## SECTION – A

**(20 × 1 = 20)**

**In this section, Question Nos. 1 to 20 are Multiple-Choice Questions. All questions are compulsory.**

1. A Hydrocarbon which **does not** belong to the same homologous series of carbon compounds is 1

(A) $C_4H_{10}$ (B) $C_6H_{14}$

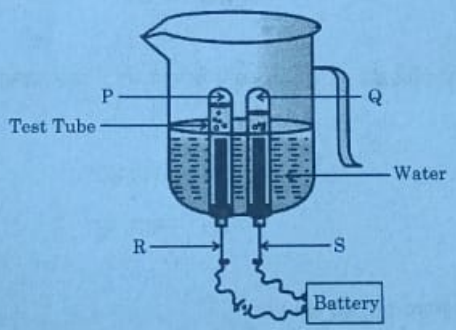
(C) $C_7H_{14}$ (D) $C_{10}H_{22}$

2. The formula of washing soda is 1

(A) $NaHCO_3 \cdot 6H_2O$ (B) $Na_2CO_3 \cdot 6H_2O$

(C) $NaHCO_3 \cdot 10H_2O$ (D) $Na_2CO_3 \cdot 10H_2O$

3. In the following experimental setup of electrolysis of water, if P and Q are the gases collected in the test tubes enclosing the electrodes R and S, then select the option/options in which the matching is correct : 1




(i) P – Oxygen gas , R – Anode

(ii) P – Hydrogen gas , R – Cathode

(iii) Q – Hydrogen gas , S – Cathode

(iv) Q – Oxygen gas , S – Anode

(A) (i) and (ii) (B) (iii) and (iv)

(C) (i) and (iii) (D) (ii) and (iv)

4. Select from the following a statement which is not true about burning of magnesium ribbon in air : 1

(A) It burns with a dazzling white flame.

(B) A white powder is formed on burning.

(C) It is an endothermic reaction.

(D) It is an example of a combination reaction.

5. The water of crystallization is present in 1

(i) Bleaching Powder (ii) Plaster of Paris

(iii) Washing Soda (iv) Baking Soda

(A) (ii) and (iv) (B) (ii) and (iii)

(C) (i) and (iii) (D) (i) and (iv)

6. The nature of aqueous solution of potassium nitrate is : 1

(A) acidic (B) basic

(C) neutral (D) alkaline

7. The colour of the solution observed after about 1 hour of placing iron nails in copper sulphate solution is 1

(A) Blue (B) Pale green

(C) Yellow (D) Reddish brown

8. Mendel obtained $F_2$ generation by 1

(A) self pollinating $F_1$ generation plants

(B) cross pollinating $F_1$ generation plants with plants having dominant trait.

(C) cross pollinating $F_1$ generation plants with plants having recessive trait.

(D) cross pollinating both the parents.

9. The basic filtration unit of the excretory system in human beings is : 1

(A) Nephron (B) Urethra

(C) Neuron (D) Urinary bladder

10. When a seed germinates the root grows downwards and a small shoot grows upward. This shoot is known as 1

(A) radicle (B) stem

(C) cotyledon (D) plumule

11. A pair of endocrine glands located in the human brain is 1

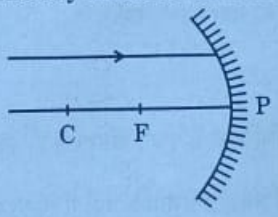
(A) Parathyroid and Pituitary

(B) Pineal and Thymus

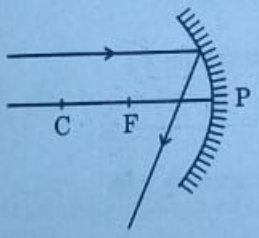
(C) Hypothalamus and Thymus

(D) Hypothalamus and Pineal

12. Identify from the following the ray diagram which shows the correct path of the reflected ray for the ray incident on a concave mirror as shown : 1




(A)

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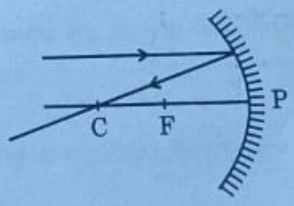
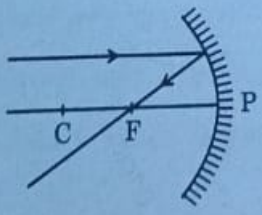
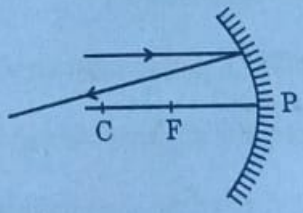



(C)




(D)



13. In human alimentary canal, the digestive juice secreted by the gastric glands are 1

(A) Bile, Trypsin, Pepsin

(B) Hydrochloric acid, Pepsin, Mucus

(C) Lipase, Bile, Mucus

(D) Salivary amylase, Pepsin, Bile

14. Most of the refraction for the light rays entering the eye occurs at 1

(A) Iris

(B) Pupil

(C) Crystalline lens

(D) Outer surface of Cornea

15. The **incorrect** statement about ozone is 1

(A) It is a deadly poisonous gas.

(B) It shields the surface of the earth from UV radiation from sun.

(C) It is used as a refrigerant and in fire-extinguishers.

(D) It is formed by combining oxygen molecule with free oxygen atom.

16. Green plants occupy the first trophic level in every food chain because they 1

(A) exist over a large area.

(B) have very less concentration of harmful chemicals.

(C) have to feed large number of herbivores.

(D) can synthesize food by photosynthesis.

**Q. Nos. 17** to **20,** two statements are given – one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below :

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of the Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

17. **Assertion (A) :** Xylem tissue moves water and minerals obtained from the soil by the roots. 1

**Reason (R) :** Xylem tissue is found only in the roots of a plant.

18. **Assertion (A) :** Food web is a network of several food chains operating in an ecosystem. 1

**Reason (R) :** Food web decreases the stability of an ecosystem.

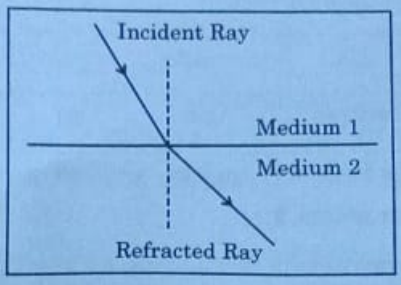
19. **Assertion (A) :** Carbon and its compounds are our major sources of fuels. 1

**Reason (R) :** Most of the carbon compounds on burning release a large amount of heat and light.

20. **Assertion (A) :** In the common domestic circuits the earth wire is connected to a metallic plate buried deep inside the earth. 1

**Reason (R) :** Earth wire ensures that any leakage of current to the metallic body of the appliance keeps its potential to that of the earth, so the user may not get a severe electric shock.

25. Study the figure in which the path of a ray of light going from Medium 1 to Medium 2 is shown.




(a) Out of the two Media – Medium 1 and Medium 2, in which is the speed of light more ?

(b) State reason of bending of the refracted ray away from the normal.

(c) Express refractive index of Medium 2 with respect to Medium 1 in terms of speed of light in two media. 2

26. Indicate the flow of energy in a food chain operating in an ecosystem. Why is it uni-directional ? Give reason. 2

## SECTION – C

**Question Nos. 27 to 33 are short answer type questions. Each question carries 3 marks.**

27. The gene combination of purple flowered pea plants is denoted as (WW) and that of white flowered pea plants as (ww), when these two plants are crossed $F_1$ generation is obtained.

(a) List two observations made by Mendel in $F_1$ generation plants.

(b) Give the (i) percentage of white flowered plants and (ii) ratio of the gene combinations WW, Ww and ww in $F_2$ generation.

(c) Write one difference between dominant and recessive trait. 3

## SECTION – B

**Question Nos. 21 to 26 are very short answer type questions. Each question carries 2 marks.**

21. Cinnabar is an ore of a metal 'X'. When this ore is heated in air, it is first converted into oxide of 'X' (XO) and then reduced to metal 'X' on further heating.

Identify metal 'X' and write chemical equations for the reactions that occur in the above processes. 2

22. (a) "Proteins control the expression of various characters." Explain this statement by taking an example of "tallness" as a characteristic in plants. 2

**OR**

(b) Explain the mechanism of inheritance used by sexually reproducing organisms to ensure the stability of DNA of the species. 2

23. (a) How is brain protected in our body ?

(b) A doctor finds in one of his patients that he is not maintaining a proper posture and balance of his body. State the region of brain and also the part of brain which is responsible for it. 2

24. (a) Give reasons :

(i) The sky appears dark to passengers flying at very high altitude.

(ii) 'Danger' signal lights are red in colour. 2

**OR**

(b) What is a rainbow ? "We see a rainbow in the sky only after the rainfall." Why ? 2

28. (a) In an experiment a student dipped pH papers in four different solutions A, B, C and D and reported his observation as given below :

| Solution | A | B | C | D |
|---|---|---|---|---|
| Colour of pH paper | Light green | Blue | Green | Red |

(i) In which one of these solutions is the concentration of (1) hydrogen / hydronium ions; (2) hydroxyl ions maximum ?

(ii) Give one example each of the two solutions identified in (i) above.

(iii) What would be the pH of the resultant mixture obtained when these two solutions are mixed together in equal proportions ? Justify your answer. 3

OR

(b) (i) Name the gas liberated when an acid reacts with a metal. How is this gas tested ?

(ii) Write the chemical equation for the reaction of zinc metal with

(1) hydrochloric acid, and

(2) sodium hydroxide

Name the compound of zinc obtained in each case. 3

29. An object of size 5 cm is placed at a distance of 30 cm from the optical centre of a converging lens of focal length 20 cm. Use lens formula to determine the position and size of the image formed. 3

30. Write balanced chemical equation for the reactions that occur when

(a) steam is passed over red hot iron.

(b) natural gas is burnt in air.

(c) glucose reacts with oxygen in the cells of our body and provides energy. 3

33. (a) Draw a diagram to show the dispersion of white light by a glass prism.

(b) What is spectrum ? Give reason for its formation. 3

## SECTION – D

**Question Nos. 34 to 36 are long answer type questions. Each question carries 5 marks.**

34. (a) Define Puberty. List any two changes seen in boys at the time of puberty.

(b) Why are testes in human males located outside the abdominal cavity in scrotum ?

(c) List any three techniques of contraception used by humans. Which one of these is **not** meant for males ? 5

**OR**

(a) Name the part performing following functions in human female reproductive system :

(i) production of eggs

(ii) site of fertilization

(iii) site of implantation

(iv) entry of the sperms

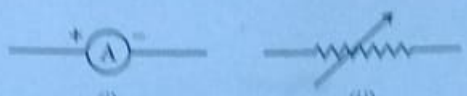
(b) What changes are observed in the uterus :

(i) subsequent to implantation of zygote and

(ii) if an egg does not get fertilized ? 5

31. (a) Explain the statement "Potential difference between two points is 1 volt". 3

(b) What do the symbols given below represent in an electric circuit ? Write one function of each. 3



(i) (ii)

32. A student placed a candle flame at different distances from a convex lens and focused its image on a screen. He recorded his observation in tabular form as given below :

| S.No. | Distance of flame from the lens (cm) | Distance of the image from the lens |
|---|---|---|
| 1 | – 90 | + 18 |
| 2 | – 60 | + 20 |
| 3 | – 40 | + 24 |
| 4 | – 30 | + 30 |
| 5 | – 24 | + 40 |
| 6 | – 20 | + 60 |
| 7 | – 18 | + 90 |
| 8 | – 12 | + 120 |

Analyse the observation table and on the basis of your analysis only, answer the following questions (without doing any calculations) :

(a) What is the focal length of the convex lens used ? Give reason to justify your answer.

(b) Which one of the sets of observations is <u>not</u> correct and why ?

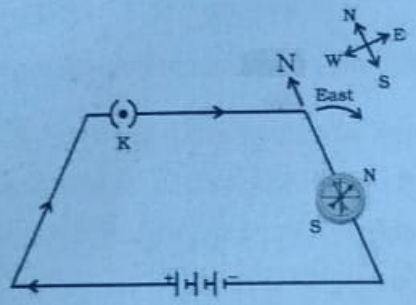
(c) Draw ray diagram to show image formation for any correct set of observation. 3

35. (a) Name an alcohol and a carboxylic acid having two carbon atoms in their structures. Draw their structures and state how this alcohol can be converted into a carboxylic acid. What happens when these two compounds react in the presence of an acid ? Write chemical equations for the reactions involved in the two cases mentioned above. 5

OR

(b) What are soaps ? Write the structure of a soap molecule. Explain the cleansing action of a soap. Why are soaps not considered suitable for washing clothes in a region where water is hard ? How is this problem overcomed ? 5

36. (a) Study the following electric circuit diagram and answer the questions that follow :




(i) What does the circuit diagram shows ?

(ii) What will happen if the direction of current is reversed ? Justify your answer giving circuit diagram.

(b) Name and state the rule to determine the direction of magnetic field associated with a straight current carrying conductor. 5

OR

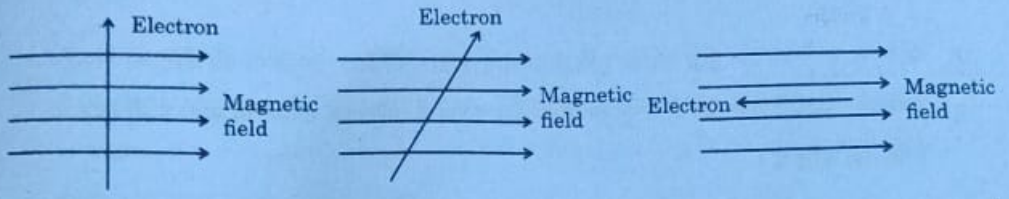
(a) Draw the pattern of magnetic field lines of

(i) a bar magnet

(ii) a current carrying solenoid

List two distinguishing features between the two magnetic fields.

(b) Study the following three diagrams in which the entry of an electron in a magnetic field is shown. Identify the case in which the magnetic force experienced by the electron is (i) maximum, and (ii) minimum. Give reason for your answers in each case.




(A) (B) (C) 5

## SECTION – E

**Question Nos. 37 to 39 are Case/Source based questions. Each question carries 4 marks.**

37. Many pure metals like copper, iron and gold are very soft and as such are considered unsuitable for certain uses. Metallic objects around us such as cooking utensils, statues, ornaments, guns etc. are actually not made up of pure metals. Instead of pure metals, alloys are used in the design of most of the useful objects. Making alloys enhances the basic properties of a metal which is the primary constituent (metal) of an alloy. 4

(I) How does electrical conductivity and melting point of a metal change when it is converted to its alloy by mixing a small amount of an element in it ? 1

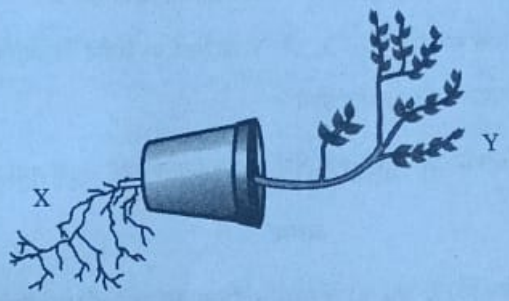
(II) Name an alloy used for welding two wires together in an electric circuit. Write its major constituents. 1

(III) (a) What are alloys ? How is 'Brass' (an alloy) prepared ? 2

**OR**

(III) (b) What is stainless steel ? How is it prepared ? Write one important property which makes it more useful in making cooking utensils as compared to its primary metal. 2

38. The growth movements of plant parts in which the direction of the stimulus determines the direction of the response is known as tropic movements or tropism. Plants also have non-directional movements which may not be growth dependent. 4




(I) Name the movement which causes 'X' and 'Y' to grow downwards and upwards respectively. (Refer above figure) 1

(II) Write the name of a hormone that plays a major role in (i) falling of leaves (ii) rapid cell division 1

(III) (a) Leaves of the sensitive plant move very quickly in response to 'touch'. How is this stimulus of touch communicated and explain how the movement takes place. 2

OR

(III) (b) Name the plant hormone which is synthesized at the shoot tip. How does this hormone helps the plant to bend towards light ? 2

[ P.T.O. ]

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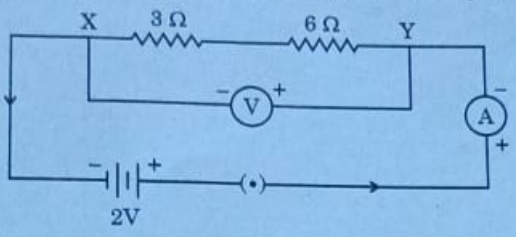
39. Study the circuit shown in which two resistors X and Y of resistances 3 Ω and 6 Ω respectively are joined in series with a battery of 2 V. 4




(I) Draw a circuit diagram showing the above two resistors X and Y joined in parallel with same battery and same ammeter and voltmeter. 1

(II) In which combination of resistors will the (i) potential difference across X and Y and (ii) current through X and Y, be the same ? 1

(III) (a) Find the current drawn from the battery by the series combination of the two resistors (X and Y). 2

**OR**

(III) (b) Determine the equivalent resistance of the parallel combination of the two resistors (X and Y). 2

*31/6/2*