

CLASS X (2020-21)
SCIENCE (CODE 086)
SAMPLE PAPER-9

Time : 3 Hours

Maximum Marks : 80

General Instructions :

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
 - (ii) Section–A – question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
 - (iii) Section–B – question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
 - (iv) Section–C – question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.
 - (v) Section–D – question no. 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
 - (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
 - (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.
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SECTION-A

Q1. Give an example of a redox reaction. [1]

OR

What type of reaction is represented by the digestion of food in our body?

Q2. Write the name given to bases that are highly soluble in water. Give an example. [1]

Q3. What is meant by homologous series of carbon compounds? [1]

Q4. In which form
(i) oxygen is carried to the tissues?
(ii) CO₂ moves out of the blood? [1]

Q5. Name two organisms in which food material is broken down outside the body and absorbed. [1]

OR

Name the various cells through which water moves upward to reach the leaves.

Q6. What prevents backflow of blood inside the heart during contraction? [1]

Q7. Why is convex mirror used as a rear view mirror in vehicles? State any one reason. [1]

OR

A small electric lamp is placed at the focus of a convex lens. What is the nature of beam of light produced by the lens?

- Q8. Which property of concave mirror is utilised for using them as shaving mirrors? [1]
- Q9. How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light? [1]
- Q10. Why is resistance less when resistors are joined in parallel? [1]

OR

Define resistance. Give its SI unit.

- Q11. How is the strength of the magnetic field at a point near a wire related to the strength of the electric current flowing in the wire? [1]
- Q12. Name the alloy which is mainly used for making permanent magnets. [1]
- Q13. What is a biodegradable substance? [1]

OR

What is the function of ozone in the upper atmosphere?

For question numbers 14, 15 and 16, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :

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

- Q14. **Assertion :** In a reaction of copper with oxygen, copper serves as a reducing agent.
Reason : The substance which gains oxygen in a chemical reaction acts as a reducing agent. [1]
- Q15. **Assertion :** Mendel selected the pea plant for his experiments.
Reason : Pea plant is cross-pollinating and has unisexual flowers. [1]
- Q16. **Assertion :** Supersonic jets cause thinning of ozone layer.
Reason : Depletion of ozone layer causes greenhouse effect. [1]

OR

Assertion : Biotic components of ecosystem continuously require energy to carry on life processes.
Reason : Abiotic components are the non-living factors of the ecosystem.

- Q17. **Read the following and answer any four questions from 17.1 to 17.5.** 1 × 4
In 1817, Dobereiner showed that when the three elements in a triad were written in the order of increasing atomic masses; the atomic mass of the middle element was roughly the average of the atomic masses of the other two elements. But this classification into triads was not found to be useful.
In 1866, Newlands arranged the then known elements in the order of increasing atomic masses and proposed a law known as 'Newlands' Law of Octaves'. It states that "when elements are arranged in order of increasing atomic masses, then every eighth element has properties similar to that of the first". In order to fit elements into his table, he adjusted two elements in the same slot, but also put some unlike elements under the same note. Then Mendeleev, a Russian chemist was the most important contributor to the early development of a Periodic Table of elements in which the elements were arranged on the basis of atomic mass and also on the similarity of chemical properties.

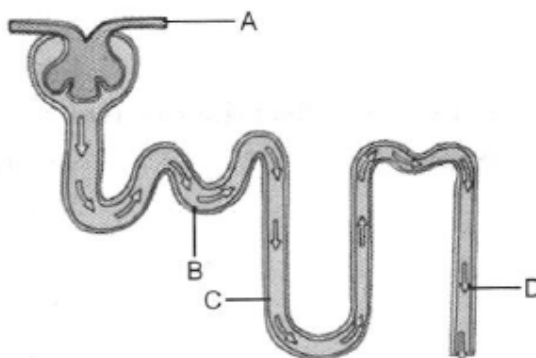
- 17.1** The three triads identified by Dobereiner are
 (a) N, P, As; He, Ne, Ar; Ca, Sr, Ba
 (b) Li, Na, K; N, P, As; Cl, Br, I
 (c) N, P, As; Ca, Sr, Ba; Cl, Br, I
 (d) Be, Mg, Ca; N, P, As; Cl, Br, I
- 17.2** Which of the following statements is incorrect about the table proposed by Newlands?
 (a) It was applicable only upto calcium.
 (b) It worked well with heavier elements only.
 (c) It became irrelevant for noble gases.
 (d) It was not applicable for only 56 elements existed at that time .
- 17.3** The two pairs of elements placed in one slot by Newlands are
 (a) Co, Ni and Ce, La (b) Be, Mg and Co, Ni
 (c) F, Cl and Ce, La (d) Zn, Sr and Be, Mg
- 17.4** The drawbacks of Mendeleev's Periodic Table were removed when the elements are arranged in the order of
 (a) decreasing atomic masses (b) increasing atomic masses
 (c) decreasing atomic number (d) increasing atomic number
- 17.5** Who introduced the terms 'Groups' and 'Periods' in the Periodic Table first?
 (a) Dobereiner (b) Newlands
 (c) Mendeleev (d) Henry

Q18. Read the following and answer any four questions from 18.1 to 18.5. 1 × 4

Nitrogenous materials formed due to metabolic activities are need to be removed. The biological process involved in the removal of these harmful metabolic wastes from the body is called excretion. Different organisms use varied strategies to do this. Many unicellular organisms remove these wastes by simple diffusion from the body surface into the surrounding water while complex multi-cellular organisms use specialised organs to perform the same function.

- 18.1** The excretory system of human beings include
 (a) a pair of kidneys, a pair of ureters, a urinary bladder and a urethra
 (b) a pair of kidneys, a pair of urinary bladders, a ureter, and a urethra
 (c) a pair of kidneys, a pair of ureters, a pair of urinary bladders and a urethra
 (d) a kidney, a ureter, a urinary bladder and a urethra

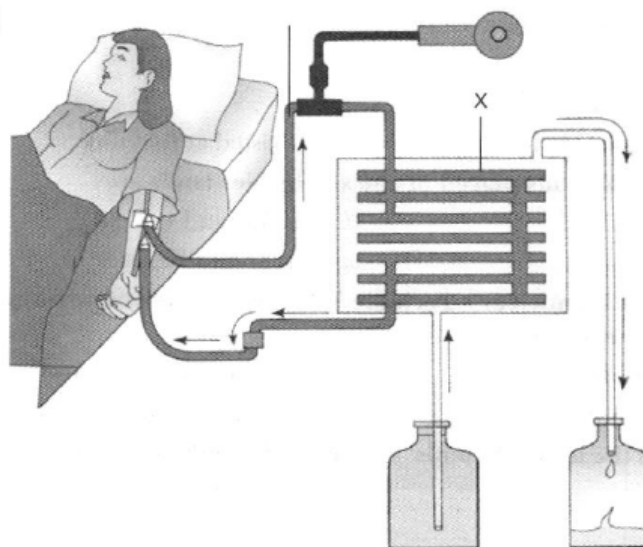
18.2 The given figure represents the structure of a nephron.



Which section of the nephron is responsible for concentrating the solute in the filtrate?

- (a) A (b) B
 (c) C (d) D

18.3



Study the picture given above and choose the correct combination of plots provided in the following table.

	X	Process used	Function
(a)	Dialyser	Diffusion	To remove the excess wastes and fluid from the blood
(b)	Blood thinner	Clotting	To remove the clots from the blood
(c)	Dialysate	Osmosis	To add fluid to the blood
(d)	Dialysing pump	Filtration	To draw blood from the body and send it to dialyser

18.4 Which of the following statement(s) is (are) true about excretion in human beings?

- I. Kidneys are the primary excretory organs.
- II. The bladder is muscular, so it is under nervous control.
- III. Each kidney has large numbers of filtration units called nephrons.
- IV. Urine is stored in the urethra until the urge of passing it out.

- (a) I and II only
- (b) I and III only
- (c) I, II and III only
- (d) I and IV only

18.5 Study the table below and select the row that has the incorrect information.

	Excretory organ	Substances excreted
(a)	Kidneys	Nitrogenous wastes
(b)	Lungs	Urea
(c)	Skin	Sweat
(d)	Oil glands	Sebum

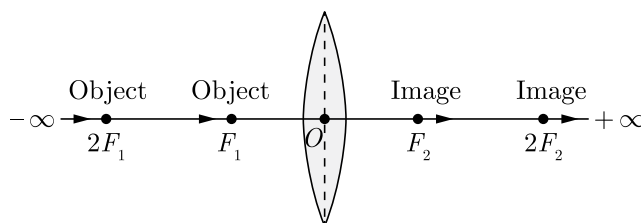
Q19. Read the following and answer any four questions from 19.1 to 19.5.

1 × 4

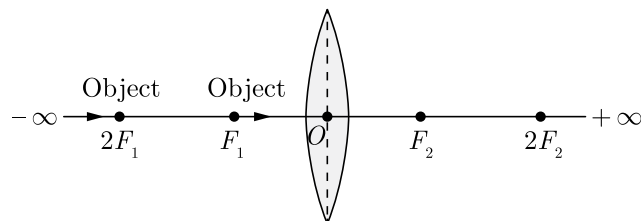
The image formed by a convex lens depends on the position of the object in front of the lens. When the object is placed anywhere between focus and infinity, the image formed by convex lens is real and inverted. The image is not obtained on the screen when the object is placed between focus and the lens.

The distance between the optical centre O of the convex lens and the focus point F_1 or F_2 is its focal length.

When the object shifts from $-\infty$ to F_1 , the image moves from F_2 to $+\infty$.



When the object shifts from F_1 to O , the image moves from $-\infty$ to O .



A student did an experiment with a convex lens. He put an object at different distances from the lens. In each case he measured the distance of the image from the lens. The results were recorded in the following table.

Object distance (in cm)	25	30	40	60	120
Image distance (in cm)	100	24	60	30	40

Unfortunately his results are written in the wrong order.

19.1 The focal length of this lens is

- (a) 20 cm
- (b) 25 cm
- (c) 30 cm
- (d) 35 cm

19.2 The image distances in the correct order (in cm) is

- (a) 24, 30, 40, 60, 100
- (b) 100, 24, 60, 40, 30
- (c) 100, 60, 30, 40, 24
- (d) 100, 60, 40, 30, 24

19.3 Which of this object distances gives the biggest image?

- (a) 30 cm
- (b) 25 cm
- (c) 40 cm
- (d) 60 cm

19.4 The minimum distance between an object and its real image formed by a convex lens is

- (a) $2f$
- (b) $3f$
- (c) $4f$
- (d) zero

19.5 A virtual image is formed by convex lens when object is placed

- (a) at infinity
- (b) between C and F
- (c) at F
- (d) between F and O

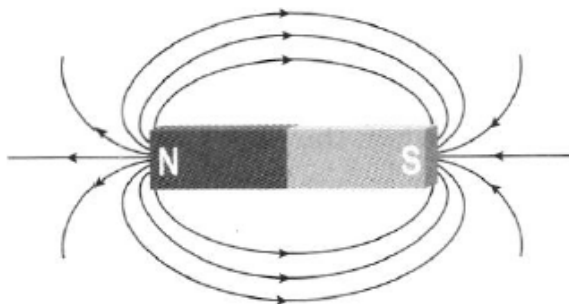
Q20. Read the following and answer any four questions from 20.1 to 20.5.

1×4

When magnet is brought into the field of another magnet, the field interacts with each pole of the magnet and each of these poles experience magnetic force.

The space surrounding a magnet where a magnetic force is experienced is called magnetic field.

A magnetic field line is a continuous curve in a magnetic field such that the tangent at any point on it gives the direction of magnetic field at that point.



- 20.1** Magnetic field is produced by the flow of current in a straight wire. The phenomenon was discovered by
- (a) Faraday (b) Fleming
(c) Oersted (d) Maxwell
- 20.2** At the centre of bar magnet, the magnetism is
- (a) same as the pole (b) zero
(c) maximum (d) minimum
- 20.3** Magnetic field lines can be used to determine
- (a) only the direction of magnetic field
(b) only the relative strength of the magnetic field
(c) both the direction and relative strength of the magnetic field
(d) the shape of the magnetic field
- 20.4** A bar magnet has strongest magnetism
- (a) inside of the magnet
(b) at the centre of the magnet
(c) near the poles of the magnet
(d) at one quarter distance from the poles of the magnet
- 20.5** SI unit of magnetic field is
- (a) webre (b) tesla
(c) newton (d) henry

SECTION-B

- Q21. Why are food cans tin-plated instead of zinc plated though zinc is cheaper than tin? [2]
- Q22. What is a covalent bond? What type of bond exists in
- (i) CCl_4
(ii) CaCl_2 ? [2]

OR

Carbon, Group (14) element in the Periodic Table, is known to form compounds with many elements.

Write an example of a compound formed with

- (i) Chlorine (Group 17 of Periodic Table)
(ii) Oxygen (Group 16 of Periodic Table)

- Q23. What is the role of saliva in the digestion of food? [2]
- Q24. "All plants give out oxygen during day and carbon dioxide during night". Do you agree with this statement? Give reason. [2]

OR

What is translocation? Why is it essential for plants?

- Q25. Is the position of a star as seen by us is its true position? Justify your answer. [2]
- Q26. Two lamps, one rated 100 W; 220 V, and the other 60 W; 220 V, are connected in parallel to electric mains supply. Find the current drawn by two bulbs from the line, if the supply voltage is 220 V. [2]

SECTION-C

- Q27. 2 g of ferrous sulphate crystals are heated in a dry boiling tube.
(i) List any two observations.
(ii) Name the type of chemical reaction taking place.
(iii) Write balanced chemical equation for the reaction and name the products formed. [3]
- Q28. (i) Write the electron dot structures of sodium, oxygen and magnesium.
(ii) Show the formation of Na_2O and MgO by the transfer of electrons.
(iii) What are the ions present in these compounds? [3]
- Q29. Two elements X and Y have atomic numbers 12 and 16 respectively. To which period of the Modern Periodic Table do these two elements belong? What type of bond will be formed between them and why? Also give the chemical formula of the compound formed. [3]
- Q30. Write three types of blood vessels. Give one important feature of each. [3]
- Q31. Give the pair of contrasting traits of the following characters in pea plant and mention which is dominant and recessive.
(i) yellow seed
(ii) round seed [3]

OR

What is DNA copying? State its importance.

- Q32. It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm.
(i) What should be the range of the object distance in the above case?
(ii) Will the image be smaller or larger than the object? Draw a ray diagram to show the formation of image in this case.
(iii) Where will the image of this object be, if it is placed 24 cm in front of the mirror? [3]
- Q33. Calculate the amount of energy available to tiger in the following food chain if plants have 30,000 J of energy available from the Sun:
Plant \longrightarrow Deer \longrightarrow Tiger [3]

SECTION-D

- Q34. (i) Why does an aqueous solution of an acid conduct electricity?
(ii) How does the concentration of hydronium ions (H_3O^+) change when a solution of an acid is diluted?
(iii) Which has higher pH value, a concentrated or dilute solution of hydrochloric acid?
(iv) What do you observe on adding dilute hydrochloric acid to
(a) sodium carbonate placed in test tube,
(b) zinc metal in a test tube? [5]

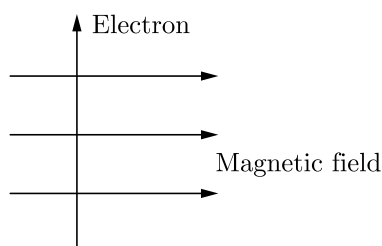
OR

A sulphate salt of Group 2 element of the Periodic Table is a white, soft substance, which can be moulded into different shapes by making its dough. When this compound is left in open for some time, it becomes a solid mass and cannot be used for moulding purposes. Identify the sulphate salt and state why does it show such a behaviour. Give the reaction involved.

- Q35. (i) Draw the diagram of female reproductive system and mark the part(s):
 (a) where block is created surgically to prevent fertilization
 (b) where CuT is inserted
 (c) inside which condom can be placed
 (ii) Why do more and more people prefer to use condoms? What is the principle behind the use of condoms? [5]
- Q36. (i) Consider a conductor of resistance ' R ', length ' L ', thickness ' d ' and resistivity ' ρ '. Now this conductor is cut into four equal parts. What will be the new resistivity of each of these parts? Why?
 (ii) Find the resistance if all of these parts are connected in
 (a) parallel
 (b) series
 (iii) Out of the combinations of resistors mentioned above in the previous part, for a given voltage which combination will consume more power and why? [5]

OR

- (i) Explain an activity to show that a current-carrying conductor experiences a force when placed in a magnetic field. How do you think the displacement of rod AB will be affected if (a) current in rod AB is increased; (b) a stronger horse-shoe magnet is used; and (c) length of the rod AB is increased?
 (ii) State the rule which gives the direction of force acting on the conductor.
 (iii) An electron moves perpendicular to a magnetic field as shown in the figure. What would be the direction of force experienced by the electron? Electron



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