# Sample Paper 20

## Class X 2026-27

## Science (086)

**Time: 3 Hours** **Max. Marks: 80**

**General Instructions:**

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some-questions. A student is expected to attempt only one of these questions.

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# SECTION-A

**1.** The chemical digestion of food begins in the mouth. Which enzyme, present in saliva, is responsible for the initial breakdown of starch into simpler sugars?

(a) Pepsin
(b) Lipase
(c) Amylase
(d) Trypsin

**2.** How is a nerve impulse transmitted from one neuron to the next across a synapse?

(a) By the flow of hormones.
(b) By the movement of blood cells.
(c) By the direct transfer of electric charge.
(d) By the release of chemical substances called neurotransmitters.

**3.** After fertilization, the zygote begins to divide and develops into an embryo. What is the process called when this embryo attaches itself to the inner wall of the uterus?

(a) Ovulation
(b) Implantation
(c) Gestation
(d) Menstruation

**4.** In genetics, a trait that is only expressed in the phenotype when an individual has two identical alleles for that particular gene is known as a:

(a) Dominant trait
(b) Recessive trait
(c) Co-dominant trait
(d) Heterozygous trait

**5.** In a grassland food chain, which group of organisms represents the primary consumers?

(a) Carnivores, like lions.
(b) Decomposers, like bacteria.
(c) Producers, like grass.
(d) Herbivores, like deer.

**6.** Consider the following statements regarding the evidence for evolution:

(i) Fossils provide a record of past life forms and show how species have changed over time.
(ii) Homologous organs have a similar basic structure but different functions, suggesting a common ancestor.
(iii) Analogous organs have different structures but perform similar functions, suggesting convergent evolution.

(iv) The embryos of all vertebrates are identical throughout their entire development.
Which of the above statements are correct?
(a) (i) and (iv) only
(b) (i), (ii), and (iii)
(c) (ii) and (iv) only
(d) All are correct.

**7.** What is the primary function of the protein haemoglobin, which gives red blood cells their characteristic colour?

(a) To defend the body against pathogens.
(b) To initiate the blood clotting process.
(c) To transport oxygen from the lungs to the body's tissues.
(d) To carry digestive enzymes in the blood.

**8.** **Assertion (A) :** Reflex arcs allow for extremely rapid responses to stimuli.

**Reason (R) :** The nerve pathway in a reflex arc bypasses the brain and is processed directly in the spinal cord.
(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.

**9.** **Assertion (A) :** Organisms at the highest trophic level often have the highest concentration of non-biodegradable toxins in their bodies.

**Reason (R) :** Harmful chemicals accumulate at each successive trophic level in a food chain.
(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.

**10.** What is the primary function of blood platelets? What would be a major consequence if a person has a significantly low platelet count?

**11.** Student to attempt either option A or B.

A. What is 'double circulation'? Name the two circulations that comprise it.

**OR**

B. Explain the process of nutrition in Amoeba with the help of simple diagrams showing each step.

**12.** In the following food chain, 100,000 J of energy was available to the plants from the sun. How much energy would be available to the lion?

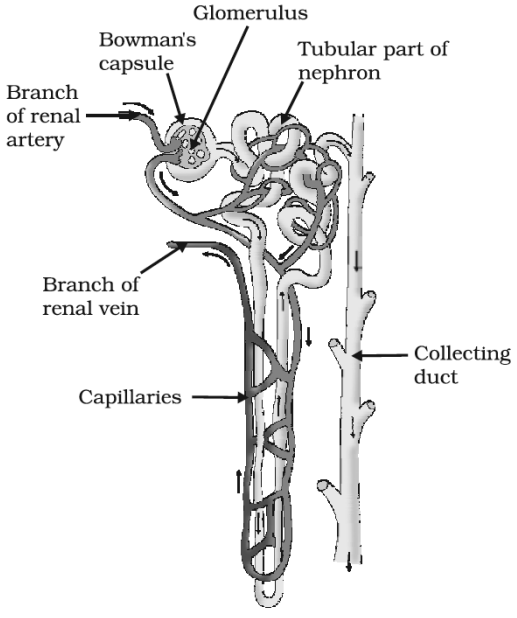
Plants → Deer → Lion

Which law governs the flow of energy in this food chain?

**13.** What is a reflex arc? Draw a neat flowchart to show the sequence of events that occur when you accidentally touch a hot object.

**14.** Differentiate between acquired traits and inherited traits by providing two points of distinction and one example for each.

**15.** A doctor is examining a report on a patient's kidney function. Refer to the structure of a nephron to the following.




A. What is the primary purpose of forming urine in the human body?

**OR**

B. Describe the process of 'selective reabsorption'. Where does it primarily occur?

C. A person meets with an accident, and both kidneys are severely damaged. Name the procedure that can be used as a life-support system.

**16.** Attempt either option A or B

A. (i) What is layering? Name a plant that is commonly propagated by this method.
(ii) How is this technique performed?
(iii) State two advantages of vegetative propagation methods like layering and cutting.

**OR**

B. (i) What is ovulation?
(ii) Describe the journey of a sperm from the point of ejaculation to the site of fertilization in the human female.
(iii) What is the function of the placenta during the development of a fetus?

# SECTION-B

**17.** Which of the following processes is an example of an exothermic reaction?

(a) Dissolving ammonium chloride in water
(b) Burning of natural gas
(c) Melting of ice
(d) Decomposition of silver chloride in sunlight

**18.** Litmus solution is a purple dye that is commonly used as an acid-base indicator. It is extracted from which of the following?

(a) A fungus
(b) A bacterium
(c) A lichen
(d) An alga

**19.** An element 'X' reacts with oxygen to form an oxide $X_2O$. A solution of this oxide turns red litmus blue. The element 'X' is likely to be:

(a) Carbon
(b) Sulphur
(c) Potassium
(d) Silicon

**20.** How many single covalent bonds are present in a molecule of ethane ($C_2H_6$)?

(a) 6
(b) 8
(c) 7
(d) 5

**21.** The painful, stinging sensation from a nettle plant's leaf is caused by the injection of which chemical into the skin?

(a) Acetic acid
(b) Formic acid (Methanoic acid)
(c) Citric acid
(d) Tartaric acid

**22.** Stainless steel is a widely used alloy prized for its strength and resistance to rust. To make stainless steel, iron is mixed with:

(a) Copper and Zinc
(b) Nickel and Chromium
(c) Tin and Lead
(d) Aluminium and Magnesium

**23.** The spoilage of food due to the oxidation of fats and oils is called rancidity. This can be prevented by:

(a) Storing food at a higher temperature.
(b) Exposing food to direct sunlight.
(c) Adding antioxidants.
(d) Using containers made of iron.

**24.** **Assertion (A) :** Aluminium, despite being a highly reactive metal, is resistant to corrosion.

**Reason (R) :** Aluminium reacts with oxygen in the air to form a thin, tough, and non-porous protective layer of aluminium oxide on its surface.

(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.

**25.** Translate the following statement into a balanced chemical equation: "Hydrogen sulphide gas burns in air to give water and sulphur dioxide."

**26.** Attempt either option A or B.

(A) (i) What is a micelle?
(ii) Explain why micelles form when soap is dissolved in water.
(iii) Draw a neat diagram of a micelle.

**OR**

(B) What is the difference between hard water and soft water? Explain the cleansing action of soap.

**27.** A metal 'X' is found in nature as its sulphide ore, XS. This metal is used in the galvanising process to protect iron from rusting.

(a) Identify the metal 'X'.
(b) Describe how the metal is extracted from its sulphide ore. Write the relevant chemical equations.

**28.** A student tests four different solutions P, Q, R, and S and finds their pH values to be 1, 6, 8, and 13, respectively.

(a) Which solution is the most acidic, and which is the most basic?
(b) Arrange the four solutions in increasing order of their hydrogen ion ($H^+$) concentration.
(c) What colour would you expect a universal indicator to show for solution R and solution P?

**OR**

(c) What would be the effect on the pH if a few drops of solution P were added to solution S? Name the type of reaction that would occur.

**29.** Attempt either option A or B.

(A) (a) Define the functional group present in butanoic acid and draw its structure.
(b) What is observed when ethanoic acid reacts with solid sodium carbonate? Write the balanced chemical equation for the reaction.
(c) What is vinegar?

**OR**

(B) (a) Write the IUPAC name and draw the structure of the third member of the alkyne homologous series.
(b) State the main reason why carbon and its compounds are used as fuels for most applications.
(c) What are substitution reactions? Give a balanced chemical equation for an example.

# SECTION-C

**30.** A student is studying the sign conventions for spherical lenses and makes the following statements:

I. The object distance (u) is always negative.
II. The focal length of a convex lens is positive.
III. The focal length of a concave lens is negative.

Choose from the following the correct option that lists the correct statements.

(a) I and II
(b) I and III
(c) I, II and III
(d) II and III

**31.** What is the condition for a light ray to undergo total internal reflection?

(a) The ray must travel from a rarer to a denser medium.
(b) The angle of incidence must be less than the critical angle.
(c) The angle of incidence must be greater than the critical angle.
(d) The angle of incidence must be equal to the critical angle.

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**32.** **Assertion (A) :** The magnification of a plane mirror is always +1.

**Reason (R) :** The image formed by a plane mirror is always virtual, erect, and the same size as the object.

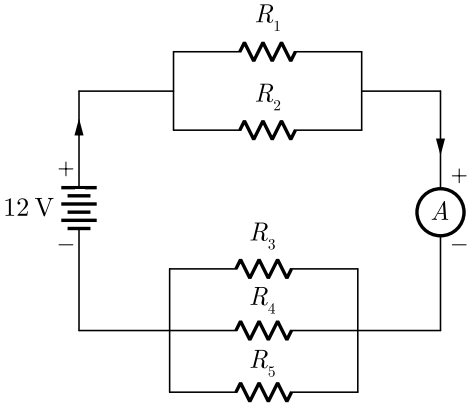
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

**33.** A concave mirror produces a magnified real image three times the size of the object at 10 cm in front.

A. Where is the image formed?
B. State the mirror formula used.
C. What is the nature of the image?

**34.** Attempt either option A or B

A If in figure A, $R_1 = 10\,\Omega$, $R_2 = 40\,\Omega$, $R_3 = 30\,\Omega$, $R_4 = 20\,\Omega$, $R_5 = 60\,\Omega$ and a 12 V battery are connected to the arrangement, calculate :




(a) Total resistance in the circuit and
(b) Total current flowing in the circuit.

**OR**

B. A torch bulb is rated 5.0 V and 500 mA. Calculate
(i) its power,
(ii) resistance when it is lighted for four hours.

**35.** What are the causes of the following defects of vision and how can they be corrected ?

(a) Cataract
(b) Presbyopia.

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**36.** An electric iron consumes energy at a rate of 840 W when heating is at the maximum rate and 360 W when the heating is at the minimum. The voltage is 220 V. What are the current and the resistance in each case ?

**37.** Answer the following questions :

(i) What is the direction of magnetic field lines outside a bar-magnet ?

(ii) The magnetic field lines in a given region are getting crowded. What does it indicate ?

(iii) State one advantage of AC over DC.

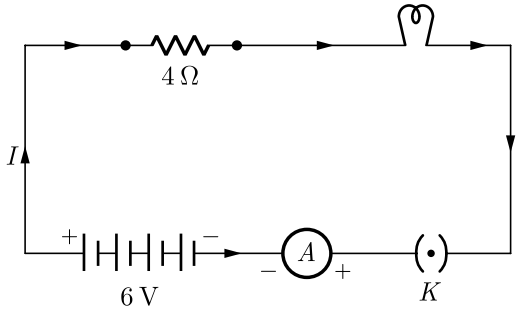
**38.** Harish is a student of class X. He is very passionate about doing science experiment. Recently, he visited Delhi with his parents to witness science fair. He purchased different types of lenses, mirrors and other articles. One day, during games period, a student of same class fell down and lips started bleeding. On observation, it was found by Physical Education teacher that very fine pieces of glass, difficult to observe, stranded over there. Harish immediately rushed to Physics Lab and bought a lens. The bigger image of stranded glass pieces eased the first aid job.

(i) Name the lens and mirror bought by Harish.

(ii) Draw the ray diagram showing formation of very big image of object by lens. What should be the position of object to get such image ?

**39.** Attempt either option A or B.

A. An electric lamp of resistance $20\,\Omega$ and a conductor of resistance $4\,\Omega$ are connected to a 6 V battery as shown in the circuit. Calculate :




(i) the total resistance of the circuit,

(ii) the current through the circuit,

(iii) the potential difference across the (a) electric lamp and (b) conductor, and

(iv) power of the lamp.

**OR**

B. (i) Two resistors with resistances $10\,\Omega$ and $15\,\Omega$ are to be connected to emf 12 V so as to obtain :

(a) minimum current

(b) maximum current.

How will you connect the resistance in each case ? Calculate the strength of the total current in the circuit in the two cases.

(ii) What do you mean by resistivity ?

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