

GCE O/L Science (34) (New syllabus – Revision Exercises)

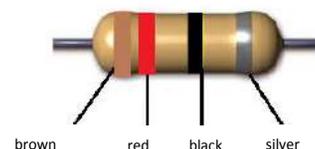
Science 1

Duration 1 Hour

- Answer all the questions.
- Select the correct or the most appropriate answer (1-4) for the questions from 1 to 40.
- Put (x) in the relevant circle

1. Which of the following is the digestive enzyme contained in saliva?
(1) amylase (2) lipase (3) maltase (4) lactase
2. In which of the following plants, unisexual flowers are born?
(1) Pea (2) *Thunbergia* (3) coconut (4) Kathurumurunga/Akathikkeerai
3. The electronic configuration of O^{2-} ion is
(1) 2,6. (2) 2,8. (3) 2,8,6. (4) 2,8,8.
4. The blood vessel transporting nitrogenous wastes to the kidneys via blood is the
(1) renal vein. (2) renal artery. (3) pulmonary aorta. (4) inferior vena cava.
5. The unit of acceleration is
(1) m. (2) $m\ s^{-1}$. (3) $m\ s^{-2}$. (4) $N\ m^{-2}$.
6. Under normal conditions the boiling point of water is
(1) 0 K. (2) 100 K. (3) 273 K. (4) 373 K.
7. A sodium chloride solution is electrolyzed using two carbon electrodes. What is the gas evolved at the anode?
(1) oxygen (2) chlorine (3) hydrogen (4) nitrogen
8. Which is the **correct** statement about the first ionization energy of the elements in the second period?
(1) The highest first ionization energy is found in neon.
(2) The highest first ionization energy is found in lithium.
(3) In boron, the first ionization energy is greater than to that of beryllium.
(4) In nitrogen, the first ionization energy is less than to that of carbon.
9. Which of the following is used in the simple microscope?
(1) a convex lens (2) a concave lens (3) a convex mirror (4) a concave mirror

10. The device used for half wave rectification of an alternating current is a
(1) transistor. (2) diode. (3) capacitor. (4) resistor.
11. In digestion of food, the organ producing bile which is essential to emulsify lipids is
(1) gall bladder. (2) liver. (3) pancreas. (4) intestinal wall.
12. Of the following, the physical quantity without units is
(1) atomic mass. (2) relative molecular mass. (3) molar mass. (4) solubility.
13. Which response contains a use of the elastic potential energy?
(1) shooting a stone with a catapult
(2) rotating a turbine using a jet of water
(3) lifting a vehicle using a jack
(4) drawing water from a well using a pulley
14. The figure shows a resistor. What is the color of the band that shows the tolerance value?
(1) brown (2) black (3) red (4) silver



15. The subatomic particle/particles participating in a chemical reaction is/are
(1) protons. (2) electrons. (3) neutrons. (4) all these particles.
16. Which of the following molecular formula indicates an alkane?
(1) C_2H_2 (2) C_2H_4 (3) C_2H_6 (4) CCl_4
17. Which of the following respectively gives the systolic pressure and the diastolic pressure of a healthy individual?
(1) 70 – 80 mm Hg, 110 – 120 mm Hg
(2) 50 – 100 mm Hg, 150 – 180 mm Hg
(3) 110 – 120 mm Hg, 70 – 80 mm Hg
(4) 150 – 180 mm Hg, 50 – 100 mm Hg
18. Which response gives the correct order of organizational levels in a multicellular living organism?
(1) cell → tissue → organ → system
(2) cell → organ → system → tissue
(3) cell → organ → tissue → system
(4) cell → tissue → system → organ

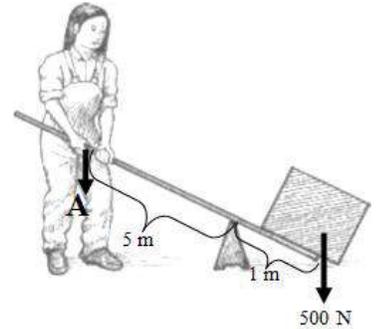
19. In a transformer, the number of turns in the primary coil is 30 and the number of turns in the secondary coil is 600. An electric current flows through the primary coil under a potential difference of 6 V. Then the potential difference induced in the secondary coil is

- (1) 30 V. (2) 60 V. (3) 120 V. (4) 0 V.

20. Which of the following statements is true?

- (1) No medium is required for the propagation of mechanical waves.
 (2) Electromagnetic waves travel in air with a velocity of 335 m s^{-1}
 (3) Energy is transmitted by waves.
 (4) In a vacuum, mechanical waves propagate with a speed of $3 \times 10^8 \text{ m s}^{-1}$.

21. The diagram shows how a rod is used to lift a block of wood. For this, what is the minimum force that should be applied at **A** on the rod?



- (1) 50 N (2) 100 N (3) 500 N (4) 2500 N

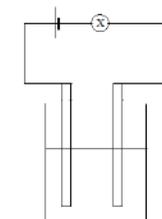
22. Which of the following is the correct statement about the growth of living cells?

- (1) Growth of cells means the increase in the dry weight of the cells.
 (2) Cell growth is a reversible process.
 (3) In every cell, the maximum level of growth is equal.
 (4) Division occurs after the growth of the cell reaches its maximum limit.

23. Which of the following is correct with regard to the action of the thoracic cavity during inspiration?

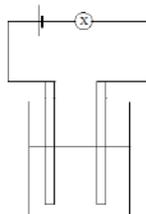
- (1) Ribs move upwards and forwards due to the contraction of intercostal muscles.
 (2) Ribs move inwards and downwards due to the contraction of intercostal muscles.
 (3) The curvature of the diaphragm decreases due to the relaxation of its muscles.
 (4) The curvature of the diaphragm increases due to the contraction of its muscles.

24. In which of the following set up, the bulb does not light?



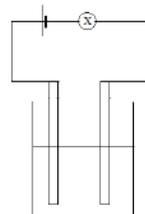
NaCl solution

(1)



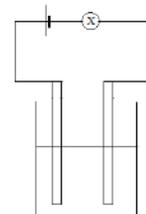
Glucose solution

(2)



HCl

(3)



CuSO_4 solution

(4)

25. When compared with the atomic mass unit, which has the highest mass?

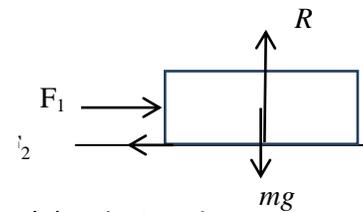
- (1) a hydrogen atom (2) a nitrogen atom
(3) a magnesium atom (3) a sulfur atom

26. An example for a cranial reflex is the

- (1) sudden withdrawal of hand when it comes into contact with a hot object.
(2) sudden rising of foot when somebody happens to step on a thorn.
(3) knee jerk caused when the knee is struck with a rubber hammer.
(4) closure of eyelids when something is about to impinge on the eye.

27. The diagram shows an object moving with a uniform velocity on a horizontal plane. F_1 represents the force applied to move the object and F_2 is the frictional force. R is the perpendicular reaction and mg is the weight of the object. Given below are some statements about the above forces.

- (A) $F_1 = F_2$ (B) $F_1 > F_2$ (C) $F_1 < F_2$ (D) $mg = R$



Of the above, the correct statement(s) is /are

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

28. Four statements regarding the corrosion of iron are given below.

- (A) Keeping iron and magnesium in contact is a method of cathodic protection.
(B) Coating iron with tin is a method of cathodic protection
(C) Galvanizing is a method of cathodic protection.
(D) Salts speed up corrosion of iron.

Of the above, the correct statements are

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

29. Some characteristics of an animal phylum are given below.

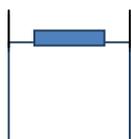
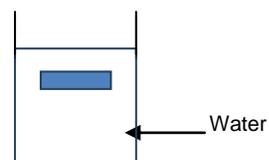
- Body wall is dipoblastic.
- Body shows radial symmetry.
- Exists in two forms, polyp and medusa.

The phylum with the above characteristics is

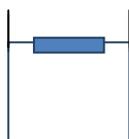
- (1) annelida. (2) mollusca. (3) coelenterata. (4) arthropoda.

30. The diagram shows how an object stays when immersed in water.

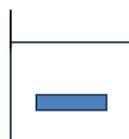
It was taken out and put into a vessel containing coconut oil. Which of the following diagram shows the position of the object in coconut oil?



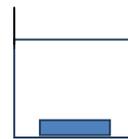
(1)



(2)



(3)



(4)

31. What is the relative molecular mass of $(\text{NH}_4)_2\text{SO}_4$?

(N =14, H=1, S=32, O=16)

(1) 66

(2) 114

(3) 122

(4) 132

32. Which of the following shows the correct relationship between the gas and its use?

Gas	Use
1. Hydrogen	To fill weather balloons
2. Oxygen	To extinguish fire
3. Carbon dioxide	To fill in dry food packets
4. Nitrogen	To support combustion

33. A force acts on a current carrying conductor kept perpendicular to a magnetic field.

Consider the following factors.

(A) Length of the conductor

(B) Electric current

(C) Cross sectional area of the conductor

(D) Strength of the magnetic field

Of the above, the factors affecting the magnitude of the force on the conductor are

(1) A and C.

(2) B and C.

(3) A, B and C.

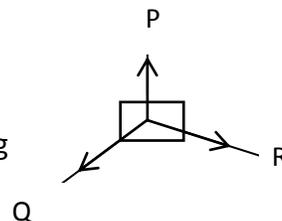
(4) A, B and D.

34. The component elements contained in nucleic acids are

- (1) carbon, hydrogen, oxygen, nitrogen, and phosphorus.
- (2) carbon, hydrogen, oxygen, nitrogen, and sulfur.
- (3) carbon, hydrogen, oxygen, phosphorus, and sulfur.
- (4) carbon, hydrogen, oxygen, phosphorus, and magnesium.

35. **P**, **Q**, and **R** are three coplanar inclined forces acting on an object.

If the object remains at rest under these forces, which of the following is true about P, Q and R?



- (1) $P + Q = R$
- (2) $P = Q = R$
- (3) resultant of Q and R = P
- (4) $P + Q > R$

36. Some of the specifications given regarding an immersion heater are as follows.

230 V, 1000 W, 50 Hz

What is the amount of electrical energy spent during 2 minutes when the heater operates with its maximum efficiency?

- (1) $\frac{1000}{2}$ J
- (2) $\frac{1000}{2 \times 60}$ J
- (3) 1000×2 J
- (4) $1000 \times 2 \times 60$ J

37. Consider the following statements regarding inheritance.

- (A) If the pairs of genes responsible for a particular characteristic are similar, that organism is homozygous.
- (B) Sex characteristics of living organisms are determined by genes.
- (C) The two chromosomes in the pair of sex chromosomes are identical.

Of the above statements, the true statement(s) is /are

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

38. Four chemical reactions are given below.

- (A) Thermal decomposition of potassium permanganate.
- (B) Decomposition of hydrogen peroxide.
- (C) Thermal decomposition of calcium carbonate.
- (D) Electrolysis of water.

In which of the above instances, oxygen is liberated as a product?

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

39. Of the following, select the correct statement about greenhouse gases.

- (1) Carbon dioxide is the only gas that can bring about greenhouse effect.
- (2) Increase in the concentration of greenhouse gases entails decrease in global temperature.
- (3) Greenhouse gas contributes to maintain a climate that is favourable to life on earth.
- (4) Only human activities cause emission of greenhouse gases.

40. A, B, C, and D indicate four modern trends.

- (A) Decrease of food mileage
- (B) Minimization of carbon foot print
- (C) Neglect of water foot print
- (D) Use of products that can be recycled and reused.

Of these, the environmental friendly consumer needs to follow are

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

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Science II

Duration 2 Hours

1. A) “The cultivation of legumes makes the soil fertile”.

A group of students are asked to check whether the above statement is true or false. They have planned and implemented an activity as follows.

Step 1

- Selecting two plots with equal area and soil factors.
- Growing soybean in one plot and maize in the other plot.
- Supplying all the factors needed for growth equally.
- Burying all the remaining parts after collecting the harvest.

Step 2

- Preparing soil afresh of the two plots and growing leaf cabbage in both of them.
- Supplying the factors needed for growth equally.

Step 3

- Comparing the growth of plants after an equal time interval.
 1. Write two factors that should be supplied equally in step 2. (2 marks)

.....
.....

2. State a criterion that can be used to compare the growth of plants in step 3. (1 mark)

.....

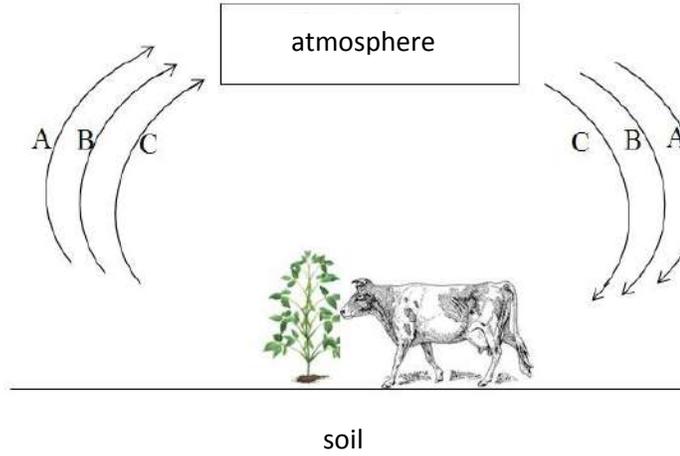
3. Is the activity sufficient to check the correctness of the statement, “The cultivation of legumes makes the soil fertile”? (1 mark)

.....

4. Give one reason for your answer. (1 mark)

.....

B) Following diagram shows the cyclic circulation of three natural gases in the atmosphere. Three gases are nar



1. Complete the following table with the facts relevant to above gases

Name of the gas	The group of organisms which removes the gas from the atmosphere	group of organisms which adds the gas to the atmosphere
		nitrifying bacteria
	Plants	
	Plants and animals	

i. Which organizational level of biosphere is shown in the above diagram? (1 mark)

.....

ii. Farmers are used to adding agro chemicals for their cultivation excessively.

a) What is the non-communicable disease to which these farmers are most susceptible? (1 mark)

.....

b) Give two factors that would lead to this disease.(2 marks)

.....

2) A) There were blossoms of flowers in a vine of long beans in the garden of a student. The bees were observed flying near these flowers.

i) Write down the two parts that belong to the androecium of a flower. (2 marks)

.....
.....

ii) To which structures the ovules inside the flower are converted after pollination and fertilization. (1 mark)

.....

iii) The student observed that the seeds of wara (*Calatrophis*) are fallen in the garden, which is not a plant in the garden. What is the agent that helped to disperse wara seeds? (1 mark)

.....

iv) Write an advantage of the dispersal of fruits and seeds for a plant. (1 mark)

.....

B) The organisms like millipedes and earthworms are observed near a decayed log.

i) Write the animal phyla to which the following organisms belong. (2 marks)

Millipede

Earthworm

ii) A student said that the frog is an amphibian. Explain the term "amphibian". (2 marks)

.....

iii) Write down a group of micro-organisms which bring about the decay of the log. (1 mark)

.....

C) An aqueous solution was prepared by dissolving a little of flour in water. An activity was carried out as follows by taking a few of this solution into a test tube and adding an equal volume of an amylase solution.

Step 1 – Placing a drop of the above mixture on a tile and adding a drop of iodine solution.

Step 2 – Placing a drop of the above mixture on a tile after 10 minutes and adding a drop of iodine solution.

i) What colour is observed in the 1st step? (1 mark)

.....

ii) What colour is observed in the 2nd step? (1 mark)

.....

iii) In this activity which substance has acted as an enzyme? (1 mark)

.....

iv) What is the most suitable laboratory equipment that can be used to put Iodine drops in the above activity? (1 mark)

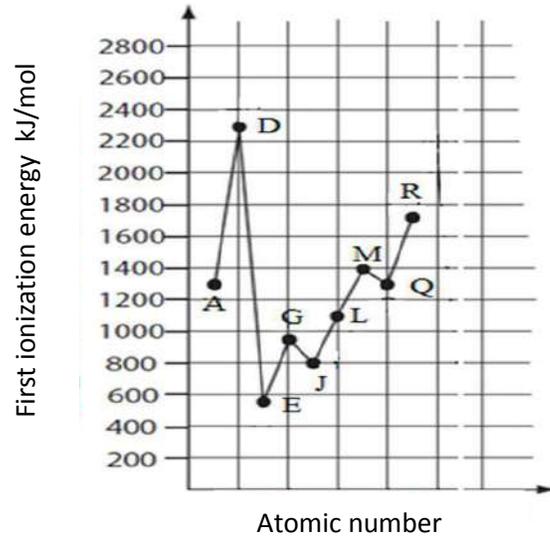
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v) What is the function of enzymes inside the living bodies? (1 mark)

.....

3.

A) **A, D, E, G, J, L, M, Q** and **R** are some successive elements within the range of elements with atomic numbers from 1 to 20. (The given symbols are not their standard symbols.) "**J**" is an element belonging to the period 2. The variation of the first ionization energy of the above elements is shown by the graph.



i) What is meant by the first ionization energy? (2 marks)

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

ii) What is the unit used to measure the ionization energy? (1 mark)

.....

iii) Name two elements belonging to the same group based on the graph. (2 marks)

.....

iv) State the reason why the first ionization energy of E is less than that of A. (2 marks)

.....
.....

B) The mass of one atom of the element ${}_{20}\text{X}$ is 6.68×10^{-23} g. (The atomic mass unit is 1.67×10^{-24} g)

i) Define the term 'atomic mass unit'. (2 marks)

.....

ii) Calculate the relative atomic mass of the element ${}_{20}\text{X}$. (2 marks)

.....

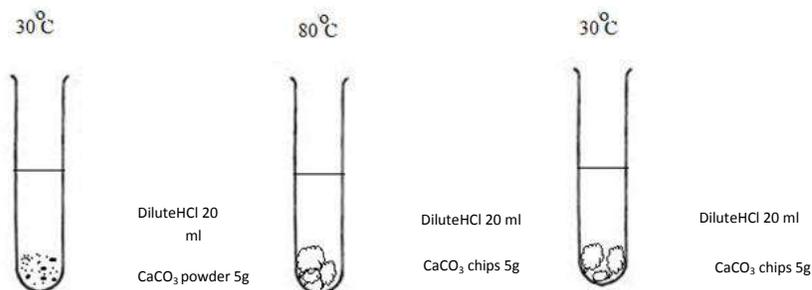
iii) The element ${}_{20}\text{X}$ forms ions when forming compounds. Does this element remove, gain or share electrons when forming ions? (1 mark)

.....

iv) Write the symbol of the ion formed by the element ${}_{20}\text{X}$. (1 mark)

.....

C) Given below are three setups prepared to investigate the factors affecting the rate of reactions.



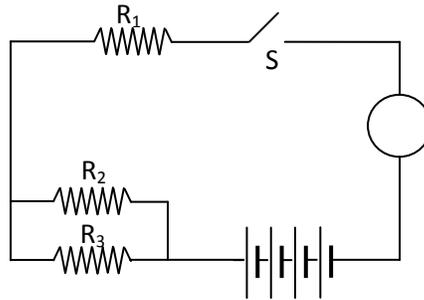
i) Answer (a) and (b) in the table referring to the above setups. (2 marks)

The factor affecting rate of reactions	The couple of setups that relate to the factor investigated
a)	B, C
The physical nature of reactants.	b)

ii) Of the test tubes B and C, in which does the reaction occur faster? (1 mark)

.....

4) A) Following diagram shows a circuit prepared by a student. The resistance of each resistor is 4Ω . The electromotive force of each cell is 1.5 V .



i) Is it a direct or an alternating current that flows through the circuit when the switch 'S' is closed? (1 mark)

.....

ii) Compare the difference between the direct current and the alternating current? (1 mark)

.....

iii) Calculate the equivalent resistance of the circuit. (2 marks)

.....

iv) Find the reading of the ammeter that is connected to the circuit. (2 marks)

.....

v) Calculate the potential difference across the resistance R_2 . (2 marks)

.....

B) When a force is applied on a block of wood kept on a table, a frictional force is created between two surfaces opposing its motion. That frictional force is divided into three types according to the nature of motion of the object. Mention the type of frictional force relevant to the given instance in the following table.

Instance	The type of frictional force
i) When there is no relative motion between the object and the surface although a force is applied.	
ii) When the motion just startson application of the force.	
iii) When there is relative motion between the object and the surface.	

C) The diagram given below shows a child on a swing at rest. Her weight is **W**.

i) The forces acting on the ropes **a** and **b** due to the weight of the child are equal. Write the magnitude and the direction of the said forces. (2 marks)

a) The force on the rope **a** Direction

b) The force on the rope **b** Direction



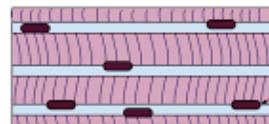
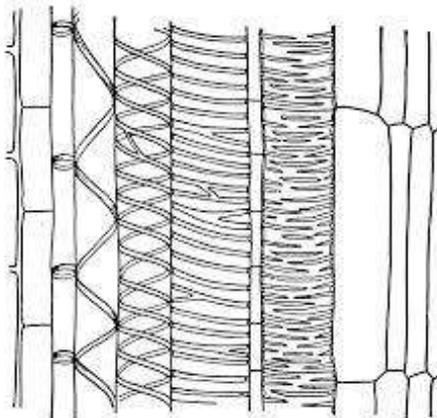
iii) Mention the magnitude and the direction of the resultant of the two forces acting along the ropes.

(2 marks)

Magnitude Direction

Part B – Essay

5) A) Living bodies are made of tissues, organs and organ systems. Living processes are interconnected through various systems. The energy needed for living processes is produced by breaking of ATP. 'A' shows a plant tissue. 'B', 'C' and 'D' show three animal tissues.



- i. Write two functions of the plant tissue 'A'. (2 marks)
- ii. State what type of muscle tissue is 'B' and 'C' each. (2 marks)
- iii. Name two functions of ATP. (2 marks)

iv. Name the enzyme needed for the digestion of protein and mention its end product. (2 marks)

B) Of the tissues 'B', 'C' and 'D', some are voluntarily controlled while the others are controlled by autonomic nervous system. Heart beat is controlled by medulla oblongata of the central nervous system.

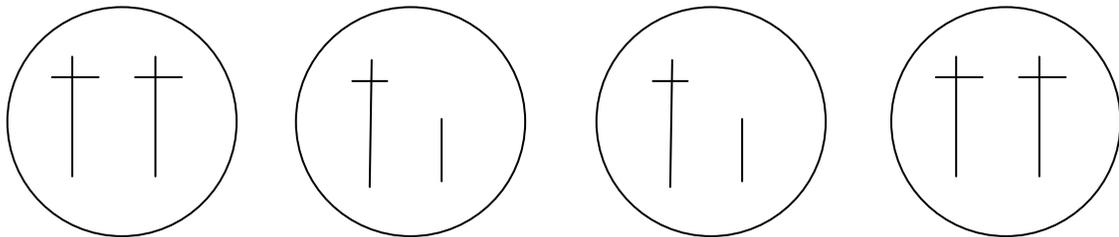
- i. State the stages of the cardiac cycle of the heartbeat. (2 marks)
- ii. Write two functions of the cerebellum. (2 marks)

C) In cell division, the nucleus of daughter cells gets chromosomes from their parental cells through nuclear division. There are two types of cell divisions named meiosis and mitosis.

- i. State a difference between meiosis and mitosis. (2 marks)
- ii. Hemophilia occurs due to an 'X' linked with a recessive gene. According to the combination of genes the offspring will be diseased, healthy or carriers. According to the combination of genes shown below, 'A' is a carrier woman.

Who are represented by 'B', 'C' and 'D'? (3 marks)

(Let the recessive gene causing hemophilia be 'h' and the dominant gene be 'H')



- iii) The pod colour green (G) of *Pisum sativum* plant is dominant over the pod colour yellow (g). Two heterozygous plants with green colour pods were crossed. Draw a Punnett box to show the results. (3 marks)

6) A) Following are some acids and bases used in the laboratory.

(HCl, H₂SO₄, NaOH, CH₃COOH, NH₄OH)

- i. Name a strong acid and a weak base from the above. (2marks)
- ii. Indicate by an equation how HCl ionizes in aqueous solution. (2marks)

B) 100cm³ of a solution was made by weighing 4g of NaOH and dissolving it in water.

- i. Is the above reaction endothermic or exothermic? Write the observation for your answer. (2marks)
- ii. The loss of heat energy to the environment during the above activity should be minimized. Draw a suitable, labeled setup. (2marks)
- iii. Calculate the concentration of the solution prepared. (2marks)

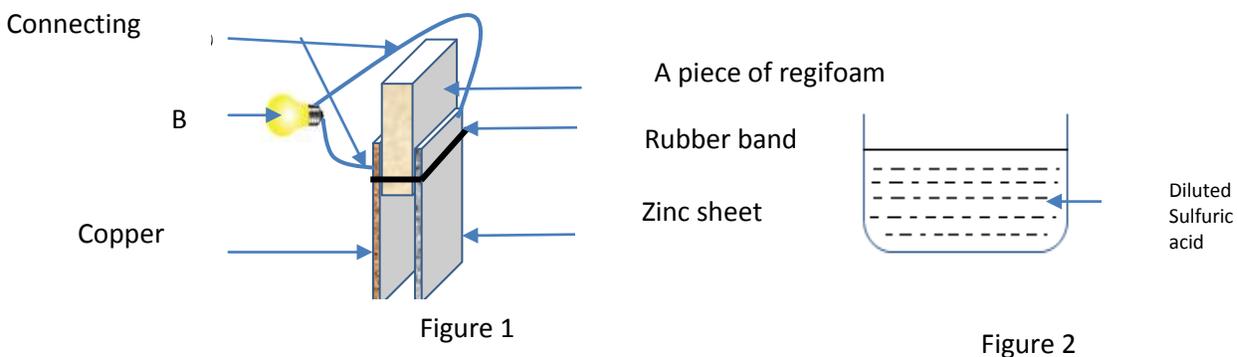
(Molar mass of NaOH is 40gmol⁻¹)

C) a, b and c are three mixtures.

- a. rice with sand
- b. salt solution
- c. aqueous iodine solution

- i. Write a suitable method to separate the components in each of the above mixtures. (3 marks)
- ii. What is the compound used to separate the underlined substance in 'c'? (1 mark)
- iii. Name a homogeneous mixture from the above three. (1 mark)

D) Figures 1 and 2 are two setups prepared in a laboratory.



- i) When the metal sheets given in the setup in Figure 1 are immersed in the acid given in the setup in Figure 2, the bulb lights.
 - a) Write an equation for the reaction taking place in the zinc sheet. (2marks)
 - b) Is the copper sheet here acting as the anode or the cathode? (1 mark)
- ii) Name the two polymers used in the setup in Figure 1. (2marks)

7) A) A few standard points related to a concave mirror are given below in Figure 1. When a lighted candle is placed in front of such a mirror kept on a table as shown in Figure 2, the image of the candle flame could be observed through the mirror.

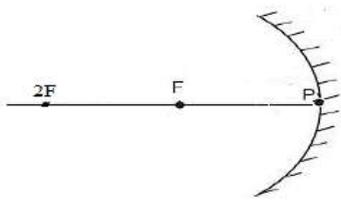


Figure 1

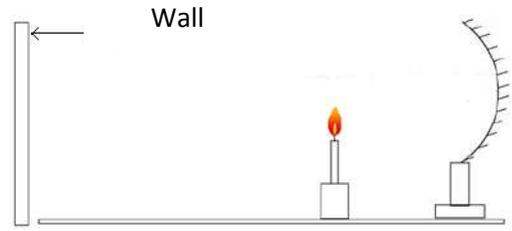
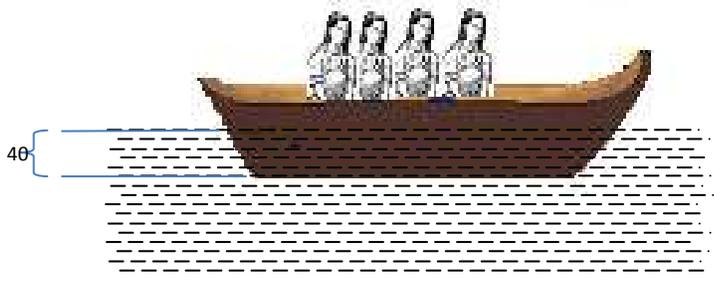


Figure 2

- i. Write two features of that image. (2marks)
- ii. The candle was moved towards the wall gradually from the mirror. Then the image inside the mirror became invisible and finally it appeared as a blurred spot of light on the wall. The candle was moved towards the wall till a sharp image of the light spot was obtained. Write the position of the candle at that instance using standard points relating to the mirror. (1 mark)
- iii. Draw the ray diagram to show how the image was formed in the instance (ii) above. (2marks)
- iv. Write two features of the sharp image so obtained. (2marks)

B) The diagram given below shows a boat in a reservoir. The weight of it is 2000N. Inside the boat are four men each with a mass of 50 kg.



- i. Calculate the upthrust exerted by water on the boat. (2marks)
- ii. If the boat dips 40cm in water, calculate the pressure exerted by water on a point at the bottom of the boat. (2marks)

- i) This boat travels from a certain point in the reservoir to the bank in a straight line. If the time taken for the journey of the boat is 5 minutes and its average speed is 2 ms^{-1} find the distance travelled. (2marks)
- ii) Draw the displacement – time graph for the motion of the boat considering that the boat is travelled with a uniform velocity.
(2marks)

C)

- i) Based on which feature the waves are classified as mechanical and electromagnetic?
(1 mark)
- ii) What is the characteristic of sound which depends on the amplitude of a wave?(1 mark)

D) The temperature of a heated liquid can be measured by a mercury thermometer.

- i) The bulb of the thermometer is immersed in the liquid to measure the temperature of the liquid. By which method the heat is transmitted to mercury through the bulb of the thermometer from the liquid.(1 mark)
- ii) Due to which feature of mercury it is used in thermometers? (1 mark)

8) When repairing a roof of a house a tile fell near a person. The mass of the tile was 2kg. The velocity of the tile when it touched the ground was 20 ms^{-1} ($g=10 \text{ ms}^{-2}$).

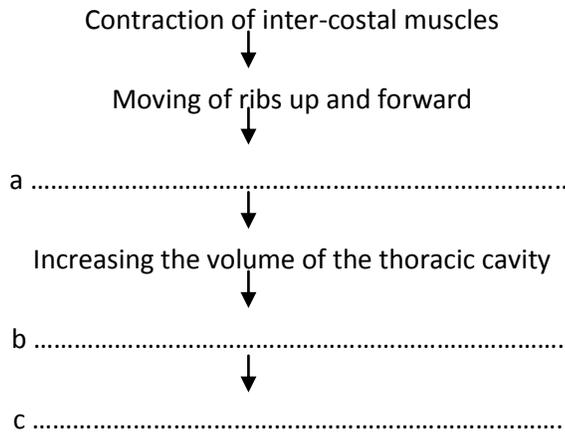
A) Seeing the tile, the man jumped away to avoid the accident.

- i) State a change that took place in each of the following systems of the man who panicked due to the incident.
 - a) Respiratory system
 - b) Blood circulatory system (2marks)
- ii) Indicate the contribution of the main types of muscles during the above incident using two examples. (2marks)

iii) Taking into consideration the nerve impulse arose from the moment the man saw the tile to his response to it, answer the following questions. (3 marks)

- a) What is the receptor?
- b) What is the part of the central nervous system that was activated?
- c) What is the effector that helped responding?

iv) Given below are a few steps of the mechanism of respiration.

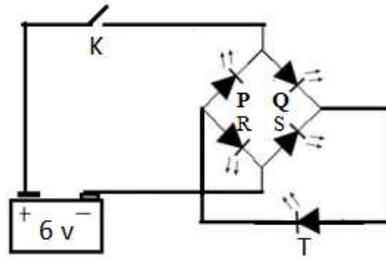


State the steps a, b and c. (3 marks)

B)

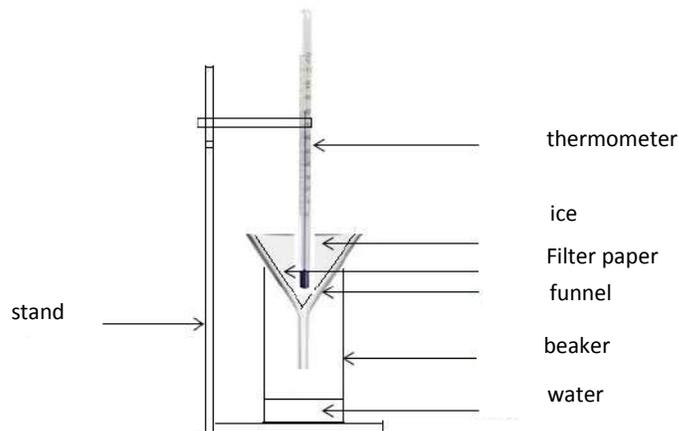
- i. What is the gravitational force acted on the tile? (2 marks)
- ii. What is the average velocity of the tile? (2 marks)
- iii. a) What is the time taken by the tile to fall on the ground? (1 mark)
b) What is the height to the roof from the ground? (1 mark)
- iv. The man in the case wears spectacles for short sight. Draw the ray diagram relevant to his observation of the tile at distance the moment it released from the roof. (3 marks)

9) A) Given below is a simple electronic circuit constructed by using light emitting diodes (LED).



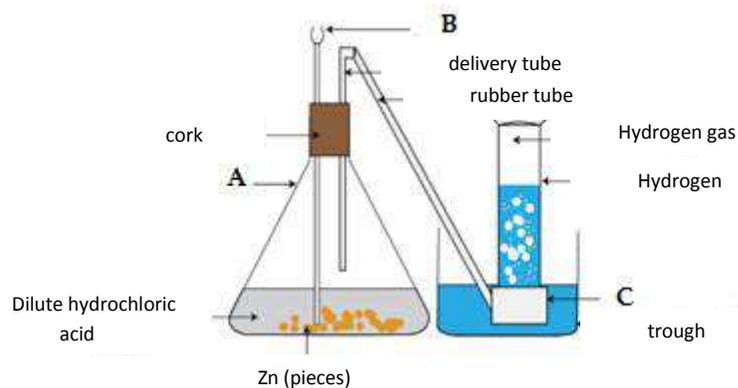
- i. Of the LEDs P,Q,R,S,T which will light when the switch K is closed,? (1 mark)
- ii. Of the LEDs P,Q,R,S,T which will light when the switch K is closed after changing the terminals of the battery? (1 mark)
- iii. After removal of the battery from the circuit, the terminals of a transformer with a 6V output was connected to the terminals A and B and an input of 230 V was supplied to it. Then, which LEDs of P,Q,R,S,T will light? (1 mark)
- iv. Explain the action of the device constructed by connecting P,Q,R,S. (1 mark)

B) Following diagram shows a setup prepared for a laboratory activity.



- i. What name can be given to the fixed temperature recorded by the thermometer? (2 marks)
- ii. What is the value of that temperature relevant to pure ice under the pressure of one atmosphere? (2 marks)
- iii. Write the change of state related to this activity. (2 marks)

C) An apparatus arranged to prepare and collect hydrogen gas in the laboratory is given below.



- i. Name the equipment labeled A, B and C in the diagram. (3 marks)
- ii. Indicate the chemical reaction taking place in A by a balanced chemical equation. (2 marks)
- iii. State a chemical property of hydrogen gas. (1 mark)
- iv. The rate of the reaction taking place in A decreases gradually. Write one reason for it. (2 marks)

Model Paper 1

Mark Scheme

Answers MCQ

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

01.

- A.
- i. For a suitable answer such as water/light/number of plants.....(2 marks)
 - ii. For a suitable answer such as number of leaves/size of leaves/height of the plant(1mark)
 - iii. adequate/not adequate(1 mark)
 - iv. adequate – can be decided by examining the plant samples(1 mark)

B.

- i. A – N₂.....Rhyzobium(2 marks)
- B – CO₂Plants/animals/plant and animals (2 marks)
- C – O₂ Plants(2 marks)
- ii. An ecosystem(1 mark)
 - a. Kidney infections(1 mark)
 - b. For an answer such as application of agro-chemicals in high concentrations/not following safety steps.....(2 marks)

02. A. i. anther, filament(2 marks)
- ii. into seeds(1 mark)
 - iii. wind(1 mark)
 - iv. to minimize competition for needs/to find new settlements/ to increase

diversity/ to be protected from pathogens..... (1 mark)

B. i. millipede– athropoda

earthworm - annelida.....(2 marks)

ii. animals using water and land to complete the life cycle(2 marks)

iii. bacteria(2 marks)

C. i.giving blue violet/ black blue colour(1 mark)

ii. yellowish brown/ no change in colour(1 mark)

iii. amylase(1 mark)

iv. dropper(1 mark)

v. Catalyzing biochemical reactions / as a catalyst(1 mark)

03. A. i. The minimum quantity of energy that should be supplied to remove an electron from an atom of the element in gaseous state to form unipositive ion in the gaseous state.....(2 marks)

ii. kJ mol^{-1} (1 mark)

i. A,E(1 mark)

ii. Having higher number of shells in E than in A(2 marks)

B. i. One twelfth the mass of $^{12}_6\text{C}$ atom(2 marks)

ii. Relative atomic mass of X = $\frac{\text{mass of an atom X}}{\text{atomic mass unit}}$

$$= \frac{6.68 \times 10^{-23}}{1.67 \times 10^{-24}}$$

= 40(2 marks)

iii. Remove electrons(1 mark)

iv. X^{2+} (1 mark)

C. i. a) temperature.....(1 mark)

b) A, C(1 mark)

ii. B(1 mark)

04. A. i. Direct current (1 mark)
 ii. The direct current flows only in one direction in the circuit (1 mark)
 An alternating current changes its direction when it flows in the circuit(1 mark)
 iii. $3\ \Omega + 3\ \Omega = 6\ \Omega$ (1 mark)
 iv. $V=IR$ / $I = V/R$ (1 mark)
 $= 6V/6\ \Omega$ / $1\ A$ (1 mark)
 v. $V=IR$
 $= 1A \times 2\ \Omega = 2\ V$ (2 marks)
- B. i. static frictional force(1 mark)
 ii. limiting frictional force(1 mark)
 iii. dynamic frictional force(1 mark)
- C. i. a – $W/2$ – upwards
 b – $W/2$ - upwards (01X4)(2 marks)
 ii. W (1 mark)
 upwards (1 mark)

PART B – ESSAY

05. A. i. Transport of water along with mineral salts absorbed by roots throughout the plant body.
 Providing mechanical support to the plant(2 marks)
 ii. B – smooth muscles C – skeletal muscles(2 marks)
- iii. Storing energy
 Releasing energy
 Transporting energy(for any two 2 marks)
- iv. enzyme – trypsin(1 mark)
 end product – polypeptide(1 mark)
- B.i.auricular contraction
 ventricular contraction / Complete cardiac diastole(2 marks)
- ii. maintaining balance of the body
 controlling the action of voluntary muscles
 coordination of body movements any 2 (2 marks)

C i.

Meiosis	Mitosis
Occurs in two stages Gives 4 daughter cells Daughter cells get half the number of chromosomes in the mother cell	Occurs in one stage Gives 2 daughter cells Daughter cells get the same number of chromosomes in the mother cell

For a comparative answer (2 marks)

ii. B – hemophilia male

C – healthy male

D – healthy female(3 marks)

iii.

gametes	G	G
G	GG	Gg
g	Gg	gg

Showing gametes – (01 mark) Punnet box – (02 marks)

06. A. i. HCl / H₂SO₄, NH₄OH (2marks)

ii. HCl (aq) → H⁺ (aq) + Cl⁻ (aq)(2 marks)

B. i. exothermic (1 mark)

Increase in the temperature of the mixture/heating of the mixture(1 mark)

ii. a suitable set up(2 marks)

iii. $n = 4g / 40 \text{ gmol}^{-1} = 0.1 \text{ mol}$ (1 mark)

$C = n/V = 0.1 \text{ mol} / 0.1 \text{ dm}^{-3} = 1 \text{ mol dm}^{-3}$ (1 mark)

C. i. a) sifting(1 mark)

b) crystallization/ vaporization / evaporation(1 mark)

c.) solvent extraction(1 mark)

ii. carbon tetrachloride / cyclohexane(1 mark)

iii. b/c(2 marks)

D) i. a) Zn (s) → Zn²⁺ (aq) + 2e⁻(1 mark)

- b) as the cathode(1 mark)
- ii. rubber and polystyrene(2 marks)
- 07. A. i. magnified/erect/virtual(2 marks)
- ii. between focus and the center of curvature/between C and f.....(1 mark)
- iii. Relevant ray diagram.....(1 mark)
- iv. magnified / inverted / real(1 mark)

B. i. weight of men = $4 \times 50 \times 10$
 $= 2000 \text{ N}$ (1 mark)

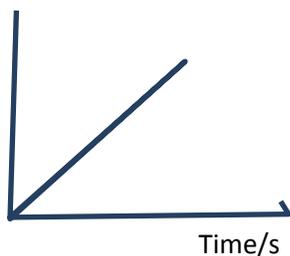
Total weight = $2000 \text{ N} + 2000\text{N}$
 $= 4000\text{N}$

Upthrust = Total weight = 4000N (1 mark)

ii. $P = \rho h g$ $P = 0.4\text{m} \times 1000\text{kgm}^{-3} \times 10\text{ms}^{-1}$ (1 mark)
 $= 4000 \text{ Pa} / \text{Nm}^{-2}$ (1 mark)

iii.Total distance = average speed X time(1 mark)
 $= 5 \text{ ms}^{-1} \times 5 \text{ min} \times 60 \text{ s min}^{-1}$
 $= 1500\text{m} / 1\text{km} 500\text{m}$

iv. Displacement /m



Marking axes correctly(1 mark)

Graph(1 mark)

- C. i. whether a medium is required or not/ the need of a medium(2 marks)
- ii. loudness(1 mark)

D. i. conduction(2 marks)

ii. expansion(1 mark)

08. A. i. a. Increase in the rate of inhalation and exhalation(1 mark)

b. increase in the rate of heart beat/increase in blood pressure/dilation
of blood vessels (1 mark)

ii. smooth muscles – control of respiratory action dilation of blood
vessels movements of the diaphragm.
Skeletal muscles – movements of legs turning of neck
Cardiac muscles – heart heat for the two correct answers (2 marks)

iii. a. eye (1 mark)

b. cerebrum (1 mark)

c. leg muscles (1 mark)

(give marks for a suitable answer)

iv. a. decrease in the curvature/convexity of the diaphragm (2 marks)

b. decrease in the pressure inside the thoracic cavity (2 marks)

c. inspiration/entry of atmospheric air into lungs (2 marks)

B (i) $F = ma$ / $W = mg$ (1 mark)

$= 2 \text{ kg} \times 10 \text{ ms}^{-2}$ or 20 N (1 mark)

(ii) $(0 + 20) / 2 = 10 \text{ms}^{-1}$ (1 mark)

(iii) acceleration = velocity change / time

$$10 = (20 - 0) / \text{time}$$

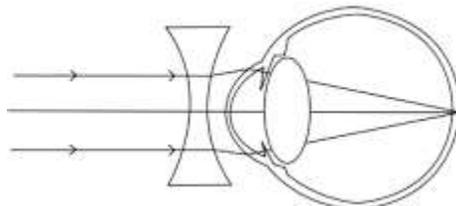
time = 2s (1 mark)

average velocity = displacement/time

$$\text{displacement} = 20 \text{ ms}^{-1} \times 2 \text{ s}$$

= 40 m (1 mark)

(iv) (2 marks)



Question 9

- A (i) Q, S, T (1 mark)
(ii) P, R, T (1 mark)
(iii) All light..... (1 mark)
(iv) conversion of an alternating current to a direct current / complete rectification of waves
(1 mark)
- B. (i) melting point of ice (2 marks)
(ii) 0°C (2 marks)
(iii) fusion/melting (of ice) (2 marks)
- C. (i) A – conical flask
B – thistle funnel
C – beehive stand (3 marks)
(ii) $\text{Zn(s)} + 2\text{HCl(aq)} \rightarrow \text{ZnCl}_2\text{(aq)} + \text{H}_2\text{(g)}$ (2 marks)
(iii) combustibility / reducing property (1 mark)
- D. concentration of the acid decreases / surface area of zinc decreases (2 marks)

20 marks



