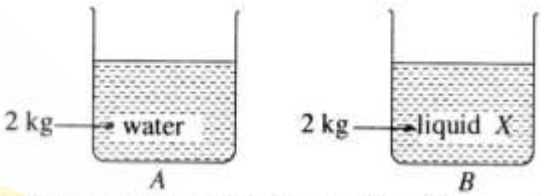
(ii) (a) Name the gas present in abundance in the gas bubbles liberated by the plants growing submerged in water.
(b) What is the process relevant to the production of that gas?

(iii) (a) Of the aquatic plants observed, which is the dioecious plant?
(b) Why is it called a dioecious plant?
(c) What is the pollinating agent of that plant?

(iv) From the interactions observed by the students, construct a food chain with three links.

(v) As regards the above observations, present **two** facts to justify that the pond can be considered an ecosystem.

(*B*) *A* and *B* are two identical vessels of negligibly small thermal capacity. *A* contains 2 kg of water of specific heat capacity 4200 J kg $^{\circ}C^{-1}$ while *B* contains 2 kg of a liquid *X* of specific heat capacity 2100 J kg $^{\circ}C^{-1}$. Each vessel is supplied with 8400 J of heat.



(i) Calculate how much will be the increase in the temperature of water contained in vessel *A* when supplied with the above amount of heat?

(ii) How much will be the increase in the temperature of liquid *X* contained in vessel *B* when supplied with the above amount of heat?

(iii) Which of the above liquids is more suitable to be used as a cooling agent? Give reasons for your answer.

(iv) A thermometer was introduced into the vessel *A*. Later, when the vessel was heated continuously, the thermometer reading stopped rising further after the water reached a certain temperature.
(a) By what name is that constant temperature known?
(b) At that instance, what can be observed in the water?
(c) What is the change of state occurring at that instance?
(d) By what name is the heat absorbed at that instance known?
(e) State the reason why the temperature of the liquid stopped rising though heat was supplied continuously.

(Total marks 20)

⑧	**(A)**	**(i)**	• Movement • Nutrition • Respiration Any 2 of them	02
		(ii)	a) Oxygen / O_2 (01)	02
			b) Photosynthesis (01)	
		(iii)	a) Vallisnaria (01)	03
			b) Staminate and pistillate flowers are born separately. (01)	
			c) Water (01)	
		(iv)	• Aquatic plants → fish → kingfisher • Aquatic plants → insect → fish • Aquatic plants → insect → kingfisher Any one of the above food chains (Give marks if any plant mentioned in the question is written instead of aquatic plants)	01
		(v)	• There are living and non living components (01) • There are interactions among them (01) (living, living / non -living, non living / living, non - living)	02
	(b)	**(i)**	$Q = mc\theta$ or 8400 (J) = 2 (kg) x 4200 (J kg^{-1} ^{o} C^{-1}) x θ (01) = 1°C (01)	02
		(ii)	2 ^{0}C	01
		(iii)	• Water (01) • Rise in temperature is smaller when the same amount of heat is supplied or The specific heat capacity of water is greater (01)	02
		(iv)	a) Boiling point (01)	05
			b) Bubbling (air) (01)	
			c) Liquid water turns into water vapour / vapourisation / liquid →gas (01)	
			d) Latent heat (of vapourisation) (01)	
			e) Heat is absorbed for doing work against the intemolecular attractive forces / to break intermolecular bonds / to break hydrogen bonds (01)	
			Total Marks	20

9. (A) Figure I and II below illustrate two electrolytic cells arranged to electrolyse fused sodium chloride and an aqueous solution of sodium chloride respectively using carbon (graphite) electrodes.

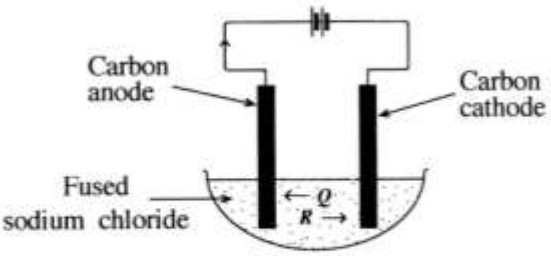


Figure I

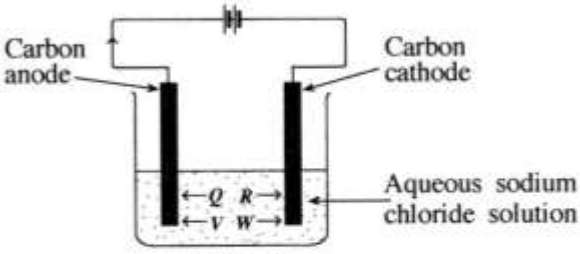


Figure II

The ions Q, R, V and W move in the directions indicated by the arrows during electrolysis. Of these the ions Q and R are common to both cells.

(i) Write the chemical symbols of the ions Q, R and W in order.

(ii) (a) Write the half reaction occurring at the cathode of the cell in Figure I.

b) Why is that reaction known as a reduction?

(iii) Write the half reaction occurring at the anode of the cell in Figure II.

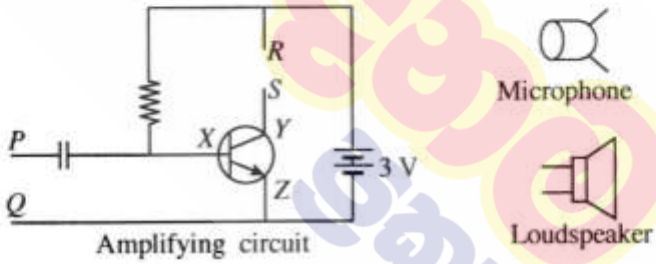
(iv) What metallic electrode can be used instead of the carbon electrodes in the above cells?

(v) In the cell indicated by which Figure does the reaction taking place in the Down's cell during the extraction of sodium happen?

(vi) (a) A few drops of phenolphthalein were added to the solution contained in the cell in Figure II when electrolysis happens in it. State the observation that can be made at that moment.

(b) Explain the reason for the observation you stated.

(B) Parts of a public address system are given below.



Amplifying circuit

(i) What type of transistor is connected to the amplifying circuit?

(ii) Name the terminals marked X, Y and Z in the transistor.

(iii) To which terminals of the amplifying circuit should the microphone be connected?

(iv) Name the phenomenon which converts the sound waves received by the microphone to an electrical signal.

(v) To which points of the amplifying circuit should the loudspeaker be connected?

(vi) What physical quantity connected with the signal given by the microphone is amplified by the amplifying circuit?

(vii) Briefly explain how sound is produced by the loudspeaker when the amplified signal is given to the loudspeaker.

(Total marks 20)

* * *

+94 71 800 8533 / +94 77 088 2228 WWW.PADANAMAPUBLICATION.LK

⑨	(A)	(i)	Q – Cl^- (01) R - Na^+ (01) W – H^+ (01)	03
		(ii)	a) $Na^+(l) + e \rightarrow Na(l)$ (01) (Physical states are not necessary.) b) (Na^+) accepts an electron / It involves gaining electrons. (01)	02
		(iii)	$2Cl^-(aq) \longrightarrow Cl_2(g) + 2e$ or $Cl^-(aq) \longrightarrow -Cl_2(g) + e$ Give marks even for writing $2Cl^-(aq) - 2e \longrightarrow Cl_2(g)$ Physical states are not necessary.	01
		(iv)	Pt / Platinum	01
		(v)	In figure I	01
		(vi)	a) (Colourless) solution turns pink (01) b) Formation of NaOH / increase in the OH^- concentration (01)	02
	(B)	(i)	npn	01
		(ii)	X – base / B/b (01) Y– collector / C/c (01) Z - emitter / E/e (01)	03
		(iii)	P and Q	01
		(iv)	Electromagnetic induction	01
		(v)	R and S	01
		(vi)	Amplitude /(Signal) Voltage	01
		(vii)	A force is created on either side of the coil when the coil (in the magnetic field) gets signals. Then the cone vibrates and sound waves are produced. Give marks if this idea is expressed in other words.	02
			Total marks	**20**

10 සහ 11 ශ්‍රේණි සඳහා ග්‍රන්ථ නාමාවලිය

(අ.පො.ස) සාමාන්‍ය පෙළ 11 ශ්‍රේණිය - කෙටි සටහන්

සිංහල මාධ්‍ය

- [ ] 10-11 සිංහල ව්‍යාකරණ
- [ ] 10-11 සිංහල සාහිත්‍යය රසාස්වාදය
- [ ] බුද්ධ ධර්මය
- [ ] කතෝලික ධර්මය
- [ ] සිංහල භාෂාව හා සාහිත්‍යය
- [ ] සිංහල සාහිත්‍යය සංග්‍රහය
- [ ] English Language
- [ ] ගණිතය - 1
- [ ] ගණිතය - 2
- [ ] ජීව විද්‍යාව
- [ ] භෞතික විද්‍යාව
- [ ] රසායන විද්‍යාව
- [ ] ඉතිහාසය
- [ ] ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය
- [ ] භූගෝල විද්‍යාව
- [ ] පුරවැසි අධ්‍යාපනය
- [ ] පෙරදිග සංගීතය
- [ ] නර්තනය
- [ ] නාට්‍ය හා රංග කලාව
- [ ] චිත්‍ර කලාව
- [ ] තොරතුරු හා සන්නිවේදන තාක්ෂණය
- [ ] සන්නිවේදනය හා මාධ්‍ය අධ්‍යයනය
- [ ] සෞඛ්‍යය හා ශාරීරික අධ්‍යාපනය
- [ ] කෘෂි හා ආහාර තාක්ෂණය
- [ ] ගෘහ ආර්ථික විද්‍යාව

11 ශ්‍රේණිය - ප්‍රශ්නෝත්තර

සිංහල මාධ්‍ය

- [ ] සිංහල භාෂාව හා සාහිත්‍යය
- [ ] බුද්ධ ධර්මය
- [ ] ඉතිහාසය
- [ ] ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය
- [ ] පුරවැසි අධ්‍යාපනය

Grade 11 - Short Notes

English Medium

- [ ] Buddhism
- [ ] Mathematics - 1
- [ ] Mathematics - 2
- [ ] Biology
- [ ] Physics
- [ ] Chemistry
- [ ] History
- [ ] Business & Accounting Studies
- [ ] Geography
- [ ] Civic Education
- [ ] ICT
- [ ] Health & Physical Education
- [ ] 10-11 English Literary (Poetry)
- [ ] 10-11 English Literary (Drama)
- [ ] 10-11 English Literary (Short Story)

Grade 11 - Model Papers

English Medium

- [ ] Civic Education

10 ශ්‍රේණිය - කෙටි සටහන්

සිංහල මාධ්‍ය

- [ ] බුද්ධ ධර්මය
- [ ] කතෝලික ධර්මය
- [ ] සිංහල භාෂාව හා සාහිත්‍යය
- [ ] සිංහල සාහිත්‍යය සංග්‍රහය
- [ ] සිංහල රචනා අත්වැල
- [ ] English Language
- [ ] ගණිතය - 1
- [ ] ගණිතය - 2
- [ ] ජීව විද්‍යාව
- [ ] භෞතික විද්‍යාව
- [ ] රසායන විද්‍යාව

- [ ] ඉතිහාසය
- [ ] ඉතිහාසය රූප සටහන් අශ්‍රිත කෙටි සටහන්
- [ ] ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය - 1
- [ ] ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය - 2
- [ ] භූගෝල විද්‍යාව
- [ ] පුරවැසි අධ්‍යාපනය
- [ ] පෙරදිග සංගීතය
- [ ] නර්තනය
- [ ] නාට්‍ය හා රංග කලාව
- [ ] චිත්‍ර කලාව
- [ ] තොරතුරු හා සන්නිවේදන තාක්ෂණය
- [ ] සන්නිවේදනය හා මාධ්‍ය අධ්‍යයනය
- [ ] සෞඛ්‍යය හා ශාරීරික අධ්‍යාපනය
- [ ] කෘෂි හා ආහාර තාක්ෂණය
- [ ] ගෘහ ආර්ථික විද්‍යාව
- [ ] ජපන් භාෂාව

10 ශ්‍රේණිය - ප්‍රශ්නෝත්තර

සිංහල මාධ්‍ය

- [ ] සිංහල භාෂාව හා සාහිත්‍යය
- [ ] බුද්ධ ධර්මය
- [ ] ගණිතය
- [ ] විද්‍යාව
- [ ] ඉතිහාසය
- [ ] පුරවැසි අධ්‍යාපනය
- [ ] භූගෝල විද්‍යාව
- [ ] පෙරදිග සංගීතය

පාඩමෙන් පාඩමට මාසික ඇගයීම්

සිංහල මාධ්‍ය

- [ ] 10-ශ්‍රේණිය - විද්‍යාව
- [ ] 11-ශ්‍රේණිය - විද්‍යාව

Grade 10 - Short Notes

English Medium

- [ ] Buddhism
- [ ] Mathematics - 1
- [ ] Mathematics - 2
- [ ] Biology
- [ ] Physics
- [ ] Chemistry
- [ ] History
- [ ] Business & Accounting Studies - 1
- [ ] Business & Accounting Studies - 2
- [ ] Geography
- [ ] Civic Education
- [ ] ICT
- [ ] Health & Physical Education

Grade 10 - Model Papers

English Medium

- [ ] Mathematics
- [ ] Science
- [ ] Civic Education
- [ ] Geography
- [ ] English Activity Book
- [ ] English Work Book

අනෙකුත් ග්‍රන්ථ

- [ ] හෙළදිව කතිකාවත - අරුණශාන්ත අමරසිංහ
- [ ] හොල්මන් අවතාර සහ යකඳුරන් - අරුණශාන්ත අමරසිංහ
- [ ] සිසු-ගුරු අත්පොත නාට්‍ය හා රංග කලාව 10-11 ශ්‍රේණි සඳහා (නව විෂය නිර්දේශය) - නන්දන අල්ගේවත්ත

සියලු ම ශ්‍රේණි සඳහා කෙටි සටහන්, ප්‍රශ්න පත්‍ර කට්ටල සහ වැඩ පොත් අප සතුව තිබෙන අතර, මෙම ඕනෑම ග්‍රන්ථයක් වට්ටම් සහිත ව ඔබේ නිවසට ම ගෙන්වා ගත හැකි ය.