

**Group-A-Multiple Choice Questions (10 × 1 = 10)**

1. Choose the best option from the given alternatives and write in your answer sheet.
  - a. Which statement of the following accurately describes the relationship between the rate of photosynthesis and the amount of sunlight in an experiment?
    - i. Amount of sunlight is an independent variable and the rate of photosynthesis is a controlled variable.
    - ii. Amount of sunlight is an independent variable and the rate of photosynthesis is a dependent variable.
    - iii. Amount of sunlight is a controlled variable and the rate of photosynthesis is an independent variable.
    - iv. Amount of sunlight is a dependent variable and the rate of photosynthesis is a controlled variable.
  - b. What is a digital footprint?
    - i. A list of websites where a person has gone online
    - ii. Tracking someone's physical location through an app
    - iii. A collection of data of someone's online activities that can be traced back
    - iv. All the ways of two people's online connection
  - c. Which phylum of the following do the elongated, cylindrical, unsegmented and unisexual animals belong to?
    - i. Nematelminthes
    - ii. Annelida
    - iii. Arthropoda
    - iv. Platyhelminthes
  - d. When a black and a white rabbits are crossed, all the baby rabbits appear black. Which law of Mendel does it justify?
    - i. Law of segregation
    - ii. Law of purity of gametes
    - iii. Law of independent assortment
    - iv. Law of dominance
  - e. What is the value of average acceleration due to gravity of the moon?
    - i.  $\text{m/s}^2$
    - ii.  $9.78 \text{ m/s}^2$
    - iii.  $9.83 \text{ m/s}^2$
    - iv.  $2.62 \text{ m/s}^2$
  - f. If the distance between two bodies is doubled, what change in the gravitational force between them occur?
    - i.  $2F$
    - ii.  $4F$
    - iii.  $\frac{1}{2} F$
    - iv.  $F/4$
  - g. What angle should a ray of light strike the surface of water with to make an angle of refraction  $20^\circ$  if the refractive index of water is 1.33?
    - i.  $24.07^\circ$

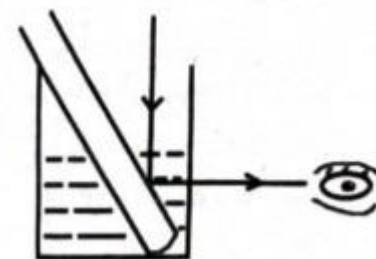
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- ii.  $27.05^{\circ}$
- iii.  $22.07^{\circ}$
- iv.  $30.07^{\circ}$
- h. Who discovered the magnetic effect of electricity?
  - i. Orested
  - ii. Fleming
  - iii. Dalton
  - iv. Faraday
- i. The molecular formula of a compound is in the form of  $A_2O$ . What is the belonging group of A in the modern periodic table?
  - i. VIA
  - ii. VIIA
  - iii. IIA
  - iv. IA
- j. Why do detergents work better than soaps in hard water?
  - i. Detergents do not form scum with magnesium and calcium ions.
  - ii. They have higher melting point.
  - iii. Detergents are made from natural oils.
  - iv. They are cheaper.

**Group-B-Very Short Answer Questions ( $9 \times 1 = 9$ )**

- 2. Write very short answer to the following questions.)
  - a. In a research work, why should the controlled variables be kept in control?
  - b. Draw a symbolic diagram of a digital signal and show ON/OFF on it.

- c. State Archimedes' principle.
- d. Why does the empty test tube seems shiny, why? Give reason.



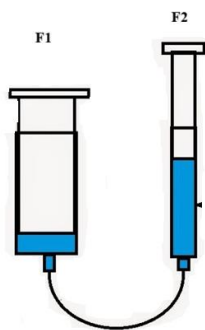
- e. When a dynamo installed bicycle start running, the bulb connected to it glows. Which principle is applied in the working mechanism of dynamo?
- f. Write an evidence for galaxies are moving apart with time
- g. Which metal can be extracted from malachite?
- h. Write a difference between alkanes and alkenes.
- i. An organic compound has molecular formula  $C_3H_5(OH)_3$ . What is its IUPAC name?

**Group-C-Short Answer Questions ( $14 \times 2 = 28$ )**

- 3. Prove that unit of resistance Ohm ( $\Omega$ ) =  $kgm^2s^{-3}A^{-2}$ .
- 4. Write any two distinguishing characteristics of earthworm.)
- 5. Frog and lizard both live on land, yet they belong to different classes of sub-phylum of vertebrata. Give two scientific reasons for their classification.
- 6. What do X and Y represent in the following concept map?

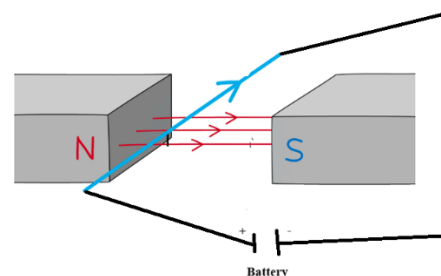
Queen Bee  $\xrightarrow{X}$  Egg  $\xrightarrow{Y}$  Drone + Queen Bee  $\xrightarrow{Y}$  Egg  $\rightarrow$  Infertile Bee

7. Food shortage is a major problem in developing countries. How does genetic technology help overcome this problem? Write in short.
8. Climate change is considered as a major global issue that requires international cooperation. Justify it.
9. Some villagers are planning to set fire in a forest, thinking new grasses will grow in it in the next season. Is it a wise plan? How does it cause climate change? Write your opinion in short.
10. State Newton's universal law of gravitation. Also, write a consequence of gravitational force.
11. Aashis made a model of a hydraulic machine, using two syringes and a catheter. He performed an experiment with the help of it and recorded the observation. Fill in the following blank with the findings and state the conclusion of this experiment.



Force applied on the small piston	Weight lifted on the big piston	Result
5N	20N	.....

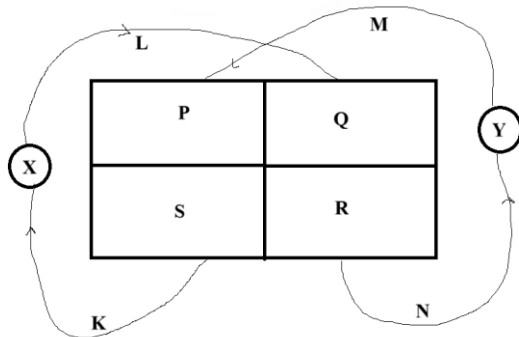
12. Observe the following figure and answer the given questions.



- a. Which effect is shown in the figure?
  - b. Name a device based on this effect.
  13. Li, Be, B, C, N, O, F and Ne belong to the same period of the modern periodic table. Which one is the most electronegative element out of these elements, why?
  14. Describe the conditions for the formation of a Big Crunch in brief.
  15. Show the electro-refining of silver in a diagram with labelling.)
  16. Farmers use chemical fertilizers and pesticides excessively in their farms.  
State two problems that may arise in the soil or crops due to this practice.
- Section-D- Long Answer Questions (7 x 4 = 28)**
17. A school computer lab uses internet cables to connect all computers to a single server for internet data serving.

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- a. Identify the type of transmission used in the lab.
  - b. Give two reasons why this transmission method is suitable for the lab.
  - c. Mention one limitation of this transmission.
18. Write a difference between inbreeding and line breeding. In a garden pea, 'R' for the round shape of seed is dominant and for wrinkle shape of seed is recessive. If a heterozygous round seeded pea plant is self-pollinated, 75% offspring are found round seeded and remaining 25% offspring are found wrinkle seeded. Which law of Mendel does it justify? Explain with an appropriate crossing - diagram of the cross.
19. In the figure given below, P, Q, R and S are the four chambers of the human heart. X represents lungs, Y represents different organs, and K, L, M and N are the blood vessels. Study this diagram carefully and answer the following questions.



- a. Which blood vessel transports the pure blood?
  - b. Write any two differences between S and Q.
  - c. What is the purpose of pumping blood to X?
20. Explain the behavior of water on cooling from 10 °C to 0°C in brief. If 2 litres of water at 80°C is mixed with 5 litres of water at 20°C. What is the final temperature of the mixture?) (Specific heat capacity of water is 4200J /Kg°C)
21. The focal length of lens A is 20 cm and that of lens B is -20 cm. Out of these two lens, which one forms virtual, erect and diminished image of an object placed 40 cm away from the lens? Write with a scaled ray diagram. How is long-sightedness treated by laser eye surgery method? Write in brief.
22. Reny burns a magnesium ribbon in air. It burns brightly, producing a white ash. Answer the following questions on the basis of her activity.)
- a. Write the balanced equation of the chemical reaction taking place in her activity.
  - b. What happens when the white ash formed in the above chemical reaction is treated with dilute nitric acid? Write the chemical equation. What type of equation is it?
23. When an egg shell is treated with dilute hydrochloric, a colourless gas slightly heavier than air is formed. On the basis of this fact, answer the following questions.
- a. Write the chemical equation of the formation of this gas.
  - b. Draw a diagram of the laboratory preparation of this gas.
  - c. When this gas is treated with ammonia, what is formed? Write with a balanced chemical equation.

**The End**

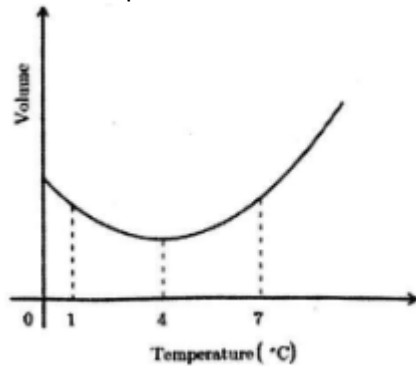
## Group A

1. Rewrite the correct answer option in your answer sheet of the following questions.  $10 \times 1 = 10$

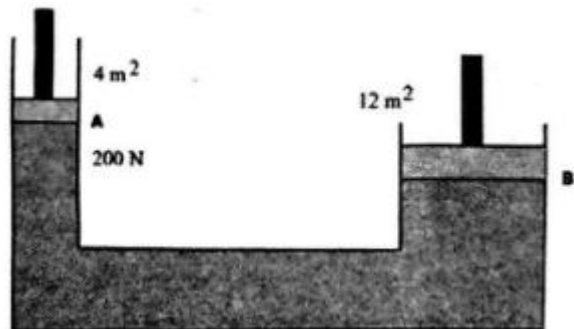
- a. Which of the following is true about DNA?
  - i. Nitrogen bases are T, A, C, G and it helps in protein synthesis
  - ii. Nitrogen base are T, A, U, G and it helps in protein synthesis
  - iii. Nitrogen bases are U, A, C, G and it helps in transference of genetic characters
  - iv. Nitrogen bases are T, A, C, G it helps in transference of genetic characters
- b. Which of the following is the formula to calculate refractive index?
  - i. Refractive index =  $\text{Sini} / \text{Sin r}$
  - ii. Refractive index =  $\text{Sin i} / \text{Sin i}$
  - iii. Refractive index =  $\text{Sin i} / \text{Sin r}$
  - iv. Refractive index =  $\text{Sin r} / \text{Sinr}$
- c. Which of the following is the major vessel that transports pure blood to the body parts?
  - i. Artery
  - ii. Pulmonary artery
  - iii. Arteriole
  - iv. Aorta
- d. Which of the following factor is more responsible in climate change?
  - i. Oxygen
  - ii. Hydrogen
  - iii. Carbon dioxide
  - iv. Helium
- e. Which of the following is correct?

Compounds	General molecular formula
$\text{C}_n\text{H}_{2n}$	$\text{C}_4\text{H}_{10}$
$\text{C}_n\text{H}_{2n+2}$	$\text{C}_4\text{H}_6$
$\text{C}_n\text{H}_{2n-2}$	$\text{C}_4\text{H}_8$

- i. a - 1 b-2, c-3
  - ii. a - 2 b-3, c - 1
  - iii. a - 3 b - 1 c - 2
  - iv. a - 1 b-3, c-2
- f. Which of the following value is correct about gravity of the moon?
    - i.  $1.67\text{m} / \text{s}^2$
    - ii.  $9.8\text{m} / \text{s}^2$
    - iii.  $10\text{m} / \text{s}^2$
    - iv.  $25\text{m} / \text{s}^2$
  - g. How many types of wires are there in household wiring?
    - i. 2
    - ii. 3
    - iii. 4
    - iv. 5
  - h. Which of the following is correct about the following graph?



- i. Volume is increased with the increase in temperature
  - ii. Volume is decreased with the decrease in temperature
  - iii. Water of 4°C has more volume than water of 1°C
  - iv. Water of 4°C has less volume than water of 1°C
- i. How many bits are there in one byte?
    - i. 1
    - ii. 4
    - iii. 8
    - iv. 1024
  - j. How much force is produced in B according to the following information?



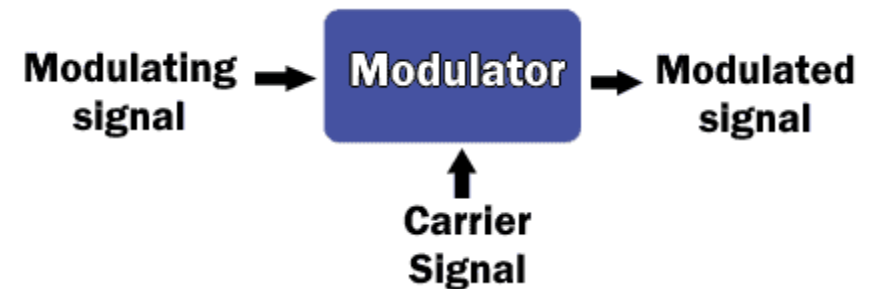
- i. 500 N

- ii. 600 N
- iii. 800 N
- iv. 2400 N

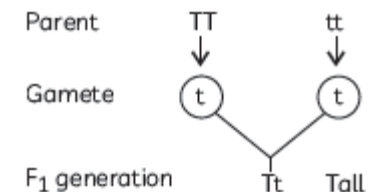
### Section B (9×1=9)

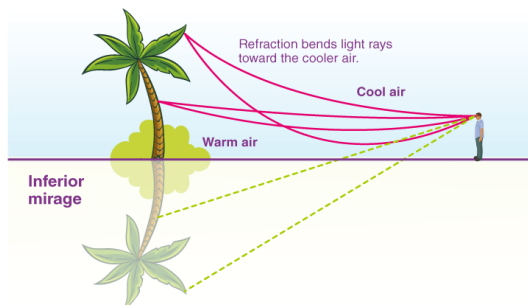
#### 2. Write very short answer of following questions.

1. What is the percentage of blood cells in blood?
2. What is the chemical nature of ammonia gas?
3. What are the chemicals required for the preparation of carbon dioxide in laboratory?
4. What does the following figure indicate?



5. Write the relationship between temperature and rate of chemical reaction?
6. What type of food preservatives is sodium chloride?
7. Which law does the following chart explain?
8. Why is the phenomenon given in the figure occurred?







9. Draw a ray diagram image formed by a convex lens keeping an object at between  $F$  and  $2F$ .

### Section 'C'

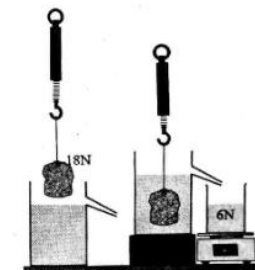
#### Short answer questions ( $14 \times 2 = 28$ )

3. Write any two characteristics of worker bee.
4. Write any two reasons of some of the animals are endangered in Nepal.
5. Mention any two points of digital well-being.
6. Write any two differences between the following organisms.

	
<b>A</b>	<b>B</b>

7. Write any two differences between DNA and RNA.
8. Clarify about Big Bang theory in two points.
9. Write any two differences between exothermic and endothermic reactions.

10. To which principle is the given experiment related? Write. Find the up-thrust applied on the object drowned in liquid.



11. Draw well labelled diagram of laboratory preparation of carbon dioxide.
12. Due to excessive use of chemical fertilizer, how is soil affected? Mention any two points.
13. All vertebrates are chordates but all chordates are not vertebrate, explain with any two reasons.
14. What is the total heat energy required to raise the temperature from  $10^\circ\text{C}$  to  $35^\circ\text{C}$  of a metal having mass  $6000\text{ g}$ ?
15. Write any two differences between calcination and roasting.
16. Which compound is formed by the removal of one hydrogen atom from one atom and one hydroxide group from another atom of ethanol? Also sketch the structural formula of the compound formed.

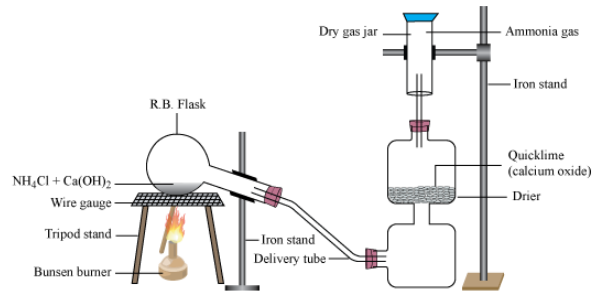
### Section 'D'

#### Long Answer questions. $7 \times 4 = 28$

17. Write a characteristic of each of the following of the modern periodic table on the given basis.
  - a. On the basis of metallic character
  - b. On the basis of atomic size
  - c. On the basis of electronegativity
  - d. f-block elements

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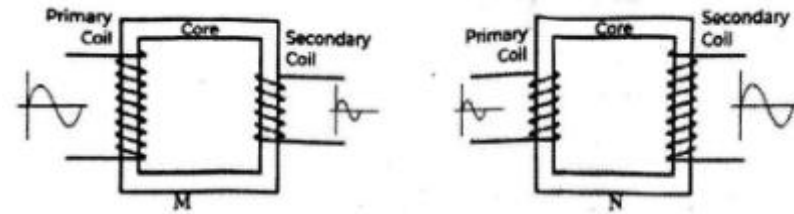
18. Write any one dependent, one independent and any two controlled variables while producing ammonia from the following process.



19. Draw a ray diagram of looking coin when kept in water. A person cannot read the letters about 40 cm. What is the problem in him? Draw a ray diagram of the eye of remedy of such problem.

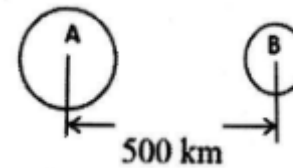
20. Draw a well labelled diagram of internal structure of heart. Also, write the name of membrane which covers it. Write a function of fluid present inside the membrane.

21. Identify the transformers given below. 460 V is produced in secondary coil if 210 V is passed from primary coil. To which of the following transformer is related with this information? Which of the following transformer is used to play radio? What would happen if the radio is connected directly without transformer?



22. Have you ever seen or heard about artificial insemination in your community or in any other places? By which reason this type of insemination is necessary? In which respect In-vitro fertilization is different from artificial insemination? Write any two points.

23. Mass of the objects A and B as shown in the diagram are 2,000 kg and 900 kg respectively.



- Calculate the gravitational force between the objects A and B.
- If the distance between A and B is changed to 300 km, what change will occur in gravitational force? Show with calculation.

**The End**



Section 'A'

Multiple choice question

1. Choose the best alternative of the following questions and write in the answer sheet. (10×1=10)

a) Which of the following is the derived units represented by the group  $\text{kgm}^3\text{s}^{-3}$ ?

- i) Pascal                  ii) Watt                  iii) Joule                  iv) Newton

b) Raunak observed two organisms A and B in the laboratory. Organism A was bilaterally symmetrical and dorsoventrally flattened like a leaf, and organism B was bilaterally symmetrical, cylindrical, and tapering at both ends. Under which phylum should A and B be placed?

- i) A → Nematelminthes,                  B → Annelida  
ii) A → Annelida                  B → Platyhelminthes  
iii) A → Platyhelminthes                  B → Nematelminthes  
iv) A → Platyhelminthes                  B → Annelida

c) Which of the following correctly describes the structural nature of RNA?

- i) Double-stranded structure containing uracil  
ii) Single-stranded structure containing thymine  
iii) Single-stranded structure containing uracil  
iv) Double-stranded structure containing thymine

d. Which part of the given plant is used as medicine?

i. Fibrous root, because it stores curcumin and aromatic oils

ii. Rhizome, because it contains the highest concentration of curcumin.

iii. Stem, because it turns into the powdered form after drying.

iv. Tuber, because it develops the yellow pigment in underground parts.

e. A meteoroid is falling at a distance of 12800 km from the centre of the Earth. The mass of Earth is  $6 \times 10^{24}\text{kg}$  What is the acceleration due to gravity at that point?

- i.  $1.6\text{m} / \text{s}^2$                   ii.  $9.8 \text{ m} / \text{s}^2$                   iii.  $2.45\text{m}/\text{s}^2$                   iv.  $25.6\text{m} / \text{s}^2$

f. Study the following statements related to heat. Which of them is correct?

- i) Amount of heat is inversely proportional to the kinetic energy of the molecules.  
ii) Specific heat capacity is inversely proportional to change in temperature.  
iii) The amount of heat lost is inversely proportional to the mass of the body.  
iv) The amount of heat is inversely proportional to specific heat capacity.

g. Study the following statement and the arguments:

Statement: Electricity can be generated due to the relative motion of the conductor coil and magnetic flux.

Argument 1: The induced emf is directly proportional to the rate of change of magnetic flux.

Argument 2: The emf continues to induce even when the magnetic flux stops changing.



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- i) Statement and argument 2 are correct but argument 1 is incorrect
- ii) Statement and argument 1 are incorrect but argument 2 is correct
- iii. Statement and arguments Argument 1 is correct, but argument 2 is incorrect
- iv. The statement is correct but both arguments are incorrect
- h. What will be the future of universe if the average density of the universe is more than the critical density?
  - i) open universe
  - ii) closed universe
  - iii) flat universe
  - iv) paper like universe
- i. Why electrons enter the 4s orbital before the 3d orbital?
  - i. The 4s orbital holds fewer electrons than the 3d orbital.
  - ii. The 4s orbital is easier to occupy because of its larger size. 4s
  - iii. The 4s orbital lies closer to the nucleus than the 3d orbital.
  - iv. Orbitals with lower energy are filled first.
- j. Identify the correct statement regarding food preservatives and ripening agents:
  - i. Primary preservatives are naturally derived and can be added to food in necessary quantities.
  - ii. Secondary preservatives are natural and permitted only in restricted amounts in food.
  - iii. Calcium Carbide is a conventional fruit-ripening substance.
  - iv. High consumption of fruit ripening agents helps to maintain good health

## Section B

2. Write very short answers to the following questions. (9 x 1 = 9)
- a) Why is digital well-being important?
  - b) Why is a whale called a mammal?
  - c) Why meiosis is called reductional cell division?
  - d) Water pipe in Ramesh house burst during winter season. He noticed that the temperature had dropped below 0°C for several days. Identify the cause.
  - e) Where must be an object placed in front of the convex lens so that the image formed is upright and magnified?
  - f) Which force is responsible to hold the universe firmly?
  - g) How many periods and groups are there in modern periodic table?
  - h) Metal 'A' is in Group 2 (IIA), Period 4, and non-metal 'B' is in Group 16 (VIA), Period 2 of the modern periodic table. Write the chemical formula of the compound formed when A reacts with B.
  - i) Write the structural formula of monohydric alcohol used as alcoholic beverage.

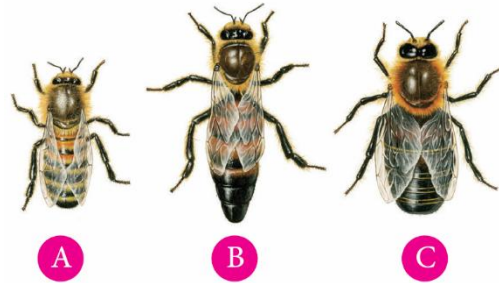
## Section 'C'

**Write short answers to the following questions. (14x2 = 28)**

- 3. Why can't we use the formula  $s = v/t$  to calculate the distance travelled by a moving body? your answer by checking the units.
- 4. List out any two characteristics of class gymnosperm.

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5. Observe the three different types of honey bee in a hive. Justify that the reproduction of C type honey bee is unique in sexual reproduction but not of the A type and B type.



6. Illustrate the F1 generation obtained by crossing a pure tall pea plant with a pure dwarf pea plant. Also, state which of Mendel's laws is demonstrated by this result.

7. What happens when the number of platelets is abruptly increased or decreased in our blood?

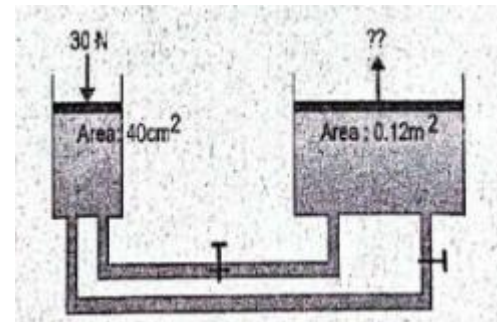
8. Read the following passage. (NTNC-Species Diversity, Environment Statistics of Nepal):

Nepal is recognised as a global biodiversity hotspot, hosting an exceptionally wide variety of wildlife, flora and fauna within its diverse landscapes. According to the National Trust for Nature Conservation (NTNC), the country shelters more than 6,973 species of flowering plants, along with 1,150 bryophytes, 534 pteridophytes, 1,822 fungi, and about 1,001 species of algae. Nepal's fauna is equally diverse, with 208 species of mammals, 867 species of birds, 123 reptiles, around 55 amphibians, and over 230 species of freshwater fish, in addition to 651 species of butterflies. Although Nepal occupies less than 0.1% of the Earth's land area, it supports over 3% of the world's known flora and nearly 1% of its fauna, including globally important

species like the Snow Leopard, Royal Bengal Tiger, one-horned Rhinoceros, Red Panda, and many endangered birds and reptiles. (Source: NTNC-Species Diversity, Environment Statistics of Nepal)

Question: Suggest two actions that you-as a student or local citizen-can take to help preserve Nepal's wildlife and their habitats.

9. Study the figure and use the given insumeration and answer the question.



a) Calculate the pressure transmitted through the liquid. (1)

b) Determine the load that can be lifted by the large piston. (1)

10. When 15kg of cold water is mixed with 5kg of boiled water at 100°C. The final temperature becomes 36.25°C. Calculate the initial temperature of cold water.

11. Sameer cannot see the letters written in the board properly from last bench. Which type of lens you suggest him for the remedy of his problem and why?

12. Study the given part of the periodic table and answer the following questions:

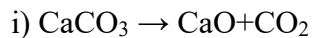
Na	Mg	Al	Si	P	S	Cl	Ar
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a) On what basis are these elements arranged? (1)

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b) Which element has smallest atomic radius? Give reason. (1)

13. Two chemical reactions are given below.



a) Write any two differences between equation (i) and (ii). (2)

14. List out the stages of metallurgy.

15. Hydrocarbons of the alkane are commonly called paraffins.

a) Why are they are classified as paraffin? (1)

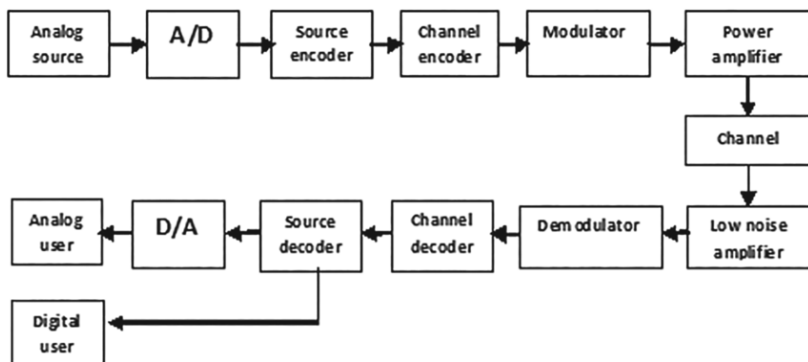
b) Write one application of the alkane. (1)

16. "Overuse of pesticides causes serious health problems." Support this statement with two suitable arguments.

## Section 'D'

**Long answer type question: (4×7=28)**

17. Study the given figure and answer the questions given below:

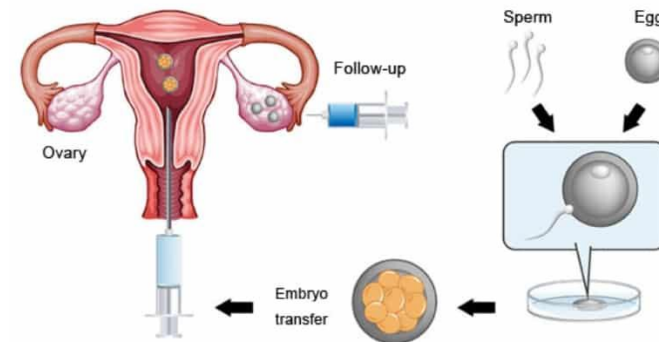


a) Write any two differences between broadband and baseband. (2)

b) Write down an advantages of the above-mentioned communication system.

c) Differentiate between the above-mentioned communication with the analogue communication.

18. Answer the following questions based on the given diagram.



a) Write the name of the process shown in the diagram. (1)

b) What do A and B represent? (1)

c) Write one advantage and one disadvantage of the process. (2)

19. Define blood pressure. List out any three symptoms of high blood pressure. (1+3)

20. A science teacher drops a small ball from the top of a tall tower. At the same moment, she asks another teacher to throw a second ball vertically upward from the bottom of the tower with a speed of 20m/s. Students observe that both balls meet at the same point after 2 seconds.

a) Calculate the height of the tower. (2)

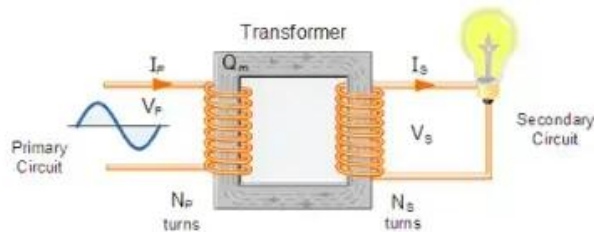
b) What would be the apparent weight of the falling ball at that instant? (2)

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21. A person saw water on the road while driving on a coal-tarred road on a very hot day. But he did not find water when he reached that place.

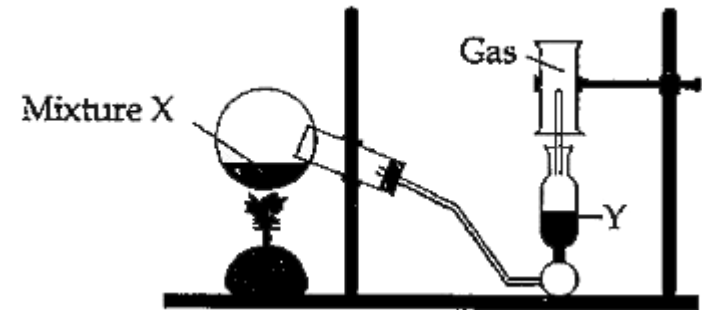
- a) What is this condition called? (1)
- b) What is the main cause of this condition? (1)
- c) Write any two condition required for this process to occur. (2)

22. Study the following figure.



- a) Where is this type of transformer used? (1).
- b) If there are 1000 primary turns and 300 secondary turns. Calculate the output voltage when connected to 220V AC. (2)
- c) Why is the core of given structure laminated? (1)

23. Study the given figure alongside and answer the following questions:



- a) Which gas is collected in gas jar? (1)
- b) Why the tank Y is used? (1)
- c) How do you test the gas prepared? (1)
- d) Mention a use of the prepared gas for the agricultural sector. (1)

**The End**

**Set 41**

**Section A**

**1. Choose the best alternative to the following questions and write in the answer sheet: [10×1=10]**

a) Which of the following condition is seen if the amount of glucose in the blood is more than required?

- i) Hyperglycemia
- ii) Hyperuricemia
- iii) Leukemia
- iv) Anaemia

b) Which of the following is the functional group of aldehyde in hydrocarbon?

- i) –OH      ii) –CHO      iii) –NH<sub>2</sub>      iv) –COOH

c) What does the behavior of posting information about new scientific discoveries from time to time on social networks indicate?

- i) Unsystematic use of social networks
- ii) Digital well-being skills
- iii) Awareness of digital wellbeing
- iv) Digital reputation management.

d) Which of the following indicates the unit of magnetic flux?

- i) Weber      ii) Ohm      iii) Hertz      iv) Candela

e) What is the typical composition of carbogen?

- i) 50% O<sub>2</sub> and 50% CO<sub>2</sub>
- ii) 80% O<sub>2</sub> and 20% CO<sub>2</sub>

iii) 95% O<sub>2</sub> and 5% CO<sub>2</sub>

iv) 5% O<sub>2</sub> and 95% CO<sub>2</sub>

f) Sebik has been coughing for a long time in this winter season. For this, which medicinal plant helps to get relief from cough?

- i) Boiled neem water
- ii) Aloe vera juice
- iii) Boiled tulsi water
- iv) Yarsagumba powder

g) A stone is dropped from the roof of school takes 2 second to reach the ground. What is the height of the building?

- i) 9.8m      ii) 19.6m      iii) 39.2m      iv) 78.4m

h) The weight of a stone in air is 12N and it displaced the liquid of 3N. What is the weight of stone in water?

- i) 12N      ii) 3N      iii) 9N      iv) 15N

i) Which of the following unit represent Pascal?

- i) kgm<sup>2</sup>s<sup>-2</sup>      ii) kgm<sup>-1</sup>s<sup>-2</sup>      iii) kgms<sup>-2</sup>      iv) kgm<sup>2</sup>s<sup>-3</sup>

j) What type of chemical reaction is the reaction between sodium chloride and silver nitrate?

- i) Combination reaction
- ii) Decomposition reaction
- iii) Single displacement reaction
- iv) Double displacement reaction

**Section B**

**2. Write short answer to the following questions: [9×1=9]**

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- Give a difference between monocot and dicot on the basis of their root structure.
- State Pascal's Law.
- What is called the chemical substance which alters the rate of chemical reaction?
- Which of the specific method is used to remove if either ore or the impurities are hydrophilic and other being hydrophobic?
- Rasmika has a problem of dry skin in her hands, feet and face. Which compound can be used to solve her problem? Write the IUPAC name of that compound.
- Write the name of any two natural materials used in cleansing.
- A teenage girl who has lost her mental balance became the victim of rape and gave birth to a child. How can the father of the child be detected?
- What is the name of special scented substance produced from the body of queen bee?
- If 600 J of heat is added to 20gram of water, what is the rise in temperature? (Sp Heat Capacity of water =  $4200\text{J/kg}^\circ\text{C}$ ).

### Section C

**Write short answer to the following questions: [14×2=28]**

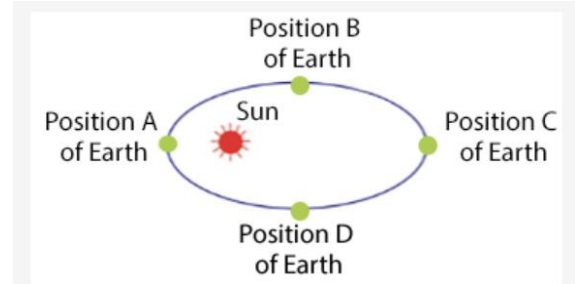
- Prove that the unit of electric resistance 'ohm' (2)  $\text{Kg m}^2\text{s}^{-3}\text{A}^{-2}$
- Write any two important characteristics of plants under gymnosperm.
- Give any two differences between worker bee and queen bee.
- WBCs are like the soldiers of the body. Why?

7. What measures can be adopted to protect rare animals? Write any two points.

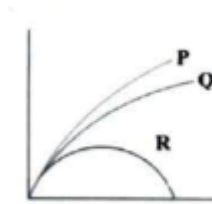
8. The earth revolves around the sun as shown in the given diagram.

i) What happens to the magnitude of gravitational force of sun when the earth is at point A and at the point B?

ii) Why does the earth revolve around the sun as in the given diagram?



9. Study the graph of the future of universe and identify the future of universe shown by P and R. Also write a difference between them.

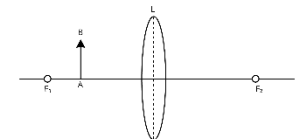


10. Write the full forms of DDT and BHC.

11. Give any two differences between roasting and calcination.

12. Complete the given ray diagram.

13. Draw a chart to show the result in the first and second filial generation of offspring of pure black dog and pure white dog.





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14. How will you manufacture the ammonia gas in industry on a large scale?

Write the principle with the balanced chemical reaction.

15. Apekshya burns a strip of magnesium ribbon. It burns brightly and forms white ash compound 'Q'.

i) Write the name of the substance 'Q'.

ii) Write a balanced chemical reaction that takes place while forming compound 'Q'.

16. Prove that  $g$  where the symbols have their usual meaning.

### Section D

**Write long answer to the following questions: [7×4=28]**

1. In the periodic table given below, the positions of six elements are represented by letters. These letters are not the real symbol for the element. Answer the following questions related to the table.

Group/Period	IA	IIA	IIIA	IVA	VA	VIA	VIIA	VIIIA
2	Lithium			A			X	
3		C			Phosphorus		Y	Argon
	B						Z	

i) Identify the letters of the most reactive metal and most reactive non-metal.

ii) Name the common name of elements represented by X, Y and Z.

iii) Write the electronic configuration of element represented by letter 'C' on the basis of sub-shell.

iv) Write the name and molecular formula of the compound formed by the elements 'B' and 'Y'.

18. A person has been feeling continuous discomfort and pain in the chest for the past few days. He has also been experiencing cold sweating, and problems with breathing have started to appear. After this, he went to a nearby hospital for a check-up and is now taking medicine as advised by the doctor. Based on this situation, analyze the condition and answer the questions given below.

i) What possible health condition is suggested by the symptoms described in the situation?

ii) What lifestyle changes might the doctor recommend along with medicines to prevent this problem in the future? Mention any two points.

iii) What medical tests might be used to confirm it?

19. Study the given diagram and answer the following questions:

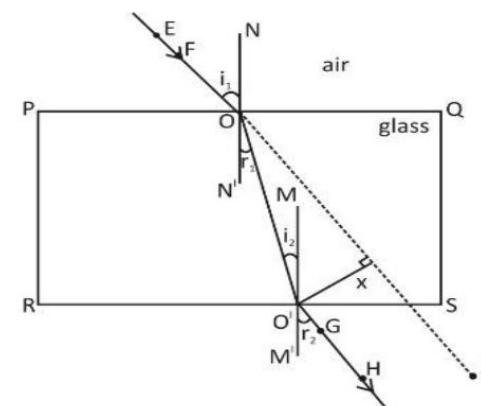
i) Which phenomenon of light is shown in the given diagram?

ii) What is the main cause of this phenomenon?

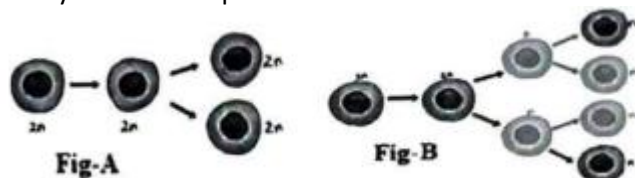
iii) Write any one law belongs to this phenomenon of light.

iv) Write the formula of the refractive index in terms of angle of incidence and angle of refraction.

20. Different types of cell division are shown in the diagram. Answer the following questions:







- Which one of them can form gametes?
- Which one of them is called equational cell division? Why?
- Write any importance of figure 'A'.
- Which of them helps to bring the variation in offspring?

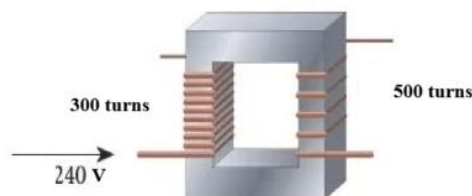
21. If three liquids A, B and C having equal masses are taken in three same size of beakers and exposed in sunlight for 10 minutes. Answer the following questions on the basis of given table.

Liquid (तरल पदार्थ)	Increased temperature $\Delta t$ (बढेको तापक्रम)
P	$12^{\circ}\text{C}$
Q	$10^{\circ}\text{C}$
R	$8^{\circ}\text{C}$

- Which liquid has highest specific heat capacity? Why?
- If all the three liquids are heated to same temperature and put in the same sized beakers separately. Which one cools down faster? Why?

22. A type of transformer is given below. Study it and answer the following questions.

- On which principle the given transformer is based on?
- What type of transformer is it? Why?



iii) Calculate the output voltage.

23. It is very importance to all the students to know about digital wellbeing. The healthy and balanced use of digital technologies helps to support mental, physical, and social well-being. It involves being mindful of how much time we spend on devices, the type of content we consume, and how technology affects our emotions, productivity, and relationships. Practicing digital wellbeing includes managing screen time, taking regular breaks, maintaining good posture, protecting privacy, and setting boundaries between online and offline life. By using technology consciously and responsibly. individuals can reduce stress, improve focus, and enhance overall quality of life in the digital age.

Based on the given text answer the following questions:

- What is meant by digital wellbeing?
- How does it help us to cultivate good habits? Mention any two points.
- Name any two digital well-beings applications that can be installed on your smartphone.

**The End**

**Set 42****Group-A-Multiple Choice Questions (10 × 1 = 10)**

1. Circle the correct alternative of the following questions:

a) What kind of behavior shows when a new scientific discovery is posted on social media?

i proper use of social Media.

ii. Digital well being skill

iii Awareness for digital well being

iv Digital reputation management

b) What is the function of hard cover in the bodies of slug, snail and octopus?

i. Used for locomotion

ii To detect stimuli

iii. To protect soft bodies

iv. For sensation

c) Match the following pair of living organisms and their characteristics is correct in the given table:

Living beings	Characteristics
a. fern	i. First Tissue graded animal
b. Cuttle fish	ii. ii. Poikilothermic and two chambered heart
c. Jelly fish	iii. Having vascular bundles
d. Sea horse	iv. Soft bodies and muscular foot

i. a-i b-ii c-iii d-iv

ii. a-iii b-iv c-i d-ii

iii. a-iii b-iv c-ii d-i

iv. a-iii b-i c-iv d-iii

d) Deepika, a Grade Ten student, is studying about nature and the environment. She suggested to her friend Saugat that he apply a paste made from neem plant powder to the affected parts of his body and spread neem leaves on his bed during chicken pox. This practice helps in healing chicken pox. What is the main reason for giving this suggesting?

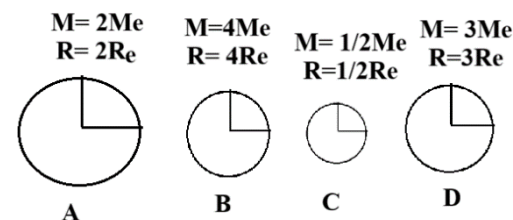
i. Antipyretic Property

ii. Antimicrobial Property

iii. Anti -Aromatic Property

iv. Anti -Inflammatory Property

e) The given figure shows the mass and radius of heavenly bodies. Which of the following option is correct while arranging these heavenly bodies in descending order?



(i) ABCD (ii) DCAB (iii) CADB (iv) BDCA

f) Why does aluminium foil float on water when spread out but sink when squeezed into a spherical shape?

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i. The weight increases, upthrust decreases and sinks.

ii. The surface area decreases, Upthrust decreases and sinks.

iii. The surface area increases, Upthrust increases and sinks.

iv. The weight increases Upthrust increases and sinks.

g) Which is the correct statement based on the characteristics of the image formed by the lens.

i. Convex lens forms a real, inverted and diminished image of an object

ii. Concave lens forms a virtual, erect and diminished image of an object,

iii. Convex lens forms a real, inverted and magnified Image

iv. Concave lens forms a virtual, erect and magnified image of an object.

h) Under what condition an open universe can be hypothesized?

i. When the average density is greater than the critical density.

ii. When the average density is less than the critical density.

iii. When average density and critical density are equal.

iv. When the average density and critical density are not comparable.

i) What is obtained in a chemical reaction between aluminium and nitrogen?

i)  $\text{Al}_2\text{N}_2$       ii)  $\text{AlN}$       iii)  $\text{AlNO}_3$       iv)  $\text{Al}_2\text{N}_3$

Symbol No.....

j) A statement and two Argument are given below:

Statement: About 80% of the used pesticide get mixed to the soil which is non-biodegradable.

Argument 1:- Microorganisms in the soil are destroyed due to pesticide.

Argument 2:- Surface and underground source of water are at the high risk of pollution.

i. Statement and Argument 1 is correct and Argument 2 is incorrect.

ii. Statement and Argument 2 is correct and Argument 1 is incorrect.

iii. Statement and Argument 1 is correct and Argument 2 is also correct.

iv. Statement and Argument 2 are in correct but Argument 1 is incorrect.

### Group 'B'

#### 2. Very short answer type questions: (9 x 1 = 9)

a) Give an example of a dependent variables.

b) What is meant by the blood pressure of a human is 120/80 mmHg?

c) Give an example to show the effect of climate change in Nepal.

d) Name the forces 'A' and 'B' acting on a floating object and their directions.

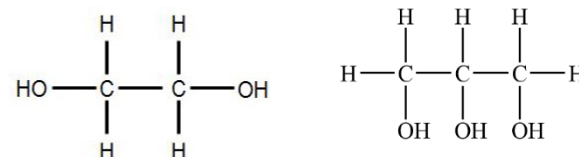
e) Calculate the angle of incidence if the angle of refraction in water is  $20^\circ$ . The refractive Index of water is 1.33.

f) How do you increase the magnetic flux of the coil without changing the magnetic strength of the bar magnet?

g) Why will a closed universe eventually end in a Big Crunch?

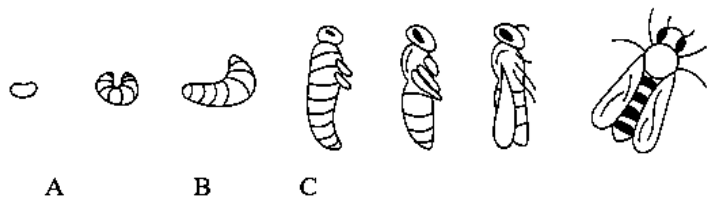
h) Which concentration method is used during the extraction of iron from its ore?

i) Write one difference between these compounds shown in the picture.



**Group 'C'****Short answer type questions. (14 \* 2 = 28)**

3. Check the validity of equation  $(P) = mv^2$  by the analysis of units.
4. Students of Class Ten visited the Godavari Botanical Garden. During observation, Sagar noticed that two plants, A and B, had different characteristics. Plant A has naked seeds and needle-shaped leaves, whereas plant B has enclosed seeds. Write any two similarities between plant A and plant B.
5. Study the diagram and Answer the following questions:



- i. In which condition does 'A' develop into a drone bee?
- ii. How long does 'C' take to form queen and worker bee?

6. Study the figure, and Answer the following questions:

- i. Name the nitrogen base which is only found in 'A' and 'B'.
- ii. Where are these substances located in the cells?



Fig A Fig B

7. Which process is represented by the given chart? Based on that process write down one difference between  $(44 + XX)$  and  $(44 + XY)$ .

	22,X	22, X
22,X	44, XX	44, XX
22,Y	44,XY	44,Xy

8. Ramesh gets tired very quickly during physical training and cannot complete short running activities. Doctor said his haemoglobin level is low.
- a) Which disease is Ramesh suffering from?
- b) Write one effect of low haemoglobin in the body.
9. The mass of Jupiter is about 319 times more than the mass of the Earth, but why acceleration due to the gravity of Jupiter is only 2.5 times more than the Earth?
10. Rita and Reecha dropped a stone from the top of two different towers. Rita dropped a stone of mass 1 kg from the top of the tower of height 80 m. Reecha dropped another stone of mass 1.5 kg from the top of another tower. The stone dropped by Reecha reaches the ground 0.5 s later than the stone dropped by Rita. Calculate the height of the tower from which Reecha dropped the stone? (Use  $g = 10 \text{ m/s}^2$ )
11. What is power of does the power of convex lens is always positive?
12. A transformer production company study the demand of transformer in the market:

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i. If the company manufactured transformers having 2000 turns in the primary coil and 1000 turns in the secondary coil, what type of transformer is manufactured?

ii. If 50V D.C is passed into the transformer what will be the secondary voltage? Write with a reason.

13. Write any two differences between electric motor and generator.

14. Rushi conducted an experiment in the laboratory by following the procedures given below.

i. First of all, she took a beaker half filled with copper sulphate solution.

ii. She immersed the iron nail into the solution and left it overnight and observed the changes in the morning.

a. Write the balanced chemical reaction of this process.

b. Mention the type of chemical reaction.

15. A student made a model of methane and another student made a model of propane. Which hydrocarbon is formed when the teacher removed one hydrogen atom from each model and joined the two structures together? Write its structural formula.

16. Write any two precautions to be used by the farmer while using chemical insecticides in the field.

### Group D

#### Long answer type questions. $7 \times 4 = 28$

17. Digital technology has improved effective communication and strengthened relationships,

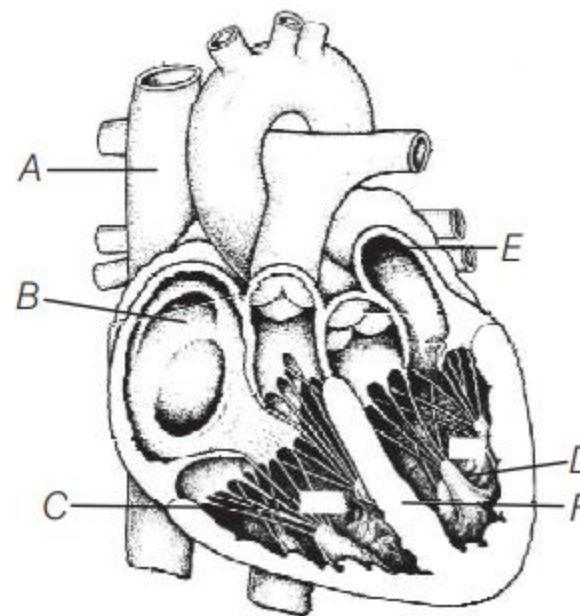
yet it has also increased the risk of mental and physical health problems among children.

i. Mention any two preventive measures adopted to reduce the risk of physical and mental health in children's?

ii. What are the positive aspects of Digital Technology in our life?

18. Draw a chart to show the result obtained in the first and second filial generation of offspring of mice, having black colour and white colour according to Mendel's experiment result. Write down the genotype and phenotype ratio of the second filial generation in the chart.

19. The given figure shows the different parts in the human heart labelled from 'A' to 'F'. Answer the following questions based on the given diagram:



a) Write down the name of the parts 'A', 'B', 'C' and 'D'.

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b) Write down one function of part 'A'.

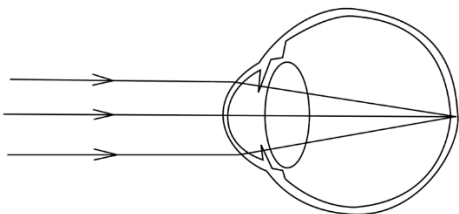
c) Write down one similarity between parts 'B' and 'E'.

20. Three Liquids P, Q and R having equal masses are kept in the same type of container and placed in sun for one hour. The increase in temperature is given below:

Liquid	Change in temperature
P	25°C
Q	28°C
R	20°C

- Which liquid has the highest specific heat capacity among them? Why?
- If equal masses of these substances are heated to the same temperature and then cooled, which one cools faster?
- If R is water and shows special type of property, mention its one advantage and disadvantage in our daily life.

21. Defect of vision of two students A and B are shown in the diagram.



- Define the defect of vision shown in the diagram.
- Write down any one cause of this defect of vision.
- Draw a neat and labelled diagram for the remedy of this defect.

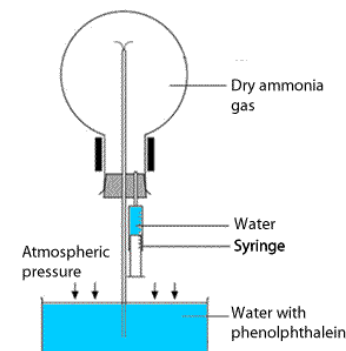
22. Study the given table and answer the following questions:

Elements	Electronic configuration
A	$1s^2, 2s^2 2p^5$
B	$1s^2, 2s^2 2p^6, 3s^2$
C	$1s^2, 2s^2 2p^6, 3s^2 3s^5$

- Write down the valency and block of element 'B'.
- Which one is more reactive between A' and 'C'. Give reasons,
- Write down the molecular formula of the compound formed by the combination of one metal and non-metal in the table.

23. Study the figure and answer the following questions:

- Why does water gradually rise up in the tube?
- Why does the phenolphthalein turn pink?
- Write one use of this gas for industrial purposes.
- What happens when this gas is heated with oxygen at 800°C in the presence of platinum metal?



**The End**

**Set 43**

**Group A**

**Choose the correct answer (10 x 1 = 10)**

1) Which is the last component of digital communication?

- a) Source                      b) Input Transducer
- c) Output Transducer   d) Output Signal

2) Why mosses and ferns both are found in moist and shady place?

- a) Do not need sunlight for photosynthesis.
- b) Survive only at low temperature.
- c) Depend upon microorganism for nutrition.
- d) Requires water for fertilization.

3) Which one is the significance of mitosis cell division?

- a) Plays vital role in sexual reproduction.
- b) Brings genetic diversity and helps in organic evolution.
- c) Cells reformed in infected areas and restores in previous conditions.
- d) Repairs chromosomal disorder in chromosomes.

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4) Which medicinal plant can be used for the treatment of skin diseases by reducing blood pressure?

- a) Neem                                      c) Asiatic pennywort
- b) Heart-leaves moonseed      d) Holy basil

5) If the distance between two objects is double, how does the gravitational force between them changes?

- a) It doubles                              c) It becomes half
- b) It quadruples                      d) It becomes one fourth

6) Which of the following is an application of a hydraulic brake system?

- a) Hydraulic brake system.                      b) Magnetic levitation.
- c) Solar panel operation.                      d) Wind turbine generation.

7) If the speed of light in air and glass is  $3 \times 10^8$  m/s and  $2 \times 10^8$  m/s respectively, then what is the value of refractive index of glass?

- a) 1.5    b) 1.33                      c) 0.67                      d) 2.42

8) Under what condition can the open universe are hypothesized?

- a) When average density is equal to the critical density.
- (b) When average density is less than the critical density.
- c) When average density is greater than the critical density.
- d) When average density and critical density are not comparable.

9) In an acid base reaction, the product formed are:

- a) Water and salt                      b) water and gas
- c) acid and based                      d) acid and salt

10) Based upon the effects on the environment, pesticides can be classified as

- a) Contact and systemic                      b) Degradable and non-degradable naturally
- c) Synthetic and organic                      d) Insecticides and herbicides

### Group B

**Give very short answer (9x 1 = 9)**

1. Write one common challenge of scientific study.
2. State Archimedes' principle?
3. Besides light, which other type of wave can undergo both reflection and total internal reflection.
4. Mention the reason for the dispersion of light.
5. When an alternating current of 60Hz frequency is connected to the primary coil of the transformer, what will be the frequency of alternating current in the secondary coil?
6. Which force is responsible for the existence of heavenly bodies in the universe?
7. Although copper and iron both are metals, copper is not used to make cooking utensils. Why?

8. Differentiate between roasting and calcination based upon presence or absence of oxygen.

9. Write one use of propane-1, 2, 3-triol.

### Group C

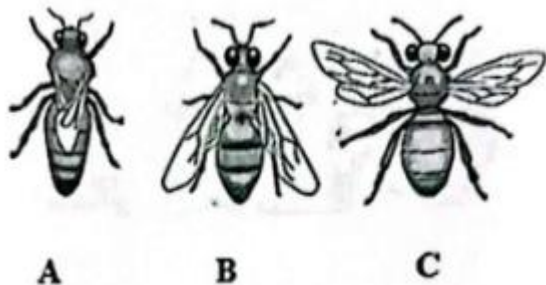
**Give short answer (14 x 2 = 28)**

1. Name a dependent and independent variable of an observation of the growth rate of plants in a lighted room and dark room?



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2. What are the main characteristics of pteridophyta? Mention any two.
3. Identify the type honey bee shown by 'C' in the given diagram. Write the relation between the number of such bees and production of honey. Mention any one way to collect excess amount of honey from apiculture.



4. Write down the reason for the number of chromosomes in each daughter cell is just the half than the number of chromosomes of mother cell in meiosis cell division.
5. A woman is pregnant. What is her probability of giving birth to a daughter? Explain it.
6. Differentiate between artery and vein.
7. Mention any two causes of climate change.
8. What is acceleration due to gravity on the Earth's pole? And what does it mean.
9. If the masses of two objects A and B are 20 kg and 40 kg respectively. If the distance between their center is 5 m, calculate the gravitational force produced between them.
10. Differentiate between step-up transformer and step- down transformer.

11. Thermal power plants are widely used for electricity generation despite their environment impact. Give reasons.
12. What happens when carbon dioxide reacts with water? Also, write a balanced chemical equation.
13. A homologous series of a type of hydrocarbon is given in the table alongside. Where, X and Y are given in serial number 2 and 3 instead of the real compounds.

S.N.	Homologous series
1	CH <sub>4</sub>
2	X
3	Y
4	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>

- a) Write molecular structure of the compound formed when one hydrogen atom of X is displaced by -OH.
  - b) Write the structural formula of the compound formed by the removal of one hydrogen atom from two adjacent carbon atoms Y.
14. A survey of a rice field has found the problem of erosion due to excessive use of chemical fertilizer. How can it be controlled? Mention any two points.

#### Group D

**Give long answer questions (7 x 4 = 28)**

- 1.If you are reducing a video of 6 minutes to 4 minutes, how do you complete the task? Write any four steps to be followed.

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2. What is monohybrid cross? Show in the filial chart, the result obtained by the cross pollinating first and then self-pollinating of a red flowering pea plant and white flowering pea plant?

3. Sketch a diagram of internal structure of heart and name the aortic valve and tricuspid valve.

4. If the substance of mass 500g needs 793 J of heat to increase its temperature from 100°C to 226°C, calculate the specific heat capacity.

5. Student sitting in the last bench cannot read the letters on a blackboard clearly but can read text book. Write the type of defect of vision, the suffering with its two causes and sketch suitable ray diagram showing its remedy.

6. What are the positive aspects of modern periodic table relative to Mendeleev's periodic table? Mention any four points

7. Draw a well labelled diagram of laboratory preparation of gas used in fire extinguisher. How this gas is tested using litmus paper? Mention one precaution to be taken during preparation of this gas.

**The end**

**Set 44**

**Group A**

**1. Multiple choice questions. [10×1=10]**

a) The excessive number of leucocytes in blood causes

- i. leukaemia                      iii. anemia
- ii. leukopenia                      iv. high blood pressure

b) The alternate form of gene is

- i. alternate type                      iii. recessive type
- ii. dominant character                      iv. allele

c) Which one is the dominant trait in humans

- i. back turned thumb
- iii. joint ear lobule
- ii. curly hair
- iv. straight hair

d) How many numbers of autosomes are found in human beings

- i. 23
- ii. 44
- iii. 22
- iv. 46

e) Diploblastic means

- i. having three layers of skin
- ii. having one layer of skin
- iii. having two layers of skin
- iv. having four layers of skin

What will be the gravitational force acting on an object on the surface of the earth when the gravitational force acting on it on the surface of the moon is 60N?

- i. 6N    ii. 10N                      iii. 360N                      iv. 600N

g) A hollow metal cube and a solid metal cube made up of the same material are placed gently in water. The hollow cube floats with part of its volume

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above the water surface, while the solid cube sinks completely. Which of the following statement best explain this behaviour of law of floatation?

- i. The hollow cube experiences a greater buoyant force because its mass is smaller.
- ii. Hollow Cube displaces water equal to its total volume.
- iii. Hollow cube floats because it displaces water whose weight is equal to its own weight.

iv. Solid cube sinks because buoyant force depends only on the material of the object not on the shape.

h) Which of the following equipment runs with the help of ac current?

- i. mobile phone
- iii. electric heater
- ii. calculator
- iv. laptop

i) Which one of the following is a physical change?

- i. burning of candle
- iii. digestion of food
- ii. melting of ice
- iv. Rusting of iron

j)  $C_2H_2$  has bond between the two carbon atoms

- i. single covalent
- iii. double covalent
- ii. triple covalent
- iv. quadruple covalent

## Group B

### 2. Very short-answer questions. [9×1=9]

- a) What proteins are found in blood plasma?
- b) Write one difference between ICI and IUI.
- c) Define phenotype.
- d) What is meant by 1 calorie heat?
- e) Define power of a lens.
- f) Define catalyst.
- g) How many elements are there in the actinide series?
- h) Name the chief ore of aluminium?
- i) Write one effect of acid rain.

## Group C

### Short-answer questions. [14×2=28]

- 3. List two major functions of DNA.
- 4. Write two differences between Pine and Peepal.
- 5. Write two differences between the queen bee and the worker bee.
- 6. Why does cell division take place only when it reaches a particular size?
- 7. Define heredity with one characteristic.
- 8. Different weights of a piece of a stone in three different media air, water and salt solution are given below. Answer the following questions based on it.

Medium	Weight
A	15N

B	20N
C	17N

a) Out of A, B and C which is the salt solution? Answer with reason.

b) Calculate the weight of water displaced by the stone?

9. The power of the spectacles of a person is +0.5 D. What type of defect of vision is the person suffering from? Also suggest the type of the lens for the remedy of the defect.

10. Why is water used in a radiator to cool the engine of vehicles? Explain with reason.

11. Alternating current (ac) is used widely throughout the world. What are the two reasons behind this fact?

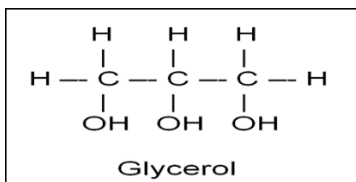
12. Why can't ammonia be collected over water? Write down a confirmatory taste of ammonia.

13. Convert the following word equations into balanced chemical equations.

a) Potassium chlorate > Potassium chloride + Oxygen

b) Copper sulphate + Ammonium hydroxide-----> Cupric hydroxide + Ammonium Sulphate

14. Observe the following structural formula and answer the given questions.



a) Write the IUPAC name of the given compound.

b) Give the general formula of the homologous series to which the given compound belongs.

18. Write two differences between calcination and roasting.

16. Define food preservatives. Write the full form of BHA.

### Group D

#### Long-answer questions: [7×4=28]

17. Draw the well labelled diagram of the heart. The right auricle of our heart is larger than the left auricle. Explain this fact with reason.

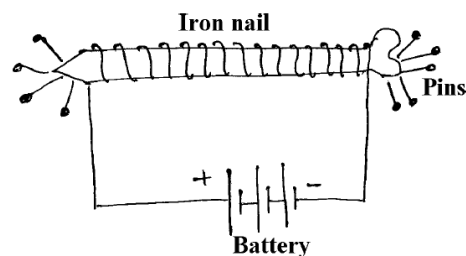
18. Define selective breeding. How do inbreeding makes it more difficult to produce new varieties in future?

19. An object is placed at a distance of 30cm from a convex lens having focal length 20 cm.

a) Draw a neat and labelled ray diagram showing the formation of the image.

b) Write down four characteristics of the image thus formed.

20. Observe the given figure and answer the following questions.



a) Which effect of current electricity is shown in the diagram?

b) What is the magnet formed by this method called?

c) Give two methods to increase the strength of the given magnet.

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21 a) A feather and coin when dropped simultaneously from a height on the surface of the moon fall with the same rapidity but they fall differently on the earth. Explain these facts with reason.

b) A stone dropped from the top of a tower reaches the ground after 2s. Calculate the height of the tower if the value of  $g$  is  $9.8 \text{ m/s}^2$ .

22. A part of the periodic table is shown below in which most of the elements are denoted by numbers like 1,2, 3 etc instead of their actual symbols. Answer the following questions based on it.

1	2	3	C	4	5	6	7
8	9	Al	10	11	12	13	Ar
K	14						

a) To which period of the periodic table does the element denoted by the number 6 belong?

b) Give the molecular formula of the compound formed by the combination of the elements denoted by the numbers 13 and 14.

c) What is the valency of the element denoted by the number 11?

d) Write a number used to denote one of the highly reactive nonmetals in the table.

23. a) Draw a well labelled diagram of laboratory preparation of carbon dioxide.

b) What happens when a wet blue litmus paper is inserted into the mouth of the gas jar full of carbon dioxide? Answer with reason.

**The End**

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### Set 45

#### Group "A" (MCQ)

**A. Choose the correct alternative of the following statements. [10x1=10]**

1. The classification of living beings is based on

- a. Genetic similarity                      b. Size and shape of organisms
- c. Habitat preferences                      d. Ability to perform photosynthesis

2. What stage does the process of transforming from a larva into an adult bee occurs?

- a. Egg stage    b. Larval stage                      c. Pupa stage    d. Adult stage

3. Which of the following is not a product of meiosis?

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a. Gamete                      c. Haploid cell

b. Somatic cell                d. Genetic variation

4. A fact and two statements about Pascal's law are given below:

Fact: The pressure given on an enclosed liquid is equally transmitted in all directions by the liquid.

Statements:

i. The law is applicable in functioning of a submarine.

ii. The law is applicable in braking system of four wheelers.

a. Fact and both the statements are correct.

b. Fact is correct but both the statements are incorrect.

c. Fact and statement 1 is correct but statement 2 is incorrect.

d. Fact and statement 2 is correct but statement 1 is incorrect.

5. Which of the following is not a common use of lenses?

a. Corrective eyeglasses                c. Telescopes

b. Microscopes                              d. Loudspeakers

6. What is the predominant component of the universe, accounting for about 68% of its energy density?

a. Dark matter                              c. Neutrinos

b. Black holes                                d. Dark energy

7. How many bits are there in a byte?

a. 4                      b. 8                      c. 16                      d. 32

8. What is the main feature of Mendeleev's periodic table?

a. Elements are arranged in order of increasing atomic mass.

b. Elements are arranged in order of increasing atomic number.

c. Elements are arranged in order of increasing atomic weight.

d. Elements are arranged in alphabetical order.

9. Which is the appropriate test result for carbon dioxide gas?

a. Lime water turns milky.

b. Universal indicator turns blue.

c. Red litmus turns blue.

d. It is used to ignite a splint.

10. Which of the following is a natural material used for cleansing?

a. Lemon                      c. Detergent

b. Soap                        d. Mustard cake

### **Group "B" (VSAQ)**

#### **B. Answer the questions in brief. [ 9x1=8]**

1. Differentiate between nuptial flight and swarming.

2. What is a gene?

3. Write any two functions of plasma.

4. Give one example of effect of climate change that you might have faced recently.

5. What is the value of acceleration due to gravity 'g' at the center of the moon?

6. Write the meaning of one Pascal pressure.

What purpose is sphygmomanometer used for?

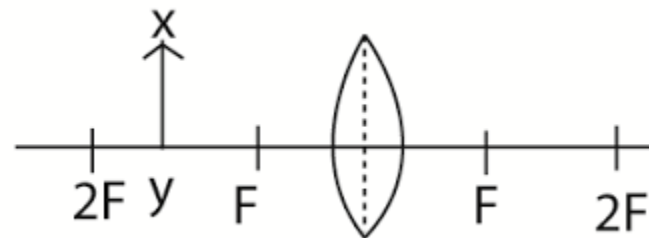
8. Write the name of any two ore of iron.

9. What is the artificial ripening agent used to ripen fruits?

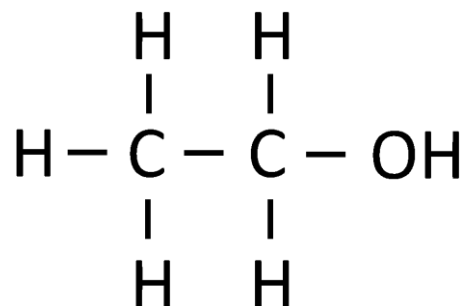
### **Group "C" (SAQ)**

**Write short answer to each of the following questions. [14x2=28]**

1. Prove that the unit of electrical resistance is a derived unit.
2. Write the similarity of plants belonging to gymnosperms and angiosperms.
3. Why is honeybee considered an important insect for human beings? Mention any two reasons.
4. Differentiate between IVF and artificial insemination technique in terms of their application purpose.
5. Write any two ways of conserving forest.
6. In which condition is  $F=G$ ? Clarify.
7. Write any two differences between the chambers of heart connected with arteries and the chambers connected with the veins on the basis of:
  - i. Function
  - ii. Thickness of wall
8. Write any two conditions for a substance to float on liquid.
9. When 10 kg of water at  $60^{\circ}\text{C}$  was mixed with 8 kg of liquid at  $40^{\circ}\text{C}$ , the final temperature became  $50^{\circ}\text{C}$ . Calculate the specific heat capacity of the liquid.
10. Write any two differences between generator and dynamo.
11. Complete the ray diagram and write the features of the image formed:



12. The value of Hubble's constant is  $73 \text{ km/s/Mpc}$ . What does it mean?
13. When ammonia is heated with oxygen at  $800^{\circ}\text{C}$  in the presence of Platinum, nitric oxide and water is formed. Translate this reaction into a balanced chemical equation.
14. Why is froth floatation process suitable for separating sulphide ores from gangue materials?
15. Observe the following structural formula and answer the following questions:








- i. Write the name and molecular formula of the hydrocarbon in the given figure.
- ii. Write any two uses of the compound.

**Group "D" (LAQ)**

Write long answer to each of the following questions. [7x4=28]

1. Observe the given figure and answer the following questions:

Fig a	Fig b	Fig c	Fig d	Fig e
				

- Which class does the fig E belong to?
  - Which of the given animal has two chambered heart?
  - Write any two similarities between fig B and fig D.
2. The gravitational force produced between any two objects is 100N when kept apart at a distance of  $2.5 \times 10^3$ km. At what distance should they be kept so that the gravitational force will double?
3. A student at the last bench cannot see anything written on board but can read book easily. On this basis, answer the following questions.
- What type of defect does s/he have?
  - Write any one cause of such defect.
  - Which lens should be used to remove such defect?
  - Draw a diagram to correct this defect.
4. Study the given diagram and answer the following questions:

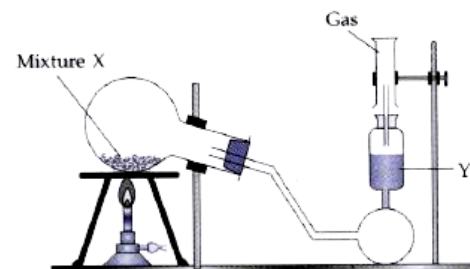
- Which device model is shown in the diagram if a magnet is also used in it?
- What should be done to feel the effect shown by the device?
- Mention any two household electrical appliances based on this principle?



5. Explain the concept of digital-to-digital conversion in data communication systems, and provide an example of its application.
6. Give the answer of the following questions with the help of the given table:

Na	Mg	Al	Si	P	S	Cl	Ar
2,8,1	2,8,2	2,8,3	2,8,4	2,8, 5	2,8,6	2,8,7	2,8,8

- In which period do the elements belong to?
  - Which block do Mg and Ar belong to?
  - Which compound formed by the combination of Na and Cl?
  - Write the balanced chemical equation between Mg and Cl with its type.
7. Study the diagram and answer the answer the following questions:





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- Which gas is collected in the given jar?
- Which coloured litmus paper is used to identify such gas?
- Why is this gas collected on dry inverted gas jar?
- What happens when lime water is not used to collect such gas and why?

**The End**

## Set 46

### Section A

#### Multiple choice questions. [10x1=10]

1. Circle the correct alternative of the following questions.

a) Identify the unit analysis for  $v^2 = u^2 + 2aS$

i.  $ms^{-2} = m^2s^{-2} + m^2s^{-2}$

ii.  $m^2s = m^2s^{-2} + m^2s^{-2}$

iii.  $m^2s^{-2} = m^2s^{-2} + m^2s$

iv.  $m^2s^{-2} = m^2s^{-2} + m^2s^{-2}$

b) Why does the pine belong to the gymnosperm?

i. Needle like leaf, naked seed, rough bark

ii. Needle like leaf, enclosed seed, rough bark

iii. Flat and broad leaf, enclosed seed

iv. Narrow leaf, parallel venation, spongy stem

c) Which of the following pairs is correct?

Age of worker bee	Function
P: 1-3 days	1. Production of royal jelly.
Q: 4-6 days	2. Cleaning of hive.
R: days 7-11	3. Development of wax gland.
S: days 12-17	4. Feeding of honey and honey bread to larva.

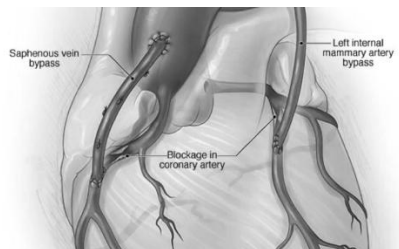
i. P-2, Q-3, R-4, S-1

ii. P-2, Q-4, R-3, S-1

iii. P-2, Q-3, R-1, S-4

iv. P-2, Q-4, R-1, S-3

d) What is shown in the diagram?



- i. angiography
- ii. Bypass surgery
- iii. Uric acid
- iv. Vein and valve

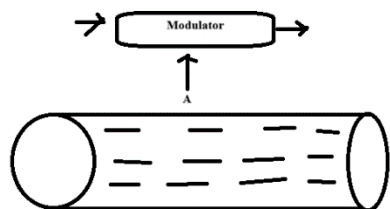
e) What happens to acceleration due to gravity if an object moves away from the surface of the earth?

- i. Acceleration due to gravity is always  $9.8\text{m/s}^2$
- ii. Acceleration due to gravity increases
- iii. Acceleration due to gravity decreases
- iv. Acceleration due to gravity does not change

f) What is the formula for Hubble's law?

- i.  $V = Hd$
- ii.  $H = Vd$
- iii.  $d = HV$
- iv.  $V = H/d$

g) Which is correct for A in the given diagram?



- i. Modulated signal
- ii. Modulating signal
- iii. Carrier signal
- iv. Electrical signal

h) Which of the following group of elements represents the decreasing metallic character of the elements?

- i.  $\text{Na} < \text{Li} < \text{K}$
- ii.  $\text{Be} < \text{Mg} < \text{Ca}$
- iii.  $\text{Ca} < \text{Mg} < \text{Be}$
- iv.  $\text{K} > \text{Na} > \text{Li}$

i) Which metal can be extracted from argentite?

- i. Copper
- ii. Gold
- iii. Iron
- iv. Silver

j) A statement and two arguments are given below.

Statement: Detergent is called a soapless soap.

Argument 1: It has cleaning property like soap but its chemical nature is different. Argument 2: It does not given lather with hard water as soap.

- i. Statement and argument 2 are correct but argument 1 is incorrect
- ii. Statement and argument 2 are incorrect but argument 1 is correct
- iii. Statement and argument 1 are correct but argument 2 is incorrect
- iv. Statement and argument 1 are incorrect but argument 2 is correct.

## Section B

### 2. Very short answer type questions. [9×1=9]

a) State the principal of Homogeneity of equations.

b) Write phylum/division of the following living beings:

- i) Body is covered with hair, viviparous.
- ii) Plant without true fruits, cone-bearing.

c) What is the benefit of eating queen bee's honey?

d) What is synapsis? In which sub stage of cell division is it observed?

e) How many species of mammals are found in Nepal?

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- f) What will be the effect on acceleration due to gravity if radius of the earth is decreased?
- g) If a hydrometer is immersed in sugar solution and pure water, in which is it immersed more and why?
- h) Define thermal energy with an example.
- i) Write a difference between octet and duplet state.

### Section C

#### Short answer type questions. [14 × 2 = 28]

3. Differentiate between endangered animals and rare animals.
4. The force of gravity seems to be zero inside the rocket moving round the earth, why?
5. Differentiate between atmospheric pressure and air pressure.
6. When we get out of bed on a very cold morning, we feel the air of the room cold. But when we come back staying out for some time, we feel the air of the same room warmer.
7. Is the dispersion of light observed when an inverted prism is kept close to the prism? Elaborate your answer with the help of a neat diagram.
8. The number of turns in the primary coil of the transformer is double than that in the secondary coil. Calculate the input voltage if 220V is generated by the secondary coil.
9. Is Hubble's constant certain? Why?
10. Differentiate between Analog signal and digital signal.

11. Elements of which group belongs to 's' block in the periodic table? What is the relation between atomic size and reactivity of elements of these groups? Write with two reasons.

12. How does the concentration of sodium thiosulphate affect the rate of reaction in between the hydrochloric acid and sodium thiosulphate?

13. How is carbon dioxide manufactured in the industry? Write with chemical equation. The mixture of carbon dioxide gas and water is sour, why?

14. Silver does not displace hydrogen from dilute acid or there is not reaction of silver with dilute hydrochloric acid. Why?

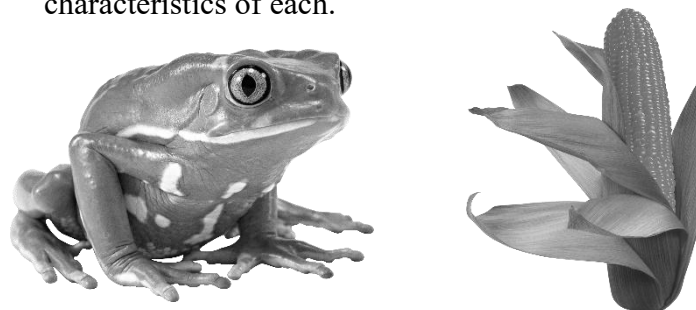
15. Why is methane called marsh gas and fire damp?

16. How can chlorine be used as a cleaning agent?

### Section D

#### Long answer type questions. [7×4=28]

17. Classify the organisms shown in the figure and write any two characteristics of each.



18. The district animal development center conducted a camp to fertilize many cows at once.

i. Which technique did that organization adopted at that time? Explain this technique in brief.

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ii. Write two points to be considered while performing this technology.

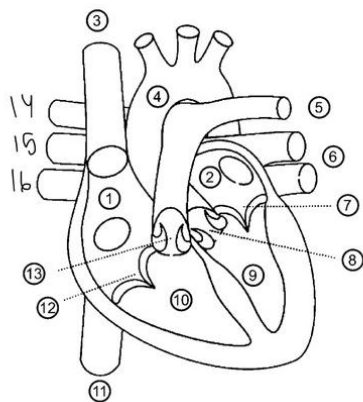
19. Look at the diagram below and answer the following questions.

i. Differentiate blood vessel 4 and 11.

ii. Write the functions of valve 12 and 7.

iii. What happens in absence of 8?

iv. Write the name of parts 9 and 10.



20. The focal length of the two lens are 20cm and -20cm respectively.

i. Mention the type of this two lens.

ii. Out of the two lens which one forms a virtual and magnified image when object is kept 16cm away from lens? Explain it by drawing a scaled ray diagram.

iii. Calculate the power for the given two lenses.

21. A bulb connected to a dynamo attached to the tire of a bicycle was not found to be glowing with steady brightness. It was found that the bulb was bright, dimmed and also turned off when cycle came to rest.

i. Mention the reasons for such observations based on the working principle of dynamo.

ii. What can be done to increase the magnitude of current produced by dynamo?

22. Draw the neat diagram of apparatus fitted to prepare the gas used in making blue print of map. Write the balanced chemical equation for its lab preparation. How can you purify the gas obtained?

23. A monohydric alcohol is used in alcoholic beverages, as a thermometric liquid and as the disinfectant in the syringes and wounds. On the basis of this statement, write the answer to the following questions.

i. Write the structural formula of that alcohol and write its IUPAC name.

ii. Write the molecular formula of the fourth member of alcohol of the homologous series in which the given alcohol lies.

**The End**

**Set 47**

**Group A**

**Multiple Choice Questions. (10x1=10)**

1. 1. Why are mosses and ferns both found in moist and shady places?

i. Do not need sunlight for photosynthesis

ii. Survive only at low temperatures.

iii. Depend on microorganisms for nutrition.

iv. Requires water for fertilization.

2. When Samira observed the specimen in the laboratory, she found that both organisms were long and cylindrical. She also found that organism A has a cylindrical, segmented body, and organism B has a non-segmented body. By studying the above characteristics, which statement is true for these organisms?

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- i. Organism A is diploblastic, whereas organism B is triploblastic.
  - ii. Organism A is triploblastic, whereas organism B is diploblastic.
  - iii. Organism A has well developed circulatory system, whereas organism B has no circulatory system.
  - iv. Organism A has no circulatory system, whereas B has well developed circulatory system.
3. Which of the following groups is a group of endangered animals?
- i. Black buck, Wild yak, One-horned Rhinoceros
  - ii. Brown bear, Bengal tiger, Jackal
  - iii. Red Panda, Pigmy hog, Deer
  - iv. Snow leopard, Asiatic wild elephant, Horse
4. If the mass and the radius of a celestial body are two times the mass and the radius of the earth respectively, what is the value of acceleration due to the gravity of that body?
- i.  $9.8\text{m/s}^2$
  - ii.  $4.9\text{m/s}^2$
  - iii.  $19.6\text{m/s}^2$
  - iv.  $10\text{m/s}^2$
5. Which one of the following statement is correct about the electromagnetic wave?
- i. Wavelength and frequency of violet ray are the highest.
  - ii. Wavelength of violet ray is less and frequency is high.
  - iii. Wavelength and frequency of violet is the lowest.
  - iv. Wavelength of violet ray is maximum and frequency is less.
6. Which of the following is the condition required for the big crunch?
- i. Average density of the universe  $>$  critical density
  - ii. Average density of the universe = critical density

- iii. Average density of the universe  $<$  critical density
  - iv. Average density of the universe  $>/<$  critical density
7. What type of chemical reaction is it: Potassium bromide reacts with Silver nitrate to give Potassium nitrate and silver bromide
- i. Single displacement reaction
  - ii. Double displacement reaction
  - iii. Neutralization reaction
  - iv. Decomposition reaction
8. What is the value of Hubble's constant?
- i.  $78\text{km/s/Mpc}$
  - ii.  $73\text{Km/s/Mpc}$
  - iii.  $70\text{ km/s/pc}$
  - iv.  $72\text{km/s/Mpc}$
9. Which one of the following is an example of unsaturated hydrocarbon?
- i. OH
  - ii.  $\text{C}_2\text{H}_2$
  - iii.  $\text{C}_3\text{H}_8$
  - iv.  $\text{CH}_4$
10. Which of the following is a natural material used in cleansing?
- i. Lemon
  - ii. Soap
  - iii. Detergent
  - iv. Mustard cake

### Group B

#### Very Short Answer Questions. (9x1=9)

11. Write the fundamental units involved in the unit of force.
12. What is an important characteristic of gymnosperm seed?
13. Write one function of worker bees during 7-11 days.
14. Define IVF technology.
15. How do medicinal plants support to enhance the economy of the nation? Mention one point.
16. What is the upthrust exerted by the water on the body in the given figure?



17. On which law is the given instrument based? State the law.

18. Draw a graph to show the relationship of alternating current and time.

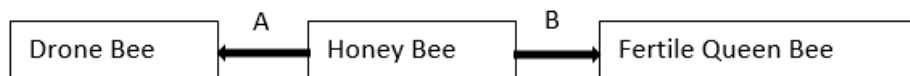
19. Define netizen.

### Group C

#### Short Answer Question. (14x2=28)

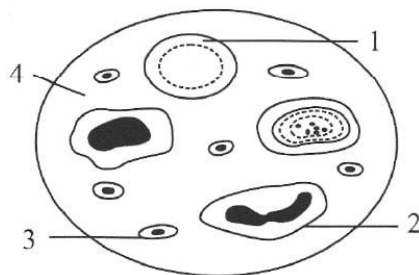
20. Check the validity of the equation  $s = ut + \frac{1}{2}at^2$  by using unit-wise analysis.

21. Which process is represented by A and B?

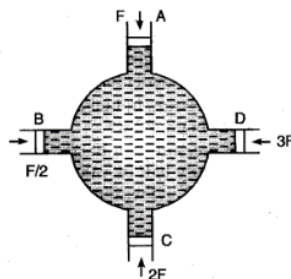


22. Write any two differences between a diploid cell and a haploid cell.

23. The composition of blood is shown in the given figure. Identify the blood components 1, 2, 3, and 4.



24. Study the given figures alongside.



a. Write the importance of a plant given in figure (a).

b. Which part of the plant given in figure (b) is more useful?



25. A stone is thrown vertically upward at velocity of 72 km/hr. If air resistance is neglected, then find the maximum height travelled by it.

26. Write any two conditions under which a body will experience weightlessness.

27. If equal quantity of vegetable oil and water kept in two different beakers are heated with equal heat, which one will become warm faster and why?

28. If 1 kg of paraffin requires 2100 Joules of heat energy to increase its temperature by  $1^\circ\text{C}$ , calculate the amount of heat required to increase temperature of 4kg of paraffin from  $20^\circ\text{C}$  to  $40^\circ\text{C}$ .

29. Identify the given lens A and B. Out of these two lens, which one will form virtual and magnified image when an object is kept at distance of 15 cm from the lens? Draw an appropriate diagram.

Lens	Focal length
A	+25cm
B	-25cm

30. Explain the following with the help of a balanced chemical equation.

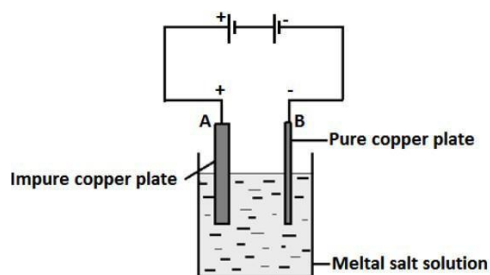
a. Milky colour appears when carbon dioxide is passed over limewater.

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b. Carbon is used for the reduction of metals from their metallic oxides during metallurgical process.

31. Ramu is frustrated that his crops of paddy is infested with rats just before harvesting. Suggest Ramu what can he do to get rid of this problem without much damage to the soil or his harvest ready crops. And also give him two main important precautions that he should be mindful of when using your suggestions.

32. Study the given diagram and answer the following questions:



a. Label A and B and name them.

b. What is the significance of using metal salt solution in this process. Name the metal salt solution used for the electrorefining of Copper.

33. Differentiate between Butane and Butene on the basis of their structural formula and a property of these hydrocarbons.

### Group D

#### Long Answer Questions. (7x4=28)

34. Information and Communication Technology (ICT) refers to the use of computers, the internet, mobile phones, and other digital tools to collect, process, store, and share information. In the modern world, ICT has become

an essential part of daily life and education. Students use ICT to search for information, prepare assignments, attend online classes, and communicate with teachers and classmates.

In Nepal, the use of ICT in education has increased rapidly in recent years. Many schools have introduced computer education, digital learning materials, and online examination systems. ICT helps students develop skills such as problem-solving, creativity, and critical thinking. It also provides access to global information and learning resources.

However, the misuse of ICT can create problems such as cybercrime, data theft, and addiction to digital devices. Therefore, students should use ICT responsibly by following ethical rules, protecting personal information, and using technology mainly for learning and productive purposes.

a. What is meant by Information and Communication Technology (ICT)?

b. Mention any two uses of ICT in education.

c. Write two advantages of using ICT for students.

d. Why should ICT be used responsibly? Give one reason.

35. A family has only two daughters. Does it mean that the husband does not produce sperm bearing the 'Y' chromosome? Explain it by showing the sex determination chart.

36. Draw the well-labelled diagram of the internal structure of the human Heart.

37. A student can see distant objects clearly but faces difficulty in reading a book placed at 25 cm.

a. Which defect of vision does the student have?



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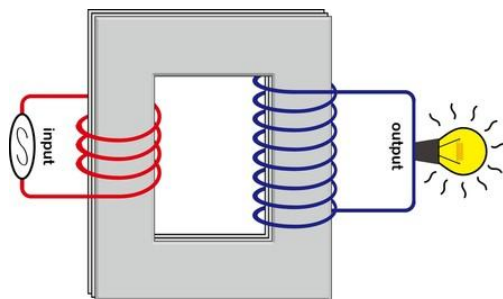
b. Write one cause of this defect.

c. Which lens is required to correct it?

d. Draw a ray diagram showing its correction.

38. Observe the given diagram of transformer and answer the following questions.

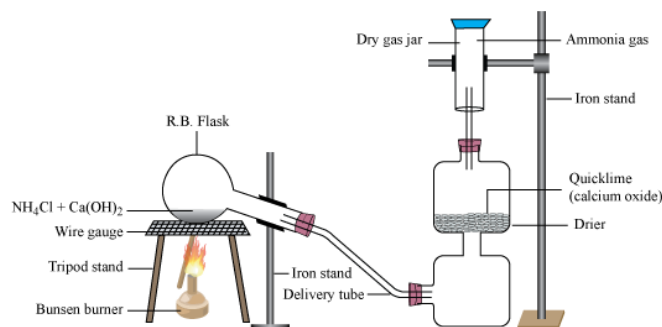
a. Identify whether the given transformer is a step-up or step-down transformer. Justify your answer. if the primary coil & secondary coil



b. Calculate the voltage across the secondary coil, if ratio of primary coil and secondary coil is 1:2.  
c. Explain why transformers are used in long-distance transmission of electric power.  
d. What would happen if a DC supply were used instead of an AC supply in this transformer? Give reason.

39. Study the given figure and answer the following questions.

a. Why ammonia gas is not collected by downward displacement of water method in a gas jar?



b. Name the compound used as a drying agent during this process with its molecular formula.

c. What is the testing method for verifying the presence of prepared gas after preparation?

d. Write a balanced chemical equation for the chemical reaction that occurs during the preparation of ammonia gas.

40. Electronic configuration of some elements is given in the table below:

Element	A	B	C	D	E	F	G	H
Electronic configuration	2,8,1	2,8,2	2,8,3	2,8,4	2,8,5	2,8,6	2,8,7	2,8,8

a. Which element among them is a metalloid used for computer chips?

b. What happens to the reactivity of elements left to right in a period?

c. Which compound will be formed with the combination of element B and element F? Write its molecular formula.

d. Which period do these elements belong to?

**The End**

**Set 48**

**Group - A**

**Multiple choice questions. (10x1=10)**

1. Choose the best option from the given alternatives:

(a) Which of the following is an audio file format?

(i) 3GP      (ii) MP3      (iii) MP4      (iv) SVI

(b) Aadarsh saw a plant thrown in his garden having long and narrow leaves with fibrous root. Which of the following options best describes the plant?

(i) It shows alternation of generation. (ii) It is a thallophyte.

(iii) It is an amphibian plant.      (iv) It is a monocotyledonous plant.

(c) Which of the following is found only in DNA?

(i) Adenine      (ii) Cytosine

(iii) Guanine      (iv) Thymine

(d) If the acceleration due to gravity is  $10 \text{ m/s}^2$  on the surface of the earth, what is the value of acceleration due to gravity on the surface of the heavenly body having mass 10 times and radius double of the earth?

(i)  $0.25 \text{ m/s}^2$       (ii)  $4 \text{ m/s}^2$

(iii)  $25 \text{ m/s}^2$       (iv)  $50 \text{ m/s}^2$

(e) Which of the following is the boiling point of water in STP?

(i)  $32^\circ\text{C}$       (ii)  $100 \text{ K}$

(iii)  $212^\circ\text{F}$       (iv)  $273 \text{ K}$

(f) Where is the image formed in a myopic eye for a near object?

(i) At the retina      (ii) Before the retina

(iii) At the infinity      (iv) Beyond the retina

(g) Which of the following conditions best describes an open universe?

(i) It has average density less than the critical density.

(ii) It has average density more than the critical density.

(iii) It has average density equal to the critical density.

(iv) The celestial bodies have zero velocity but non-zero gravitational effect.

(h) Which of the following is a correct statement about gases?

(i) Carbon dioxide gas is basic in nature.

(ii) Ozone is a greenhouse gas.

(iii) Ammonia is insoluble in water.

(iv) Carbon dioxide gas is used in blue print of map.

(i) Which metal is extracted from corundum ore?

(i) Silver      (ii) Iron      (iii) Copper      (iv) Aluminium

(1) Which of the following is a chemical food preservative?

(i) DDT      (ii) BHC      (iii) BHT      (iv) PVC

**Group - B (9x1=9)**

**2. Very short answer type questions.**

(a) Write one advantage of digital transmission

(b) Which type of cell division helps in the correction of chromosomal disorder?

(c) Which chemical substance is increased in the patient's body in hyperuricemia?

(d) Out of Black Buck, Gray Wolf, Jackal, Stripped Hyena and Bengal Tiger; which is not a protected mammal in Nepal?

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(e) If an object weighs 20 kg on the surface of the earth, what is its mass on the surface of the moon?

(f) State Pascal's law based on liquid pressure.

(g) There is a bucket of water at 30 °C and one litre water in a jug at 90 °C. Which one of the above has more thermal energy?

(h) Write the group and block of phosphorus in the modern periodic table.

(i) What is smelting?

### Group - C (14x2=28)

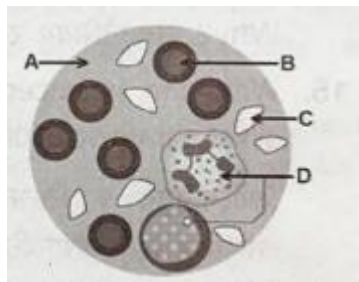
#### Short answer type questions.

3 Draw the block diagram of analogue communication system.

4. What is complete metamorphosis? After how many days does the egg of a honey bee change into a larva?

5. How has DNA technology been a boon for criminal investigation?

6. Study the figure of composition of human blood and label the parts indicated by the alphabets.



7. Why is determination of blood group essential before its transfusion? Give reason.

8. Which chemical is found in Curcuma longa? Write one medicinal value of this plant.

9. Write two differences between gravity and gravitation.

10. A hydrometer floats partially in fresh water. What will happen to its floatation if the fresh water is exchanged by a saturated salt

solution? Write with suitable reason.

11. If 48 KJ heat is required to increase the temperature of 2 kg sand from 10 °C to 20 °C, find the specific heat capacity of the sand.

12. Why does a coin placed at the bottom of a bucket filled with water appear raised? Explain with a suitable reason.

13. What is the main factor that determines the future of the universe? Write the value of Hubble's constant.

14. Which is more reactive between magnesium and sodium? Why?

15. Write the balanced chemical equation between aluminium and silver nitrate solution. Also, mention the type of chemical reaction.

16. Write two adverse effects of the use of pesticides.

### Group - D (7x4=28)

#### Long answer type questions.

17. (a) A researcher wants to test how temperature affects the rate at which ice melts. Identify the independent and dependent variables in it. On which axis of the graph is temperature plotted?

(b) Find the fundamental units involved in Pascal.

18. They have streamlined body. Most of the animals of the class are oviparous and some of them are viviparous. Answer the following questions based on the above characteristics:

(i) What is viviparous animal?

(ii) Name the respiratory organ of the animals.

(iii) How many chambers are found in their heart?

(iv) Are they poikilothermic or homoeothermic animals?

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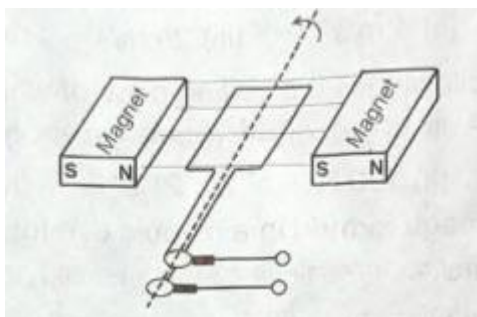
19. Show all the possible off-springs produced by crossing a red female panda with a white male panda using Mendel's chart up to second filial generation. Also, write the phenotypic and FB-Tuition Class of Rajan Shrestha genotypic ratio.

20. Mangal has two lenses, A and B. Lens A forms a virtual and diminished image, whereas lens B forms a real and diminished image of an object. On the basis of this, answer the following questions:

- Which of the above lenses is used to correct myopia?
- Which of the above lenses has a real focus?
- Draw the ray diagram by placing an object in front of one of the above lenses to obtain real and magnified image.

21.

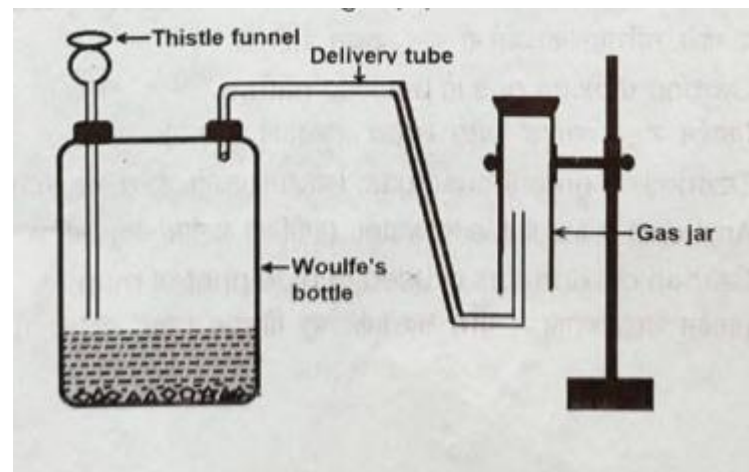
(a) Study the figure of an electric device and answer the following questions:



- On which principle does the device work?
  - Write the energy conversion in the device.
- (b) The transformer of a mobile phone charger has 880 turns in its primary coil. If the transformer is supplied with 220 V and the mobile phone

requires 5 V for charging, find the number of turns used in the secondary coil.

22. Study the figure of laboratory preparation of carbon dioxide gas and answer the following questions:



- Point out two mistakes in the figure.
  - What chemicals are required to prepare the gas
  - Which salt will be formed when the gas is passed through potassium hydroxide solution? Also, write its molecular formula.
23. It is the simplest unsaturated hydrocarbon with equal number of carbon and hydrogen atoms. Answer the following questions based on the statement:
- Which compound will be formed by adding sufficient hydrogen to the compound? What is the process called?
  - Write the structural formula of the compound formed by replacing one H atom of the compound formed in (i) by OH radical.

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(iii) Write the IUPAC name of the compound formed by replacing one H atom from each carbon of the compound formed in (i) by OH radical.

**The End**

**Write the correct option (10x1-10)**

1. If the distance between two bodies is doubled, the force of attraction  $F$  between them will be:

- A.  $1/4F$       B.  $2F$       C.  $1/2F$       D.  $4F$

2. Which of the following represents an analog signal?

- A. Infrared ray thermometer    B. Computer  
C. Smartwatch                      D. Short wave radio

3. The power of the lens is  $-2D$ , its focal length is:

- A.  $-2m$       B.  $0.5m$       C.  $-0.55cm$       D.  $-0.50m$

Which formula is used to calculate power in electricity?

- A.  $P = wxt$       B.  $P = V/I$       C.  $P = V \times I$       D.  $Pt/w$

4. The orbital configuration of Chlorine is:

- A.  $1s^2, 2s^2 2p^5$   
B.  $1s^2, 2s^2 2p^5, 3s^2 3p^5$   
C.  $1s^2, 2s^2 2p^5, 3s^2 3p^7$   
D.  $1s^2, 2s^2 2p^5, 3s^2 3p^8$

5. A feather and a coin released at the same time from the same height do not reach the ground at the same time because of the:

- A. resistance of the air                      B. force of gravity  
C. force of gravitation                      D. difference in mass

2. Why is detergent called a soapless soap?

- A. It does not give lather with hard water as a soap  
B. It has the same chemical composition as of soap  
C. It has cleaning properties like soap and can be used with hard water

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**Group A**

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D. It has cleaning properties like soap but its chemical nature is different

8. Why are club mosses more advanced than mosses?

A. Clubmoss grows on the land

B. Clubmoss is sporophyte

C. Xylem and phloem tissue are found in clubmoss

D. Sporophyte is dominant in alternation of generation

9. What is the cause of systolic blood pressure on the wall of the artery during the contraction phase of the ventricle?

A. Excessive pressure is created inside the heart

B. Pressure produced in the left ventricle of the heart is transmitted to the artery

C. The artery also contracts at the time of contraction of the left ventricle

D. Blood becomes thicker at the time of contraction of the left ventricle

10. A fact and two statements related with genetics are given below.

Fact:

i) In vitro fertilization is a process of fertilization where an egg is combined with sperm in a glass vessel and then it is transferred in mother's uterus.

Statements:

i) Sperm is not needed for the process.

ii) Surrogate mother can grow the embryo in her uterus.

A. The fact and both statements are correct.

B. Fact is incorrect but both the statements are correct.

C. Fact and statement (ii) are correct but statement

(i) is incorrect

D. Fact and statement (i) are correct but statement

(ii) is incorrect

### Group B

**Write very short answers for the following questions. (9x1=9)**

11. Name any two instruments based on Pascal's law.

12. A convex lens forms a real image of the same size as that of the object. Where is the object placed? Draw.

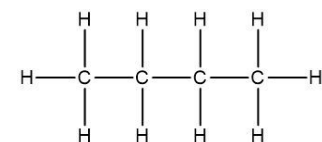
13. Why are soft magnetic materials used for making electromagnets

14. Write one importance of constellations.

15. "The specific heat capacity of mercury is 138 J kg C. Clarify the statement.

16. Write the difference between ore and mineral.

17. Name the compound in the figure below:



18. Rami has a problem of dry skin in her hands, feet and face. Which compound can be used to solve her problem?

19. What is a control variable? Clarify with an example.

### Group C

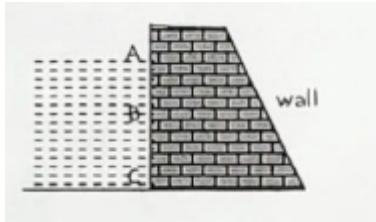
**Write short answers for the following questions. (14x2=28)**

20. Find out the fundamental units involved in the given derived unit.

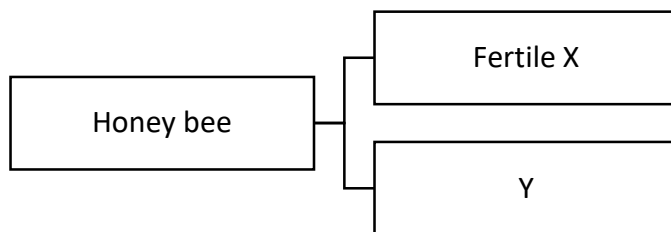
a. Newton (N)   b. Watt (W)   c. Joule (J)   d. Pascal (Pa)

21. Tides occur in oceans but not in lakes. Why?

22. Answer the following questions on the basis of the diagram shown:



- Is there any difference between the upthrust of water at the middle and at the bottom.
  - Why is the wall made thicker at the bottom.
23. Draw a labelled diagram of a Bicycle dynamo.
24. Write differences between: Star and planet.
25. Write down the symbol, atomic number, atomic mass, orbital electronic configuration and valency of Aluminum.
26. How is modern periodic table superior to Mendeleev's periodic table?"
27. Mention two chemicals used for cleaning purposes in your house and locality. Write the effect of one of those chemicals in the environment.
28. Study the concept map given below and mention the number of chromosomes in X and Y to distinguish haploid and diploid.



29. "Bryophytes are called amphibian plants." Justify this statement.

30. Identify the division/sub-division/phylum/class of the following organisms on the basis of their salient features:

- They are autotrophic, chlorophyll bearing thalloid plants. Their massive growth causes bloom in the water sources.
- These are characterized by the lack of flowers like most plants and the presence of ferns. Spores are responsible for reproduction produced inside the sporangia
- They are autotrophic and have well developed vascular bundles. The number of petals is in multiples of 4 or 5.
- Bears cones instead of flowers, seeds are naked without fruit.

31. Artificial insemination is a boon for agricultural sector. Write any two points to justify the statement.

32. Study the given figures given below. Write an importance of a plant given in figure (a). Which part of the plant given in figure (b) is more useful?

Fig (a)



fig (b)



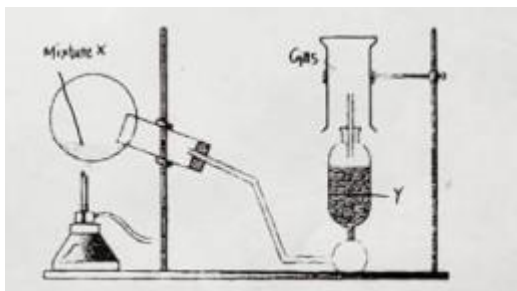
33. In order to protect and promote the medicinal herbs found in Nepal, it is essential to train the local people on the processing of herbs and their use. Explain your opinions.

### Group D



**Write long answers for the following questions. (7x4=28)**

34. Study the given figure and answer the questions:



- Which gas is being collected in the gas jar? Which litmus paper is used to identify this gas?
- Label X and Y in the diagram.
- Why is the hard glass test tube slightly inclined?
- Mention two uses of the gas collected.

35. Write down the name and molecular formula of a compound which gives hydrogen ion and chloride ion in the solution state. Fill the gaps and write down the balanced equation for the following:

- $\text{CuCO}_3 \xrightarrow{\Delta} \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
- $6\text{HCl} + \underline{\hspace{2cm}} \rightarrow \text{AlCl}_3 + \underline{\hspace{2cm}}$
- $\text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \underline{\hspace{2cm}}$
- $\text{H}_2 + \text{N}_2 \rightarrow \underline{\hspace{2cm}}$

36. Preeti wears a lens of power -4D. What is the defect of Preeti's vision called? Which lens can she use to correct her vision? Explain

with a suitable diagram. Compare the use of spectacles and the use of contact lenses to correct visual defects.

37. Discuss the impact of digital technology in our daily life. Explain at least two positive effects and two negative effects with suitable examples.

38. When a beaker filled with water at 4°C is cooled or heated, the water overflows from the beaker. Why? The temperature of 800g of a certain metal is 100°C. It is then placed in 400g of water at 15°C. If the final temperature is 20°C, calculate the specific heat capacity of the metal.

39. Round seeded pea plant and wrinkled seeded pea plant are cross pollinated first and then the offspring obtained are self-pollinated. The result of the second filial generation is shown in the table below.

	R	r
R	RR	Rr
r	Rr	Rr

Answer the following question:

- In the pea plant having Rr, there are the factors of both characters but only one character is expressed. Clarify the cause.
- Draw a chart for offspring obtained by crossing between hybrid round seeded pea plant and pea plant with recessive character.
- Write the genotypic ratio of the given generation in the table above.

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iv. What types of characters were there in the parents of the offspring shown in the table given above?

40. i) Write a short note on uric acid.

ii) Draw a neat and labelled diagram showing the internal structure of human heart.

**The end**

## Set 51

### Group 'A' (1x10-10)

**1) Choose the best alternatives of the following questions and write in the answer sheet.**

a. Which is the smallest unit of computer memory?

i) Bit      ii) Gigabyte      iii) Kilobyte      iv) Megabyte

b. Which of the following plants are in proper order on the basis of evolution?

i) Fern, Banana, Mango      ii) Horsetail, Cycas, Maize

iii) Fern, Maize, Cycas      iv) Horsetail, Banana, Soyabean

c. Which phylum of the following has multi-cellular, sessile, and pore-bearer animals?

i) Annelida      ii) Coelenterate      iii) Mollusca      iv) Porifera

d. Which one of the following group is endangered fauna?

i) Gharial, Deer, Bengal tiger

ii) Bengal tiger, Brown bear, Sarus crane

iii) Cheer Pheasant, Hispid Hare, Garden lizard

iv) Python, Pheasant, Buffalo

e. What acceleration due to gravity will be experienced by a stone that falls freely from the tower of height 72m and reaches on the ground after 6s?

i)  $4\text{ms}^{-2}$       ii)  $9.8\text{ms}^{-2}$       iii)  $10\text{ms}^{-2}$       iv)  $25\text{ms}^{-2}$

f. If large piston A and small piston B of a hydraulic lift have their cross-sectional area, pressure and force/weight are  $A_1$  and  $A_2$ ,  $P_1$  and  $P_2$

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and  $F_1$  and  $F_2$  respectively, then which of the following relation would be correct according to Pascal's law?

- i)  $P_1 = P_2$    ii)  $F_1 = F_2$    iii)  $F_1 > F_2$    iv)  $F_1 < F_2$

g. Which of the following is not true about refraction?

- i) Light refracts due to difference in speed of light in different media.  
ii) Refraction is the bending of light on travelling through different optical media.  
iii) Refraction follows the Snell's law.  
iv) Refraction occurs when light moves perpendicular to the surface.

h. Which one statement is correct according to Hubble's theory?

- i) The more distant the galaxy, the greater its advance velocity.  
ii) The more distant the galaxy, the greater its recession velocity.  
iii) There is no relation between distance of galaxies and velocity.  
iv) The attractive force of galaxies does not affect their velocity.

i. In which block the element having electronic configuration  $1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^1, 3d^{10}$  belongs to?

- i) s-block   ii) p-block   iii) d-block   iv) f-block

j. Which is general formula for alkane?

- i)  $C_n H_{2n}$    ii)  $C_n H_{2n+2}$    iii)  $C_n H_{2n-2}$   
iv)  $C_n H_{2n+1} - OH$

### Group 'B' (9×1=9)

#### 2) Write very short answer of the following questions:

- a. What are the fundamental units involved in unit of force?  
b. Write the cause of refraction of light.

c. Write Snell's Law.

d. Write difference between open universe and close universe.

e. State the principle on which Submarine is based on?

f. Write a relation between primary coil, secondary coil, primary voltage and secondary voltage in a transformer.

g. Why reduction of active metal is possible only by the electro refining method?

h. Write down two methods of oxidation.

i. Write the structural formula of a organic compound that contains 2 carbon atoms, 4 hydrogen atoms and 2 hydroxyl groups.

### Group 'C' (14×2=28)

#### Write short answers

3) A student wants to observe the effect of surface area of reactant on hydrogen gas preparation in laboratory. He put 1gm dust zinc in 5ml of dilute hydrochloric acid kept in test tube. Again, he put 1gm zinc piece in another test tube with same 5ml of dilute hydrochloric acid. He observed gas is evolving in high rate from test tube with dust zinc. Identify independent variable, and dependent variable in this experiment. Which variable should be controlled in this experiment, why?

4) Differentiate monocot and dicot plant on the basis of leaf venation and root.

5) Honey bee is very important insect for human mankind. Explain with reasons.

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- 6) Write any two differences between mitosis and meiosis cell division.
- 7) Draw a sex determination probability chart of result obtained in cross between male and female.
- 8) Draw well labeled diagram of human heart and mention any two valves.
- 9) Explain how urbanization and industrialization are leading to global warming?
- 10) Prove theoretically that acceleration due to gravity is independent of mass of falling object.
- 11) The acceleration due to gravity on the surface of Jupiter is  $25\text{m/s}^2$ , What does it mean?
- 12) Lamp is lit in the running bicycle by the help of a dynamo but it goes off when bicycle is stopped. Give reason.
- 13) A researcher observed that his magnetic compass was not working properly when a current was passed in a nearby circuit. However, the compass worked fine when there was no passage of current nearby. What might be the reason for the discrepancy in the deflection of the compass?
- 14) Write a balanced chemical equation for the reaction when burning magnesium ribbon is inserted inside gas jar filled with nitrogen gas. And write the type of chemical reaction.
- 15) A student had made model of methane and another student had made a model of propane. Their teacher removed one hydrogen atom

from the terminals of each model and joined together. Now which hydrocarbon is formed? Write its molecular formula too.

- 16) Write any two preventive measures while using pesticides.

#### **Group 'D' (7×4=28)**

##### **Write long answers:**

17) Analogue to digital to analogue conversion is an important process to send data through long distances. Answer the following questions for such type of transmission.

- i) What is the importance of encoder in analogue to digital conversion?
- ii) Why is modulation of a digital signal done?
- iii) Which device is used to convert digital signal into analogue signal?

18) The alongside checker board is the result between the crosses of pure red flowered (RR) and pure white flowered (rr) pea plant done by Mendel. Answer the following question according to this result.

	R	R
r	Rr	Rr
r	Rr	Rr

- a. Which type of cell division produces gamete (R) or (r) from the given parent?
- b. Why Mendel selects pea in his experiment?
- c. Write the phenotypic and genotypic ratio thus obtained if the offspring (Rr) and (Rr) are crossed.

19) Write two differences between pulmonary and systemic circulation of blood. Write any two symptoms that a person suffering from uric acid observes.

20) Study the figure and answer the following questions.



- What is the special property of water shown in the figure called?
- Write the change that takes place in volume of water on heating from  $0^{\circ}\text{C}$  to  $10^{\circ}\text{C}$ .
- Write one use of this special property of water.

21) A student sitting on the last bench of class wear spectacles to read the white board, but can easily read a book. The power of spectacles wearing by him is  $-2.5\text{D}$ . Give the answer of the following questions on the basis of this fact.

- What is the focal length of the lens used in it?
- Name the defect of vision of eye. Write one cause of this defect.
- How can this defect be corrected?
- Draw a diagram to show the remedy of this defect.

22) Study the given electronic configuration of the elements and answer the following questions:

- a) 2,8,1    b) 2,8    c) 2,8,7    d) 2,4

- Give the names of a metal and a non-metal from above.
  - Which one of the above elements is inert and why?
  - Identify the elements that are placed in Group 17 and Group 4.
- 23) Draw a well labelled diagram of laboratory preparation of carbon dioxide gas. Write balanced chemical reaction to prepare this gas. What happens when this gas is passed through lime water for short time? Explain with chemical equation.

**The End**