

QUESTION PAPER-1

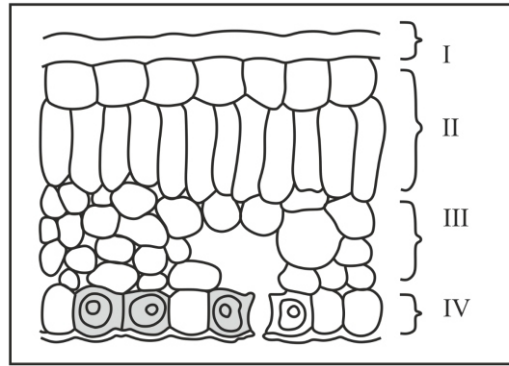
SCIENCE

SECTION-A

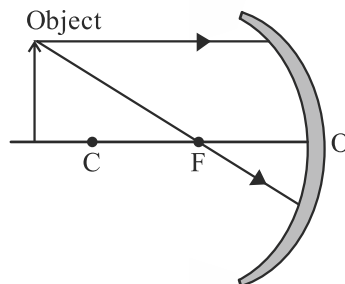
Select and write one most appropriate option out of the four options given for each of the questions 1-20

- Which of the following is an example of simple displacement reaction? [1]
 - The electrolysis of water
 - The burning ethanol
 - The reaction of a metal with an acid
 - The reaction of two solution to form a precipitate
- In the redox reaction, $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$. choose the correct statement. [1]
 - MnO_2 is reduced to MnCl_2 & HCl is oxidized to H_2O
 - MnO_2 is reduced to MnCl_2 & HCl is oxidized to Cl_2
 - MnO_2 is oxidized to MnCl_2 & HCl is reduced to Cl_2
 - MnO_2 is oxidized to MnCl_2 & HCl is reduced to H_2O
- How will you protect yourself from the heat generated while diluting a concentrated acid? [1]
 - By adding acid to water with constant stirring
 - By adding water to acid with constant stirring
 - By adding water to acid followed by base
 - By adding base to acid with constant stirring
- Identify the basic salt from the following salt : [1]
 - Na_2CO_3
 - NH_4Cl
 - NaNO_3
 - KCl
- The electronic configurations of three elements x, y and z are $x = 2, 8$; $y = 2, 8, 7$; $z = 2, 8, 2$. Which of the following is correct? [1]
 - x is a metal
 - y is a metal
 - z is a non-metal
 - y is non-metal and z is a metal
- Which among the following alloys contain mercury as one of its constituents? [1]
 - Stainless steel
 - Alnico
 - Solder
 - Amalgam
- Pentane has the molecular formula C_5H_{12} . It has [1]
 - 5 Covalent bonds
 - 12 Covalent bonds
 - 16 Covalent bonds
 - 17 Covalent bonds
- In which of the following groups of organisms, blood flows through the heart only once during one cycle of passage through the body [1]
 - Rabbit, Parrot, Turtle
 - Frog, Crocodile, Pigeon
 - Whale, Labeo, Penguin
 - Shark, Dogfish, Sting ray

9. In the given cross section of leaf identify the layer of cells where maximum photosynthesis occurs. [1]



- (a) I, II (b) II, III (c) III, IV (d) I, IV
10. Which of the following lead to a greater variety in population? [1]
 (a) Budding (b) Sexual reproduction
 (c) Regeneration (d) Fragmentation
11. The sensitive movement seen in touch – me – not plant uses [1]
 (a) Electrical – chemical signals (b) Chemical stimulus
 (c) Phototropism (d) Hydrotropism
12. In cross breeding experiments, Mendel avoided self fertilization between two traits or varieties of plants by - [1]
 (a) Pollination (b) Emasculation (c) Mutation (d) Hybridization
13. The image shows the path of incident rays to a concave mirror. [1]



Where would the reflected rays meet for the image formation to take place ?

- (a) Between F and O (b) Beyond C
 (c) Between C and F (d) Behind the mirror.
14. If the magnification of a lens has a negative value, the image is [1]
 (a) real (b) virtual and erect (c) inverted (d) none of these
15. In the following groups of materials, which groups contains only non biodegradable items? [1]
 (i) Wood, Paper, Leather (ii) Polythene, detergent, PVC
 (iii) Plastic detergents, grass (iv) Plastic, Bakelite, DDT
 (a) (iii) (b) (iv) (c) (i) and (iii) (d) (ii) and (iv)

16. Which of the following is not removed as a waste product from the body of a plant? [1]
(a) Resin and gums (b) Urea (c) Dry leaves (d) Excess water

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.
17. **Assertion (A) :** Usually the Sulphide ore is converted to oxide before reduction. [1]
Reason (R) : Reduction of oxides occurs easier.
18. **Assertion (A) :** Heights in pea plants is controlled by efficiency of enzymes and is thus genetically controlled. [1]
Reason (R) : Cellular DNA is the information source for making proteins in the cell.
19. **Assertion (A) :** Tungsten metal is used for making filaments of incandescent lamps. [1]
Reason (R) : The melting point of tungsten is very low.
20. **Assertion (A) :** Nitrogen is an essential element for plant growth and is taken up by plants in the form of inorganic nitrates or nitrites. [1]
Reason (R) : The soil is the nearest and richest source of raw materials like nitrogen, phosphorus and other inorganic minerals for the plants.

SECTION-B

Q. No. 21 to 26 are very short answer questions.

21. Bee – sting leaves a chemical substance that causes pain and irritation. Name the chemical substance. Identify the type of substance which may give relief on the sting area when applied on it. [2]

OR

- (a) Name the product formed when sodium hydrogen carbonate is heated.
(b) Write the chemical equation for the reaction involved in the above.
22. (i) Which system facilitates communication between central nervous system and other parts of the body? Mention the part of brain which controls involuntary action like blood pressure, salivation etc. [2]
(ii) Mention the part of the body where gustatory and olfactory receptors are located
23. (i) Why does a piece of bread taste sweet when chewed for some time? [2]
(ii) Cellulose acts as a roughage in man but serve as a source of nutrient in cow. Justify the statement.
24. Why are coils of electric toasters and electric irons made of an alloy rather than a pure metal ? [2]
25. What is meant by saying that the potential difference between two points is 1 V ? [2]
26. Write two differences between the two ways of oxidation of glucose in organisms . [2]

OR

- (i) When a sportsman runs, He gets muscle cramps. Why?
(ii) What happens if conducting tubes of circulatory system develops a leak? How could this be avoided?

SECTION-C

Q. No. 27 to 33 are short answer questions.

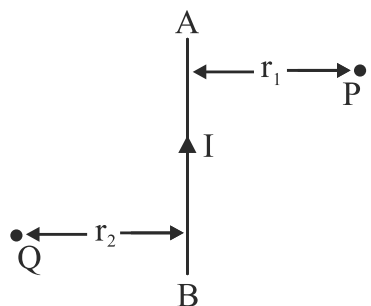
27. During electrolysis of brine a gas G is liberated at anode. [3]
When this gas G is passed through slaked lime, a compound "C" is formed. Which is used for disinfecting drinking water.
(a) Write formula of 'G' and 'C'.
(b) State the chemical equation involved
(c) What is common name of compound "C" ? Give its chemical name.
28. The given reaction shows one of the processes to extract the metals like iron and manganese.
$$\text{Fe}_2\text{O}_{3(s)} + \text{Al}_{(s)} \rightarrow \text{Al}_2\text{O}_{3(s)} + \text{Fe}_{(l)} + \text{Heat} \quad [3]$$

(a) Give reason why the above reaction is known as a thermite reaction.
(b) Identify the substance oxidized and reduced in the above reaction.
(c) Give a reason why aluminum is preferably used in thermite reaction.
29. Give reason, why – [3]
(i) separation of oxygenated and Deoxygenated blood is necessary in birds and mammals?
(ii) left ventricle has thicker wall than that of right ventricle?
(iii) arteries have thick wall, while veins have valves?

OR

- (i) Draw excretory system of human being and label the organs which perform following functions :
(a) form urine (b) long tube which collect urine from kidneys
(c) store urine (d) pass out urine
(ii) Name any two substances which are selectively reabsorbed from the tubules of a nephron.
30. What is the probability of a girl or a boy being born in a family? Justify. [3]
31. (i) State Snell's law of refraction of light. [1+2=3]
(ii) When a ray of light travelling in air enters obliquely into a glass slab, it is observed that the light ray emerges parallel to the incident ray but it is shifted sideways slightly. Draw a labeled ray diagram to illustrate it.
32. A truck uses a convex mirror as view finder whose radius of curvature is 2.0 m. A maruti car in coming behind the truck at a distance of 10 m. What will be the position of the image of the car and size of the image of the car when observed by the driver of the truck through the convex mirror ? [3]

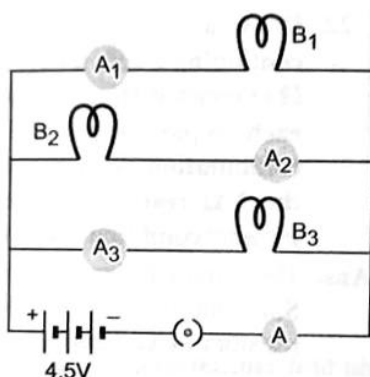
33.



[1+2=3]

- (i) AB is a current-carrying conductor in the plane of the paper as shown in figure. What are the directions of magnetic fields produced by it at point P and Q ? Given $r_1 > r_2$, where will the strength of the magnetic field be larger ?
- (ii) (a) How is the direction of magnetic field at a point determined ?
(b) What is the direction of magnetic field at the centre of a current-carrying circular loop ?

OR



B_1, B_2, B_3 are three identical bulbs connected as shown in figure. Ammeters A_1, A_2, A_3 are connected as shown. When all the bulbs glow, the current of 3A is recorded by ammeter A.

- (i) What happens to the glow of the other two bulbs when bulb B_1 gets fused ?
(ii) What happens to the reading of A_1, A_2, A_3 and A when the bulb B_2 gets fused ?
(iii) How much power is dissipated in the circuit when all the three bulbs glow together ?

[1+1+1=3]

SECTION-D

Q. No. 34 to 36 are Long answer questions.

34. A compound "X" on heating with excess conc. Sulphuric acid at 443K gives an unsaturated compound 'Y'. 'X' also reacts with sodium to evolve a colorless gas 'Z'. Identify X , Y and Z. Write the equation of the chemical reaction for formation of Y and also write the role of sulphuric acid in the reaction.

[5]

OR

- (a) Draw the structure of the following compounds
(i) Propanal (b) Propanone

[2+3=5]

(b) Complete the following chemical equations :-



35. (i) Name the hormone secreted by the following glands

[5]

(a) Pancreas

(b) Pituitary

(ii) Why is it advised to consume iodized salt?

(iii) State the meaning of recessive and dominant genes.

OR

(i) What changes are observed in the uterus if fertilization does not occur?

(ii) How fallopian tubes can help in pregnancy and can stop pregnancy?

(iii) (a) Name one viral and one bacterial STD.

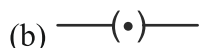
(b) Name contraceptive device that prevent STD.

36. Draw an appropriate schematic diagram showing common domestic circuits and discuss the importance of fuse. Why is it that a burnt out fuse should be replaced by another fuse of identical rating? [5]

OR

(i) Name an instrument that measures electric current in a circuit. Define the unit of electric current. [5]

(ii) What do the following symbols represent in a circuit diagram?

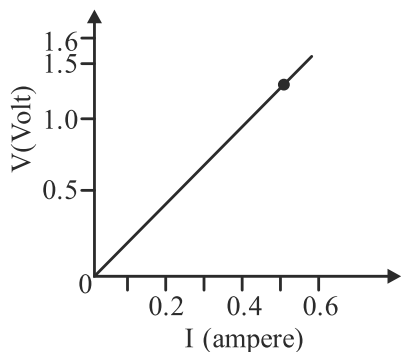


(iii) An electric circuit consisting of a 0.5 m long nichrome wire XY, an ammeter, a voltmeter, four cells of 1.5 V each and a plug key was set up. [5]

(a) Draw the electric circuit diagram to study the relation between the potential difference maintained between the points 'X' and 'Y' and the electric current flowing through XY.

(b) Following graph was plotted between V and I values using above circuit:

What would be the values of $\frac{V}{I}$ ratios when the potential difference is 0.8 V, 1.2 V and 1.6 V respectively? What conclusion do you draw from these values? (Use graph paper if needed)



SECTION-E

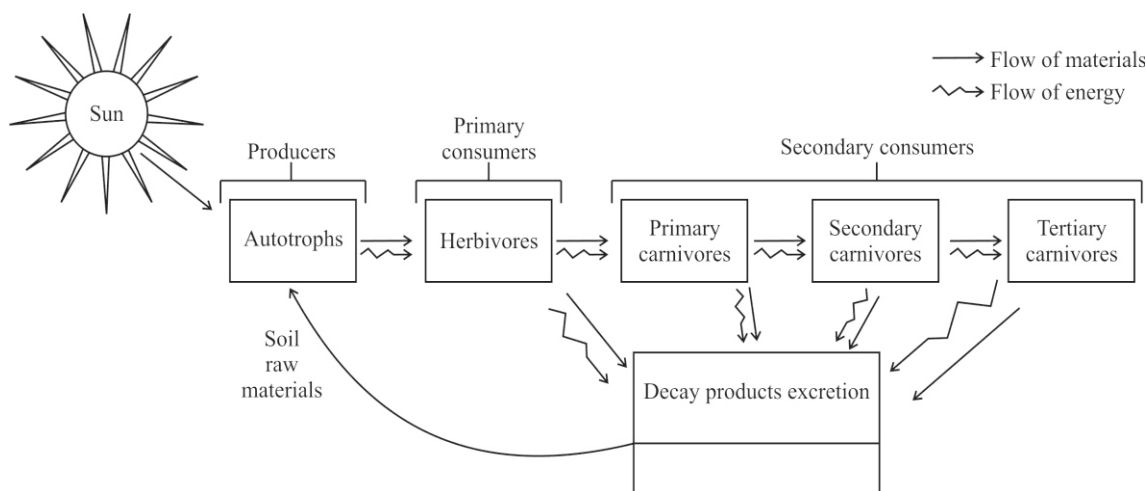
Q. No. 37 to 39 are case-based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

37. During extraction of metals, electrolytic refining is used to obtain pure metals. During the process, the impure metal is made the anode and a thin strip of pure metal is made the cathode. The solution of the metal salt is used as an electrolyte, the pure metal from the anode dissolves from the electrolyte and an equivalent of pure metal from the electrolyte is deposited on the cathode. **[1+1+2=4]**

- (i) The process of purification of the metal obtained after reduction is called:
 (a) Extraction (b) Refining (c) Froth floatation (d) Electroplating
- (ii) Which of the metal are refined by electrolytic refining?
 (i) Au (ii) Cu (iii) Na (iv) K
 (a) (i) and (ii) (b) (i) and (iii) (c) (ii) and (iii) (d) (iii) and (iv)
- (iii) The anode is _____ and the reaction at the anode is called _____.

OR

- (iii) Write the chemical equation take place at anode and cathode respectively.
- 38.** In any given ecosystem, all living organisms are linked in a systematic chain with respect to their mode of manufacturing food / feeding habits. Such a chain depicted diagrammatically below. **[1+1+2=4]**



The interaction among various components of the environment involves flow of energy from one component of the ecosystem to other. Thus, we find that beginning with producers onwards to herbivores, carnivores and next level carnivores, all organisms are inter linked in a definite sequence and involve transfer of energy from producers onwards to the last link in the chain. Such a sequential interlinking of organism involving transfer of food energy from producers, through a series of organisms with repeated eating and being eaten is called food chain.

Answer following questions

- (i) Create a food chain from the following organisms
 Insects, Hawk, grass, Snake, frog.

(ii) Which of these will have highest concentration of non-biodegradable chemicals? Name the phenomenon.

(iii) (a) Flow of energy in a food chain is unidirectional. Explain

(b) What is ten percent law of energy flow?

OR

(iii) (a) Explain the role of decomposers in the environment

(b) What is an ecosystem.

- 39.** Many optical instruments consist of a number of lenses. They are combined to increase the magnification and sharpness of the image. The net power (P) of the lenses placed in contact is given by the algebraic sum of the powers of the individual lenses $P_1, P_2, P_3 \dots$ as

$$P = P_1 + P_2 + P_3$$

This is also termed as the simple additive property of the power of lens, widely used to design :

Lens systems of cameras, microscopes and telescopes. These lens systems can have a combination of convex lenses and also concave lenses. **[1+1+2=4]**

- (a) What is the nature (convergent / divergent) of the combination of a convex lens of power +4 D and a concave lens of power -2 D ?
- (b) Calculate the focal length of a lens of power -2.5 D.
- (c) Draw a ray diagram to show the nature and position of an image formed by a convex lens of focal length 10 cm, when an object is placed at a distance of 20 cm from its optical centre.

OR

- (c) How is a virtual image formed by a convex lens different from that formed by a concave lens ? Under what conditions do a convex and a concave lens form virtual images ?