SCIENCE

SAMPLE PAPER

TIME : 3 HRS. **MAX. MARKS : 80**

GENERAL INSTRUCTIONS :

1. **The question paper comprises three sections – A, B and C. Attempt all the sections.**
2. **All questions are compulsory.**
3. **Internal choice is given in each section.**
4. **All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.**
5. **All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.**
6. **All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.**
7. **This question paper consists of a total of 30 questions.**

SECTION-A

1. Write the IUPAC names of the following compounds.

(i) $CH_3—CH_2—Br$ (ii) $H—\underset{\displaystyle H}{\overset{\displaystyle |}{C}}=O$

2. Complete the following equations.

(i) $CH_4 + O_2 \xrightarrow{\Delta}$ (excess)

(ii) $CH_3COOH + C_2H_5OH \xrightarrow{\text{Conc. } H_2SO_4}$

3. Answer question numbers 3(a) to 3(d) on the basis of your understanding of the following paragraph and the related studied concepts.

Batteries do not put out a constant current. Instead, batteries are intended to maintain a constant potential difference, or very nearly so. Thus a battery should be considered a source of voltage. The voltage is applied across a wire or device.

Electric current passes through a wire or device (connected to a battery), and its magnitude depends on that device's resistance. The resistance is a property of the wire or device. The voltage, on the other hand, is external to the wire or device, and is applied across the two ends of the wire or device. The current through the device might be called the "response" : the current increases if the voltage increases or the resistance decreases, as I = V/R.

In a wire, the direction of the current is always parallel to the wire, no matter how the wire curves, just like water in a pipe. The direction of conventional (positive) curent is from high potential (+) toward lower potential (–).

Current and charge do not increase or decrease or get "used up" when going through a wire or other device.

(a) State ohm's law.

(b) What is meant by the last statement in the paragraph, written in italics?

(c) On application of 6 volts across a conducting wire, 0.5 A current flows through it. What is the resistance of wire?

(d) How the current through the wire [mentioned in above question (c)] will be affected if the battery connected across it is replaced by an another battery of 24 volts?

4. Question numbers 4(a) to 4(d) are based on table given below

(a) Given table gives some information about the trophic levels of a food chain.

P	Q	R
Trophic level	Bio mass of organisms (In kg in 2)	Energy in the trophic level
W	14	1000
X	2	10
Y	20	10,000
Z	9	100

Which of the following food chains is correct with respect to the given information?

(1) $W \rightarrow Y \rightarrow Z \rightarrow X$ (2) $Y \rightarrow Z \rightarrow W \rightarrow X$

(3) $X \rightarrow Z \rightarrow W \rightarrow Y$ (4) $Y \rightarrow W \rightarrow Z \rightarrow X$

(b) If a grasshopper is eaten by a frog, then the energy transfer will be from

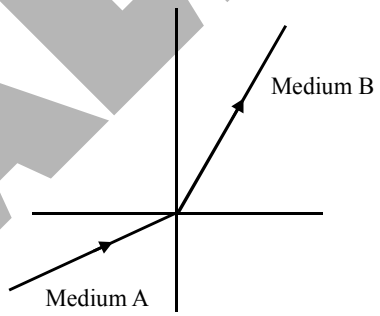
(1) Producer to decomposer (2) Producer to primary consumer

(3) Primary consumer to secondary consumer (4) Secondary consumer to primary consumer

(c) Define a food chain.

(d) Who gave the ten percent law of energy transfer in an ecosystem?

5. A light ray enters from medium A to medium B as shown in the figure. The refractive index of medium B with respect to A will be



(1) Greater than unity (2) Less than unity (3) Equal to unity (4) Zero

OR

The focal length of the eye lens increases when eye muscles

(1) are relaxed and lens becomes thinner (2) contract and lens become thicker

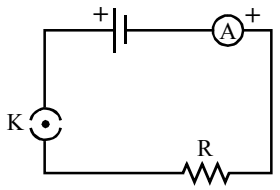
(3) are relaxed and lens becomes thicker (4) contract and lens become thinner

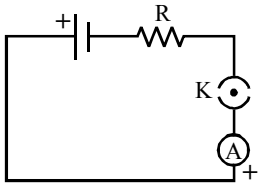
6. Which of the following represents voltage?

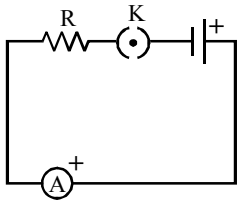
(1) $\frac{\text{Work done}}{\text{Current} \times \text{Time}}$ (2) Work done × Charge

(3) $\frac{\text{Work done} \times \text{Time}}{\text{Current}}$ (4) $\frac{\text{Work done} \times \text{Charge}}{\text{Time}}$

7. A cell, resistor, a key, and ammeter are arranged as shown in the circuit diagrams. The current recorded in the ammeter will be

(i) 

(ii) 

(iii) 

(1) maximum in (i) (2) maximum in (ii)

(3) maximum in (iii) (4) the same in all the cases.

8. Arabari forests of Bengal is dominated by

(1) Teak (2) Sal (3) Bamboo (4) Mangrove

9. What prevents backflow of blood inside the heart during contraction ?

(1) Valves in heart (2) Thick muscular walls of ventricles

(3) Thin walls of atria (4) All of the above

OR

In a synapse, chemical signal is transmitted from

(1) dendritic end of one neuron to axonal end of another neuron.

(2) axon to cell body of the same neuron.

(3) cell body to axonal end of the same neuron.

(4) axonal end of one neuron to dendritic end of another neuron.

10. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?

(1) FeO (2) Fe_2O_3 (3) Fe_3O_4 (4) Fe_2O_3 and Fe_3O_4

11. Which of the following gives the correct increasing order of the atomic radii of O, F and N ?

(1) O, F, N (2) N, F, O (3) O, N, F (4) F, O, N

12. Pentane has the molecular formula C_5H_{12}. It has :

(1) 5 covalent bonds (2) 12 covalent bonds (3) 16 covalent bonds (4) 17 covalent bonds

13. **Assertion (A) :** In esterification, carboxylic acid and alcohol reacts in the presence of acid to give ester.

Reason (R) : Esterification is the reverse of saponification.

(1) If, Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(2) If, Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).

(3) If, Assertion (A) is true but reason (R) is false.

(4) If, Assertion (A) is false but reason (R) is true.

14. **Assertion (A) :** Magnification of the lens is the ratio of the size of the image to that of the object.

Reason (R) : Magnification (m) for concave lens is always negative.

(1) If, Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(2) If, Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).

(3) If, Assertion (A) is true but reason (R) is false.

(4) If, Assertion (A) is false but reason (R) is true.

SECTION-B

15. (i) Why oil and fat containing food items are flushed with nitrogen while packing?

(ii) Why do we apply paint on iron articles?

16. An element X belongs to group 17 and third period of the periodic table.

(i) Write electronic configuration of the element. What is its valency?

(ii) Predict its nature, whether it is a metal or a non-metal.

(iii) Give the formula of the compound formed when it combines with an element Y having valency three.

OR

From the part of a periodic table, answer the following questions:

1	2	13	14	15	16	17
Lithium			Carbon		Oxygen	Fluorine
X			P			Q
Y						R
Z						T

(i) Which element is the most non-metallic?

(ii) Name the family of fluorine, Q,R,T.

(iii) Name one element each of group 2 and 15.

17. Write the number of periods and groups in the Modern Periodic Table. How does the metallic character of elements vary on moving (i) from left to right in a period, and (ii) down a group? Give reason to justify your answer.

18. State two reasons of launching the "Ganga Action Plan". Which bacteria was found in Ganga water indicating contamination?

OR

Why is sustainable management of natural resources necessary? Out of the two-reuse and recycle-which, in your opinion, is better to practise? Give reason.

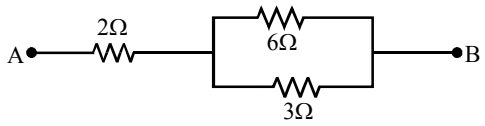
19. What are the main requirements for photosynthesis ? From where do the plants obtain them ?

20. (a) Complete the following table :

	Name of the hormone	**Gland which secretes the hormone**	**Function of the hormone**
(i)	Thyroxine	Thyroid	_____
(ii)	Growth Hormone	_____	Regulates growth and development of the body
(iii)	Insulin	Pancreas	_____

(b) List three characteristics of animal hormones.

21. What does HIV stands for? Is AIDS an infectious disease? List any four modes of spreading AIDS.

22. 

Find the effective resistance between the points A and B in the network shown in the figure.

23. Derive an expression for electric energy consumed in a device in terms of V, I and t, where V is the potential difference applied to it, I is the current drawn by it and t is time for which the current flows.

24. A student holding a mirror in his hand, directed the reflecting surface of the mirror towards the Sun. He then directed the reflected light on to a sheet of paper held close to the mirror.

(a) What should he do to burn the paper?

(b) Which type of mirror does he have?

(c) Will he able to determine the approximate value of focal length of this mirror from this activity? Give reason and draw ray diagram to justify your answer in this case.

OR

A 10 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 12 cm. The distance of the object from the lens is 18 cm. Find the nature, position and size of the image formed.

SECTION-C

25. (a) State the physical nature of ionic compounds. (Any four)

(b) List any two examples of metals found in native state.

(c) Metals high up in the reactivity series cannot be obtained from their compounds by heating with carbon. Why?

(d) Name an alloy of lead which is used for welding electrical wires together and state its constituents elements.

OR

(a) Distinguish between 'roasting' and ' calcination'. Which of these two is used for sulphide ores and why?

(b) Write a chemical equation to illustrate the use of aluminium for joining cracked railway lines.

(c) Name the anode, the cathode and the electrolyte used in the electrolytic refining of impure copper.

26. (i) Write the chemical name and formula of each of the following.

(a) Baking soda (b) Washing soda

(ii) Why baking powder is used instead of baking soda while preparing bread or cake?

(iii) Mention one use each of baking soda (except in baking) and washing soda (except in washing/ cleaning).

27. (a) Draw a flow chart showing the three different pathways involved in the breakdown of glucose in different organisms.

(b) How does gaseous exchange takes place in aquatic plants?

(c) State the function of rings of cartilage present in trachea.

OR

(a) Draw a schematic representation of transport and exchange of oxygen and carbon dioxide during transportation of blood in human being and label on it :
lung capillaries, pulmonary artery to lungs, aorta to body, pulmonary veins from lungs.

(b) What is the advantage of separate channels in mammals and birds for oxygenated and deoxygenated blood?

28. (a) What is the role of seminal vesicles and the prostate gland ?

(b) What are the three categories of contraception methods ? Write briefly about each.

29. (a) With the help of a suitable circuit diagram prove that the reciprocal of the equivalent resistance of a group of resistances joined in parallel is equal to the sum of the reciprocals of the individual resistances.

(b) In an electric circuit two resistors of 12 Ω each are joined in parallel to a 6 V battery. Find the current drawn from the battery.

OR

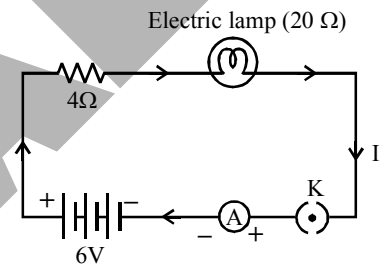
An electric lamp of resistance 20 Ω and a resistor of resistance 4 Ω are connected to a 6V battery as shown in the circuit. Calculate :

(a) the total resistance of the circuit.

(b) the current through the circuit.

(c) the potential difference across the (i) electric lamp and (ii) resistor, and

(d) power of the lamp



30. (i) Define focal length of a spherical lens.

(ii) A divergent lens has a focal length of 30 cm. At what distance should an object of height 5 cm from the optical centre of the lens be placed so that its image is formed 15 cm away from the lens? Find the size of the image also.

(iii) Draw a ray diagram to show the formation of image in the above situation.

OR

(a) Draw a ray diagram to explain the term angle of deviation in phenomena of refraction.

(b) Why do the component colour of incident white light split into a spectrum while passing through a glass prism? Explain.

(c) Draw a labelled ray diagram to show the formation of a rainbow.