PROVINCIAL EDUCATION DEPARTMENT
NORTHERN PROVINCE

THIRD TERM EXAMINATION - 2016

SCIENCE

Index No :- ..... **GRADE : - 11** **Time :- 1 hour**

PART - I

❖ **SELECT THE MOST SUITABLE ANSWER.**

(01) Which of the following shows a double helix structure?

(1) Amino acid (2) DNA (3) RNA (4)Fatty acid

(02) What is the electron configuration of $^{24}_{12}$ Mg?

(1) 2, 2, 8 (2) 2, 8, 2 (3) 2, 8, 8, 6 (4) 2, 8, 8 , 2

(03) Which of the following indicates the frequency range of sound that is audible to human ears?

(1) 20 Hz – 2000Hz (2) 20 Hz – 20kHz

(3) 2 Hz – 20000kz (4)2000 Hz – 20000Hz

(04) Which of the following enzyme is found in intestinal juice?

(1) Trypsin (2) Lipase (3) Amylase (4) Sucrase

(05) Which can be considered as the unit of atomic mass?

(1) Mass of a $^{12}_{6}$ C atom $\times$ $^{1}/_{12}$ (2) Mass of a $^{12}_{6}$ Catom$\times$ $^{1}/_{6}$

(3) Mass of a $^{14}_{6}$ Catom$\times$ $^{1}/_{12}$ (4)Mass of a $^{6}_{12}$ C atom$\times$ $^{1}/_{12}$

(06) Which of the following is the unit of acceleration?

(1) ms^{-1} (2) ms^{-2} (3) MS^{-1} (4) Nm^{-2}

(07) The blood pressure of a normal, healthy person is120/80 mmHg.What is his diastolic pressure?

(1) 120 mmHg (2) 80 mmHg (3) 200 mmHg (4) 40 mmHg

(08) Natural rubber is a polymer. What is its monomer?

(1) Ethene (2) Isoprene

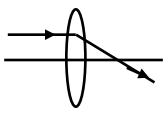
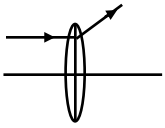
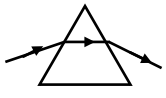
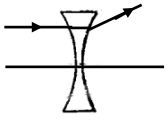
(3) Vinylchloride (4) Phenol

(09) Which of the following actions does not obey Newton's third law?

(1) Launching a rocket (2) Swimming

(3) A coconut falling from a coconut tree (4) rowing a boat with an oar

(10) Which of the following diagrams is incorrect regarding the path of a light ray through an optical instrument?

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

(11) The root of a plant growing towards the earth is

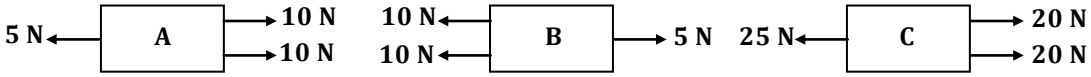
(1) Positive geotropic movement (2) Negative geotropic movement

(3) Positive phototropic movement (4) Thigmonastic movement

(12) The element X forms the compound $X_3(PO_4)_2$. What is the formula of the carbonate formed by X?

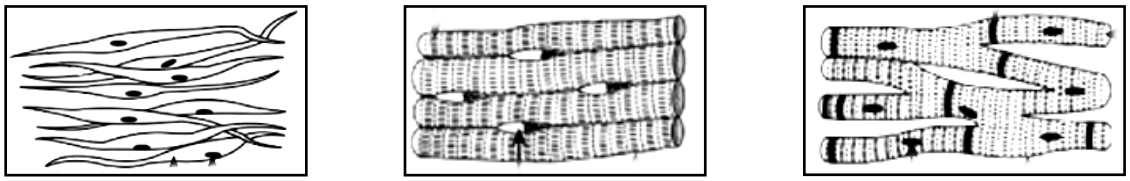
(1) X_2CO_3 (2) $X(CO_3)_2$ (3) XCO_3 (4) X_3CO_3

(13) In which of these systems is the resultant force equal?



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

(14)



A B C

Of the muscles shown above, which does not get fatigued?

(1) A (2) B (3) C (4) All

(15) In salterns, which substances sediment in the 1st, 2nd and 3rd sedimentation tanks respectively?

(1) $CaCO_3$, $MgCl_2$, NaCl (2) $CaCO_3$, $CaSO_4$, NaCl

(3) $CaSO_4$, $CaCO_3$, NaCl (4) NaCl, $CaSO_4$, $CaCO_3$

(16) When the measurement of a thermometer showing 40^0C is converted to °F,

(1) $\frac{32-F}{9} = \frac{40}{5}$ (2) $\frac{F-32}{9} = \frac{40}{5}$ (3) $\frac{F-32}{5} = \frac{40}{9}$ (4) $\frac{F-40}{9} = \frac{32}{5}$

(17) Which of the following correctly denotes the scientific name of the Naga tree?

(1) *mesua nagasarium* (2) *Mesua Nagasarium*

(3) *Mesua nagasarium* (4) *MESUA NAGASARIUM*

➢ **Use the following table to answer questions 18 and 19.**

Solution	Phenolphthalein	Red litmus paper
A	Red	No change
B	No change	Blue

(18) Identify solutions A and B.

(1) Acid, base (2) Base, neutral

(3) Base, acid (4) Neutral, acid

(19) Which statement regarding solution A is incorrect?

(1) The pH of this solution is greater than 7.

(2) It releases H^+ ions in solution state.

(3) Inhibits the corrosion of iron.

(4) Releases OH^- ions in solution state.

(20) Where does fertilization take place in a human female?

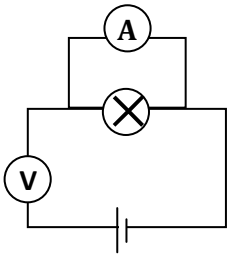
(1) Uterus (2) Vagina (3) Fallopian tube (4) Ovary

(21) What is the amount of heat energy needed to rise the temperature of 4 kgwater from30^0 C to 50^0 C? (The specific heat capacity of water is4200 J/kg^{0}C)

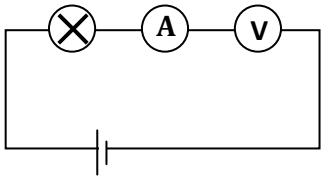
(1) 80 $\times$4200 J (2) 4 $\times$4200 J (3) 20 $\times$4200 J (4) 4200 J

(22) Which of the following diagrams correctly shows the connection of the apparatus that are used to measure the current flow and potential difference.

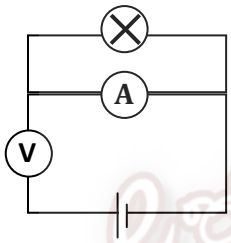
(1)



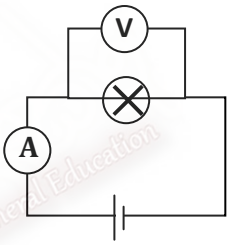
(2)



(3)



(4)



(23) Which vitamins are produced from cyano bacteria by using genetic engineering technology?

(1) VitaminA and E (2) VitaminsA and B_{12}

(3) VitaminsE and B_{12} (4) VitaminsA and C

(24) Which of the following pairs of ions have the same number of electrons?

(1) Na^+, F^- (2) Mg^{2+}, Ca^{2+}

(3) O^{2-}, Be^{2+} (4) Al^{3+}, K^+

(25) The height of a dam is8m. If water is found up to a height of 6m, what is the pressure exerted by the water at the bottom? (The density of water is1000 kg^{-3},gravitational acceleration is10 ms^{-2})

(1) $8m \times 1000\ kg\ m^{-3} \times 10\ ms^{-2}$ (2) $6m \times 1000\ kg\ m^{-3} \times 10\ ms^{-2}$

(3) $\frac{6m \times 1000\ kg\ m^{-3}}{10\ ms^{-2}}$ (4) $\frac{8m \times 1000\ kg\ m^{-3}}{10\ ms^{2}}$

(26) The substances produced during the anaerobic respiration of plants

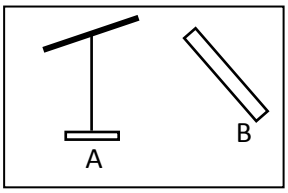
(1) Lactic acid+ energy (2) Carbondioxide + water vapour

(3) Lactic acid+ ethyl alcohol (4) Ethyl alcohol + carbon dioxide

(27) $\therefore \times \equiv \times \therefore$ What is the number of electron in the outermost orbit of X?

(1) 10 (2) 7 (3) 5 (4) 14

(28) When two glass rods, A and B, are rubbed with wool and brought closer, as shown in the figure, what will be the observation?



(1) They will repel each other.

(2) They will attract each other.

(3) No change can be observed.

(4) They will attract each other, and then repel.

(29) Which of the following plants prevent self-fertilization by dichogamy.

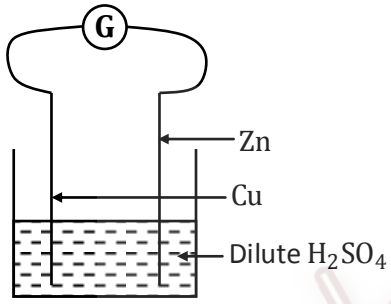
(1) Coconut

(2) Passion fruit

(3) Jasmine

(4) *Tridax*

(30)



A simple cell is shown in the diagram

What is the reaction taking place in the anode of this cell?

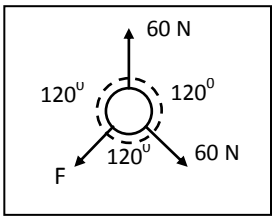
(1) $Zn_{(s)} \rightarrow Zn^{2+}{}_{(aq)} + 2e$

(2) $2H^+ + 2e \rightarrow H_{2(g)}$

(3) $Zn^{2+}{}_{(aq)} + 2e \rightarrow Zn_{(s)}$

(4) $Cu_{(s)} \rightarrow Cu^{2+}{}_{(aq)} + 2e$

(31) When the hoop is at equilibrium, find the value of F.



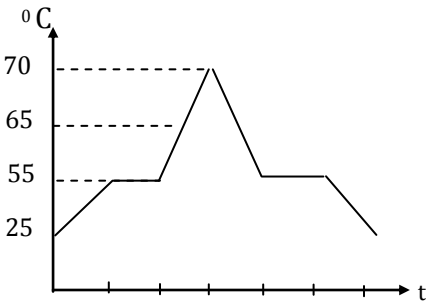
(1) 120 N

(2) 30 N

(3) 20 N

(4) 60 N

(32) A solid wax sample was heated and then allowed to cool. The temperature – time graph for this activity is given here. Using the graph, find the melting point of wax.



(1) 70^0 C

(2) 55^0 C

(3) 25^0 C

(4) 65^0 C

(33) A – Performing protein synthesis

B – Producing and transporting lipids and steroids

C – Secreting and transporting substances

Which of the organelles perform the above functions respectively?

(1) Ribosome, Golgi complex, endoplasmic reticulum

(2) Ribosome, endoplasmic reticulum, Golgi complex

(3) Mitochondria, lysosome, Golgi complex

(4) Lysosome, ribosome, chloroplast

(34) Which of the following is a nonpolar, inorganic solvent?

(1) Benzene

(2) Carbon tetrachloride

(3) Acetone

(4) Carbon disulfide

(35) Which of the following groups of food is responsible for the increase of low density lipoproteins (LDL) in the bloodstream?

(1) Beef, dhal, egg

(2) Beef, prawn, pork

(3) Pork, gingelly oil, prawn

(4)Pork, dhal, gingelly oil

(36) If the boiling point of a compound is -183^0Cand its melting point is -218^0C, which of the following is a property of this compound?

(1) It is liquid at room temperature.

(2) It is solid at room temperature.

(3) It is gaseous at room temperature.

(4) It is formed by ions with opposing charges.

(37) If the speed of light in air is $3 \times 10^8 ms^{-1}$and the refractive index of a glass block is1.5, what is the speed of light in the glass?

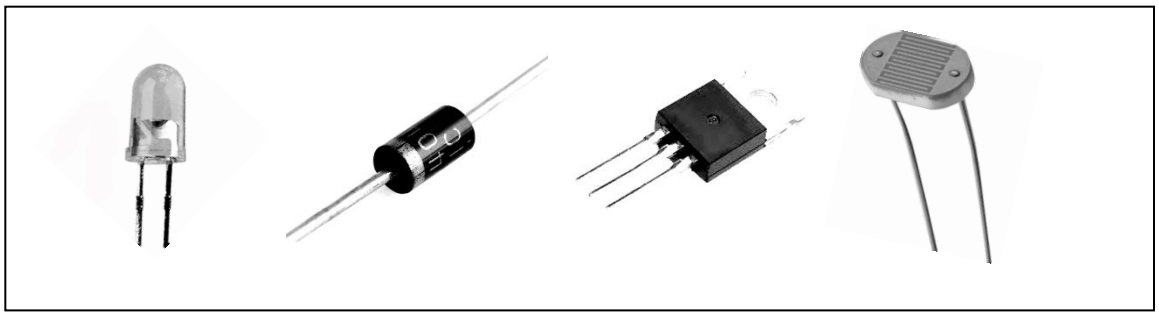
(1) $\frac{3\times10^8}{2} ms^{-1}$

(2) $1.5 \times 3 \times 10^8 ms^{-1}$

(3) $\frac{1.5}{3\times10^8}\ ms^{-1}$

(4) $\frac{3\times10^8}{1.5} ms^{-1}$

(38) The external appearances of some electronic components are shown below. Find the correct order of the pictures.



	A	B	C	D
(1)	Light emitting diode	Transistor	Diode	Light dependent resistor
(2)	Light emitting diode	Diode	Transistor	Light dependent resistor
(3)	Light dependent resistor	Diode	Transistor	Resistor
(4)	Diode	Light dependent resistor	Transistor	Light emitting diode

(39) What is the basic concept used in the disposal of wastes?

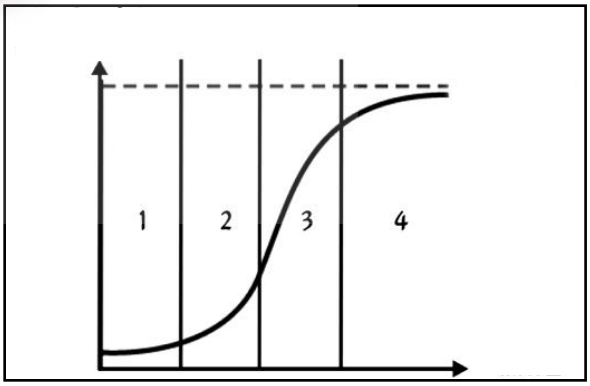
(1) 3 R

(2) 4 R

(3) 5 S

(4) 6 S

(40) In the graph shown here, depicting population growth, in which phase is the carrying capacity found?



(1) Phase 1

(2) Phase 2

(3) Phase 3

(4) Phase 4

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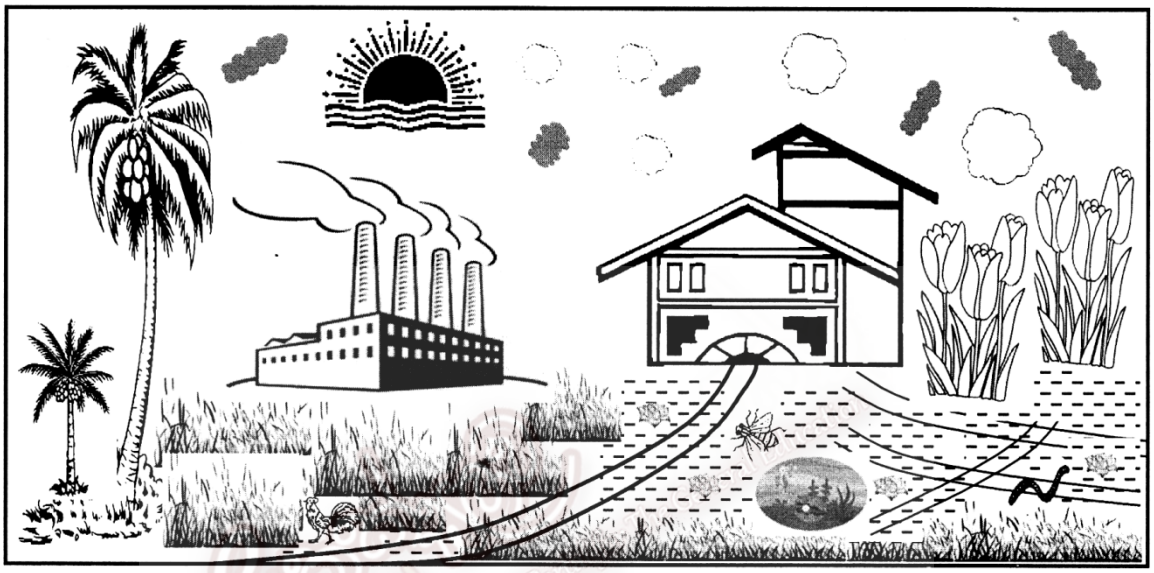
Index No :-	GRADE : - 11	Time :- 3 hours

Part II A –Structured essay

❖ **Answer all questions on the paper itself.**

(01)



(A) (i) What is the main energy source used here to fulfil the needs of the organisms??
(1 mark)

……

(ii) Write a food chain by using the organisms shown here. (2 marks)

……

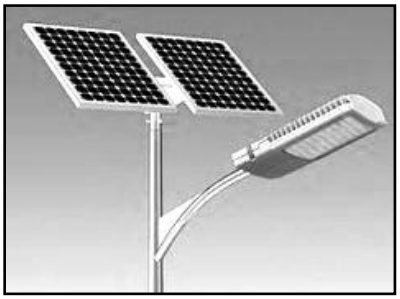
(iii) Give a secondary consumer found here. (1 mark)

……

(iv) What is the common name given to organisms that cause the decomposition of organic wastes? (1 mark)

……

(B) Due to the increasing demand for electricity, various methods are used to produce electricity. Two such methods are shown below.



(i) Which method of electricity production causes environmental pollution? (1 mark)

……

(ii) Which method can be used as solution for energy crisis? (1 mark)

……

(iii) What type of current is supplied to our houses? (1 mark)

……

(iv) Draw the graph between the current obtained from a battery and time. (1 mark)

(C) For breakfast, Rajan packed bread and eggs in a polythene bag and took it with him.

(i) Of these, which food item has the highest food mile value? (2 marks)

……

(ii) What is the colour change shown by the egg with Biurette solution? (1 mark)

……

(iii) Which gas is released to the atmosphere when polythene is burned?? (1 mark)

……

(iv) Which substance is used in carbonfoot print? (2 marks)

……

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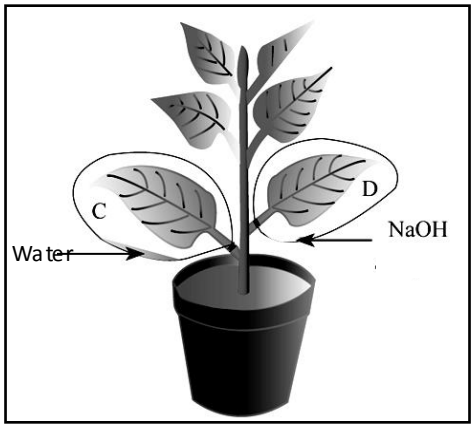
(02) Plants produce their own food by photosynthesis. The figure shows the setup arranged by a group of students to identify an important factor needed for photosynthesis.



(A) (i) To identify which factor is the above setup arranged? (1 mark)

……

(ii) Why is sodium hydroxide solution used? (1 mark)

……

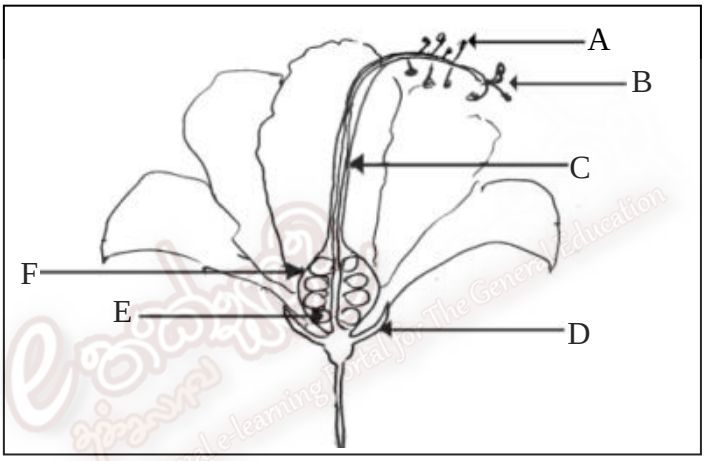
(iii) When the leaves C and D and are subjected to starch test, which leaf will show blue colour? (1 mark)

……

(iv) Give the balanced chemical equation for photosynthesis. (2 marks)

……

(B) Reproduction is important for the continuity of organisms. The plant part specialized for sexual reproduction is the flower.



(i) Names the parts A to D. (2 marks)

(A) ……

(B) ……

(C) ……

(D) ……

(ii) In the above diagram, name the male gamete that is formed by meiosis? (1 mark)

……

(iii) To which sex does the above flower belong to? (1 mark)

……

(iv) In the following plants, through which parts does natural vegetative reproduction take place?

Begonia ……

Breadfruit ……

(1 mark)

(C) The special features of some organisms are given below.

(A) - Has a thin, long worm-like body. A fluid filled cavity is found between the body wall and digestive tract.

(B) - Body is covered with hair. Has four legs. Viviparous

(C) - Has a soft body. Has head, visceral hump and muscular foot. Has internal or external skeleton made of $CaCO_3$.

(D) - One pair of appendages is modified into wings. Homoeothermic. Lays eggs.

(E) - Body is segmented. Body is divided into head, thorax and abdomen. Has an external skeleton made of chitin.

(1) - From the above list, give the letters that denote vertebrates? (2 mark)

……

(2) - Which letter denotes the organism with hydrostatic skeleton. (1 mark)

……

(3) - Which of the above is an arthropod? (1 mark)

……

(4) - To which kingdom do all the organisms mentioned above belong? (1 mark)

……

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(03) A portion of the reactive series is shown below.

Na, K, Ca, [A] , Al , [B] , Fe , Sn , [C] , H , [D]

(The symbols in the box are not standard symbols)

(A) (i) Identify the elements A, B, C and D. (2 marks)

A ……

B ……

C ……

D ……

(ii) Name 2 elements which are stored in kerosene. (1mark)

……

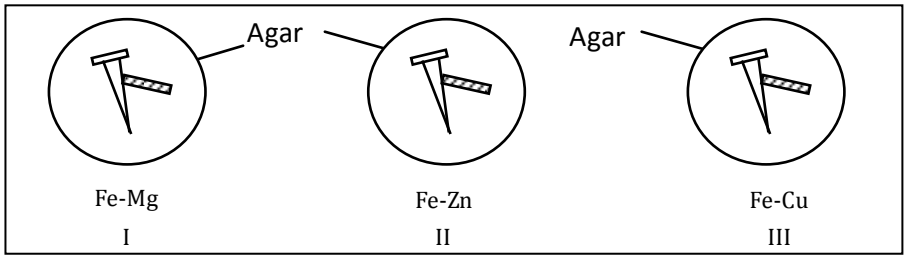
(iii) (a) What will be your observation when the element B is added to a solution of $CUSO_4$? (1 mark)

……

(b) Give the balanced chemical equation for this reaction. (1 mark)

……

(B) A solution containing NaCl, phenolphthalein and potassium ferricyanide was heated. Agar jelly was dissolved into it, and the given setups were arranged as shown. Observations were made after an hour.



(i) (a) In which setup will the iron nail corrode? (1 mark)

……

(b) What will be the observation in that setup? (1 mark)

……

(ii) In the above setups, what are the sacrificial metals? (1 mark)

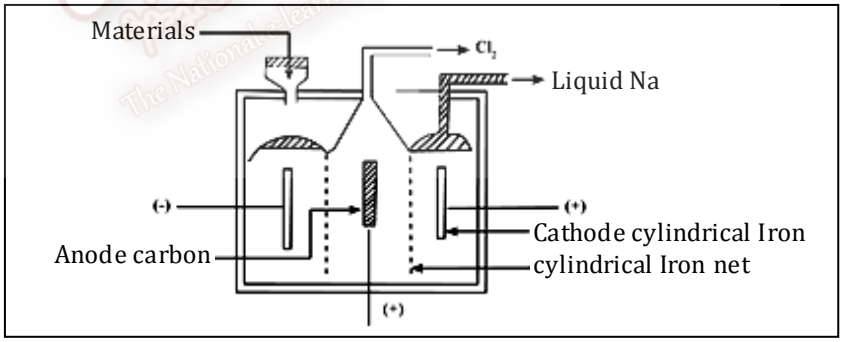
……

(iii)

Indicator	Ions	Colour change
Phenolphthalein	…….	…….
…….	Fe^{2+}	…….

(2 marks)

(C)



(i) How is this cell called? (1 mark)

……

(ii) To extract which metal is this cell used? (1 mark)

……

(iii) What is the advantage of adding $CaCl_2$? (1 mark)

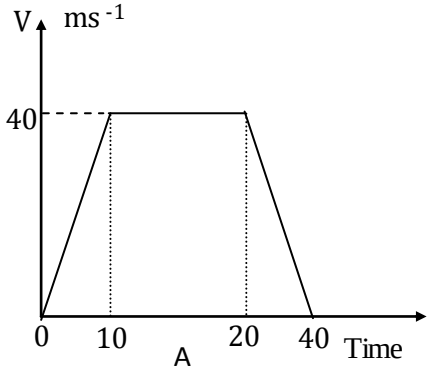
……

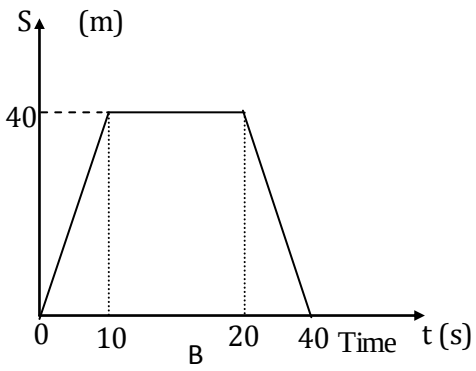
(iv) Give the ionic reaction taking place at the anode and cathode. (2 marks)

Anode ……

Cathode ……

(04) **(A)** The velocity – time and displacement – time graphs of two vehicles, A and B, when they execute 2 different motions are shown here. Using these graphs, answer the questions given below.





(i) State the type of motion of the vehicles A and B during the first 10 seconds. (1 mark)

A ……

B ……

(ii) Calculate the total distances travelled by A and B. (1 mark)

A B

…… ……

…… ……

…… ……

(iii) Find the average speeds of A and B. (1 mark)

A B

…… ……

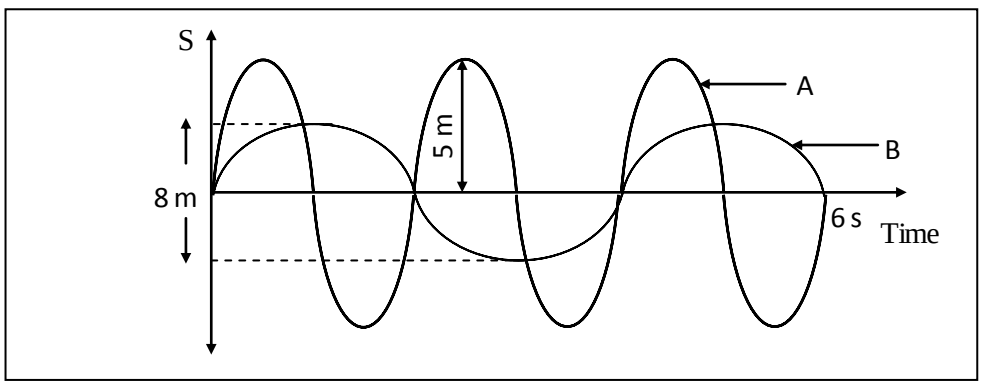
…… ……

…… ……

(iv) If the mass of vehicle A is 1000kg, find the force exerted by the vehicle brake system during the last 20 seconds. (2 marks)

……

(B)



Answer the following questions regarding the waves A and B.

(i) Calculate the frequencies of the waves A and B. (2 marks)

A B

…… ……

…… ……

…… ……

(ii) What is the amplitude of wave B? (1 mark)

……

(iii) Of the waves A and B, (1 mark)

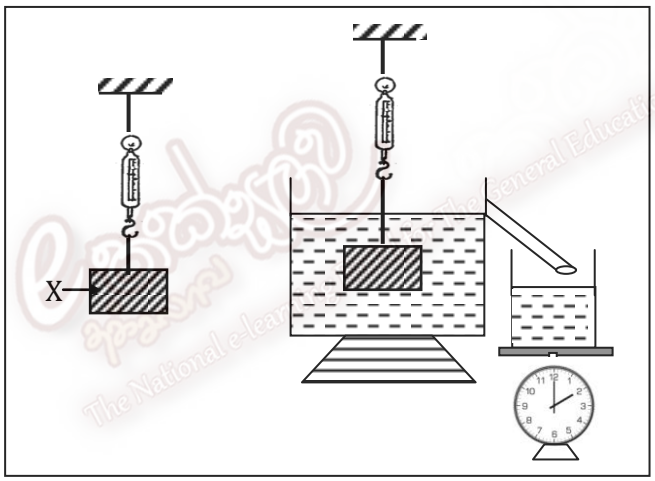
(a) Which has a higher pitch? ……

(b) Which has a higher loudness? ……

(iv) Which quality changes when the wave shape changes? (1 mark)

……

(C)



The block X was weighed first in air, and then submerged in water.

Density of water – $1000\ kg^{-3}$

Gravitational acceleration - $10\ ms^{-2}$

Density of the object X - $1500\ kg^{-3}$

Volume of the object X - $0.05\ m^3$

(i) What is the weight of the block in air? (1 mark)

……

(ii) What is the volume of water removed? (1 mark)

……

(iii) What is the weight of the water removed? (1 mark)

……

(iv) What is the weight of the block in water? (2 marks)

……

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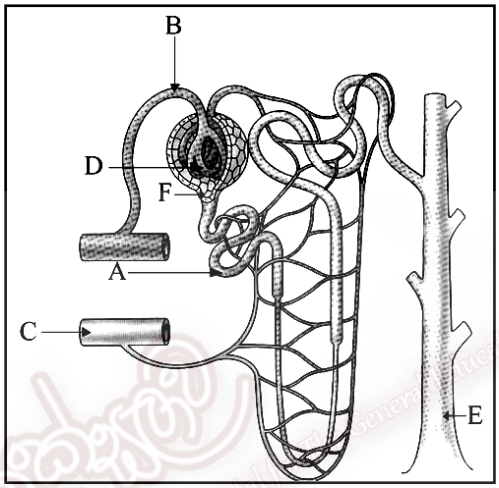
PART II B – ESSAY QUESTIONS.

❖ **Answer any three questions.**

(05) (A) Many specialized systems are found in organisms in order to perform biological activities.



(i) Name the functional unit of kidney that is shown here.

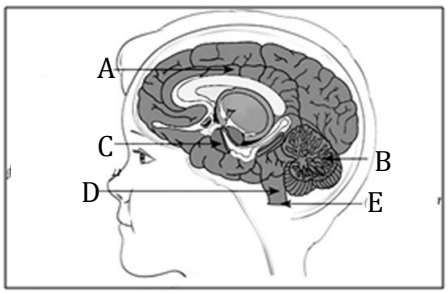
(ii) Name the parts A, B, C and D.

(iii) Give two components that are found in the blood but not in the glomerular filtrate of a healthy man.

(iv) Which substance sediments as kidney stones?

Give a habit that you should follow in order to avoid this condition.

(B) Use the English letters used in the figure to answer the questions given below.

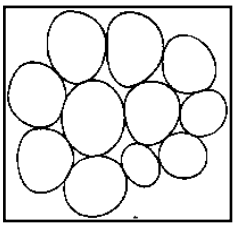


(i) Which part of the brain is responsible for studying, thinking and intelligence?

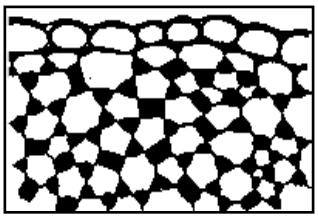
(ii) The effect of which brain part causes a drunk to stumble as he walks?

(iii) A boy, seeing a speeding vehicle suddenly coming towards him, jumped towards the fence. Give the pathway of the impulse in this situation.

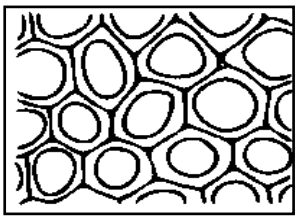
(C)



A



B



C

(i) Name the planttissues denoted by the letters above.

(ii) Which of the above is a dead tissue?

(iii) Name the complex permanent tissues.

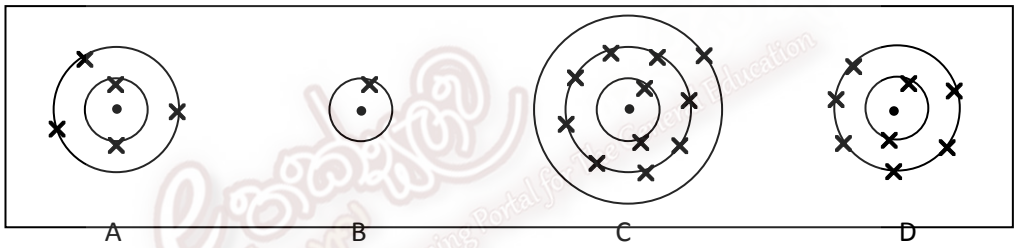
(D) Pure tall plant (T T) and pure short plant (t t) are cross bred.

(i) Give the phenotype of the F_1 generation.

(ii) When two of the F_1 plants are pollinated give the genotype and its ratio of the F_2 generation.

[20 Marks]

(06) (A) The electron configuration of four elements are shown below. The English letters given here are not the standard symbols.



A B C D

(i) Identify the elements A, B, C and D.

(ii) (a) What is the type of bond found in the compound formed by C and D.

(b) Give 2 properties of that bond.

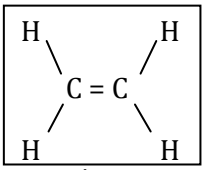
(iii) What are the elements that take part in the formation of methane?

(iv) Give the dot-cross structure of methane.

(v) Find the relative molecular mass of carbon dioxide.
(relative atomic mass of $C = 12,\ O = 16$)

(vi) What number of molecules are found in 2 mol of carbon dioxide?

(B)



(i) Name this structural formula.

(ii) What is the polymer formed by this structure?

(iii) How can you categorize this polymer based on its origin?

(iv) (a) What is the polymer of the monomer formed when one H in the above structure is replaced by Cl?

(b) Give two features of this polymer.

(v) Draw the monomer of the polymer that is used to make nonstick cookware.

(C) Two beakers are half filled with water and their initial temperature is taken. Then, urea is added to beaker A and sodium hydroxide to beaker B. The final temperatures were taken after stirring well.

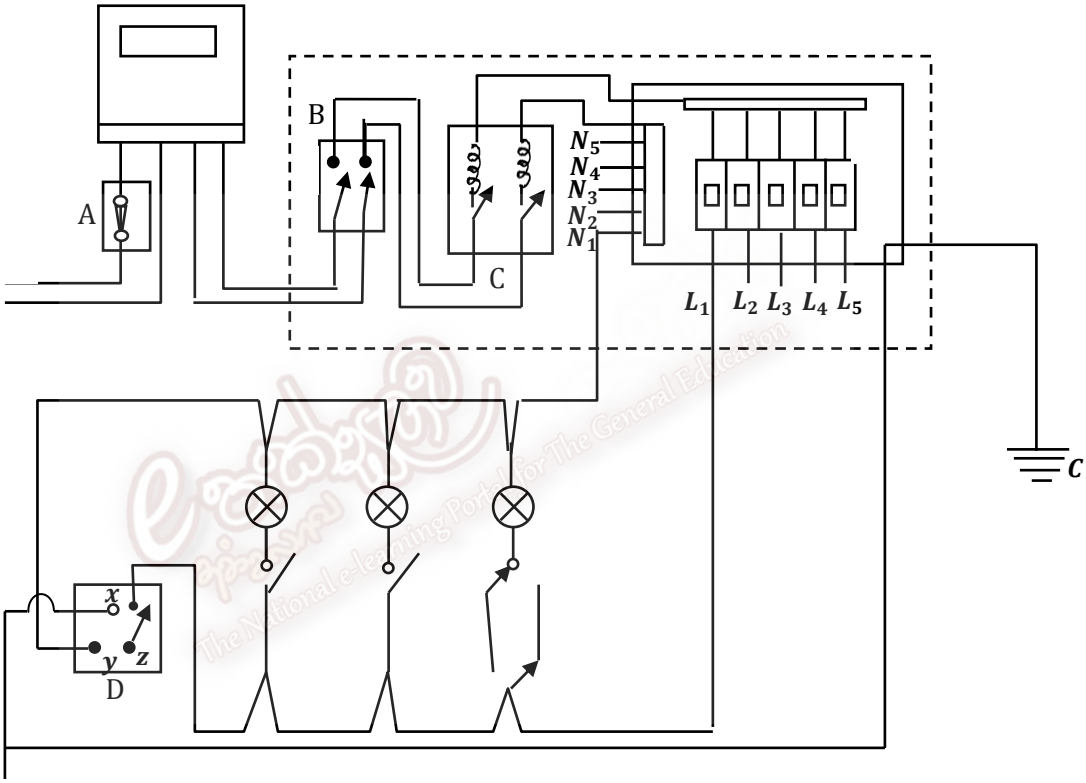
(i) State which type of reaction does A and B belong to, based on temperature change.

(ii) Draw the energy level diagram for the reaction in B.

(iii) The heat change that occurs during the reaction is given by Q = MCθ. Define the quantities M, C and θ.

[20 Marks]

(07) (A) The electricity needed to operate the electrical appliances in our houses are obtained from the national electric grid.



(i) In the given household electric circuit, name the components A, B, C and D.

(ii) From which component does the earth wire begin?

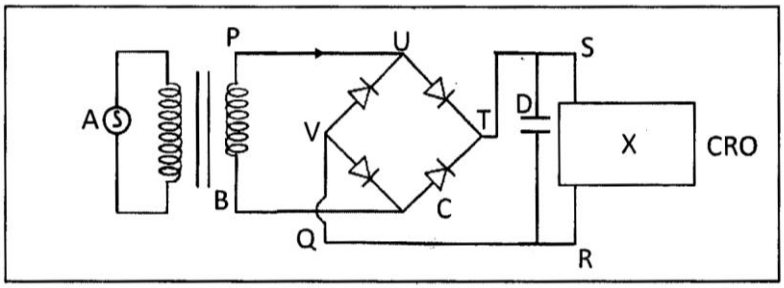
(iii) An electric ovenis attached to this house's circuit. It's power is1500 W.If the voltage of current supplied to the houses in Sri Lanka is230 V,calculate the current flow when the oven operates.

(B) At home, we boil water by using the energy obtained from electricity.

(i) When water is heated, by which method is the heat transferred within the water?

(ii) Find the amount of heat energy needed to heat 500g of water at$30^0C$to its boiling point. (Specific heat capacity of water is4200 J $\mathrm{kg}^{-1}\mathrm{K}^{-1}$)

(C) Radios in houses operate in direct current. Therefore, the alternating current supplied to the houses should be converted to direct current. A circuit used for this purpose is shown below.



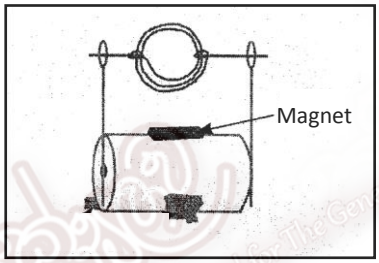
(i) Name the components A, B, C and D shown in the circuit.

(ii) Draw the wave form that appears in X.

(iii) Use the given English letters to show the path of the current that flows in the circuit in the direction$P \rightarrow U$.

(iv) There are 50 turns in the primary coil and 100 turns in the secondary coil of part B. if the voltage of the primary circuit is230 Vfind the voltage of the secondary circuit.

(D) The diagram explains the actionof a motor.



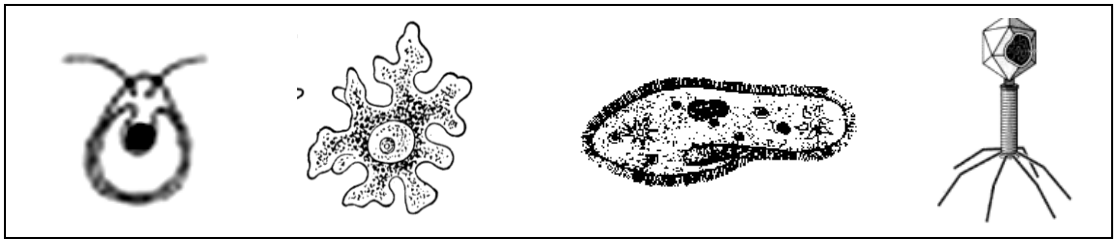
(i) What is your observation when current flows in the circuit?

(ii) Explain why the parts A and B are scratched before the metal ring is attached to the circuit.

(iii) Write the law that explains the motion of the metal ring.

[20 Marks]

(08) (A) Microorganisms are both beneficial and harmful to man.



A B C D

(i) Of the above, which one shows the characteristics of both the living and nonliving?

(ii) Which type of microbe causes cholera?

(iii) Which of the above organism can be observed in a drop of hay infusion?

(iv) Name the species of fungus that is used in the following situations.

(a) Making bread

(b) Protein supplement

(B) Minerals are important for the functioning of organisms.

(i) The deficiency of which mineral is responsible for each set of symptoms given below?

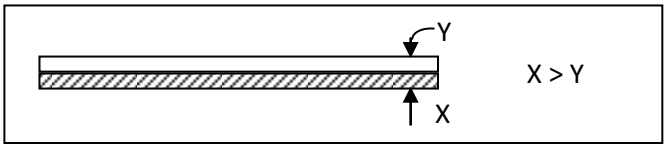
(a) Formation of red and purple spots on the leaves

(b) Death of shoots, curling of leaf tips

(ii) (a) A doctor examining a student noticed that the inside of the student's eye lids was pale. Which mineral deficiency causes this?

(b) Which vitamin deficiency causes scurvy? What food items should be consumed in order to prevent this?

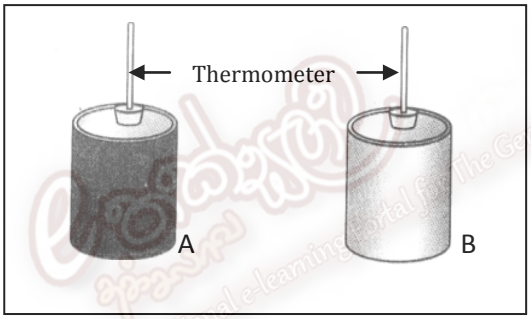
(C) (i) The figure shows a bimetallic bar.



Draw how the bar will change when it is heated.

(ii) What are the three methods of heat transfer?

(iii)



(a) Which thermometer will show a higher reading?

(b) Reason out your answer.

(iv) Give the absolute zero temperature in SI unit.

(v) Convert the following temperatures to Kelvin scale.

(a) 90^0C (b) -35^0C

[20 Marks]

(09) (A) 5g of table salt was dissolved in water and a 100g solution was produced.

(i) In this solution, which is the solvent and which is the solute?

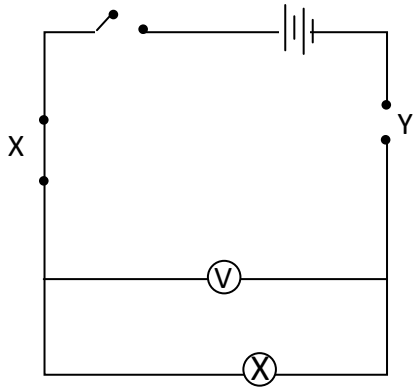
(ii) Give the composition of this solution as mass fraction.

(iii) When more table salt was added and stirred to the above solution, it precipitated without dissolving. At this state, how is this solution called?

(iv) Give an action that you can perform to dissolve this precipitated salt.

(v) Can you dissolve this table salt in kerosene? What is the reason for your answer?

(vi) Give an example each for liquid – liquid heterogeneous mixture and liquid – liquid homogeneous mixture.



The diagram shows a circuit arranged by a student in order to verify Ohm's law.

(i) Name the circuits that should be attached at X and Y to change the current and measure it, respectively.

(ii) Different Voltmeter readings were obtained for different current flow. This is shown in the graph.

Situation	Current	Voltmeter reading
1	0.3	(A) .....
2	0.6	3
3	(B)	4.5
4	1.2	6

(a) What is the resistance of the bulb in situation 2?

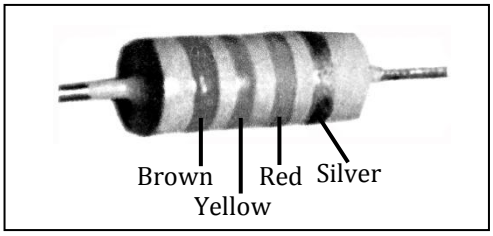
(b) What is the resistance of the bulb in situation 4?

(iii) Hence, give the values of A and B mentioned in the table.

(iv) Which physical factor should be kept constant during these situations?

(v) The given colour rings were seen on a fixed resistor.

(a)



(brown = 1, yellow = 4, red = 2, silver 10%)

Calculate the range of resistance of this resistor.

(b) Calculate the equivalent resistance obtained when $5\ \Omega$, $15\ \Omega$resistors are joined in parallel.

[20 Marks]