

CLASS X (2020-21)
SCIENCE (CODE 086)
SAMPLE PAPER-5

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. An element M is in group 13 of the periodic table. What is the formula of its oxide? [1]

OR

The atomic numbers of three elements X , Y and Z are given below:

Elements	Atomic Numbers
X	3
Y	9
Z	11

State giving reason which two elements will show similar chemical properties?

- Q2. Which element exhibits the property of catenation to maximum extent and why? [1]
- Q3. Identify 'x' in the following reaction: [1]
- $$2\text{AgCl}(\text{s}) \xrightarrow{x} 2\text{Ag}(\text{s}) + \text{Cl}_2(\text{g})$$
- Q4. Define the term dispersion of white light. [1]
- Q5. Which phenomenon is responsible for increasing the apparent length of the day by 4 minutes? [1]
- Q6. A girl was playing with a thin beam of light from her laser torch by directing it from different directions on a convex lens held vertically. She was surprised to see that in a particular direction the beam of light continues to move along the same direction after passing through the lens. State

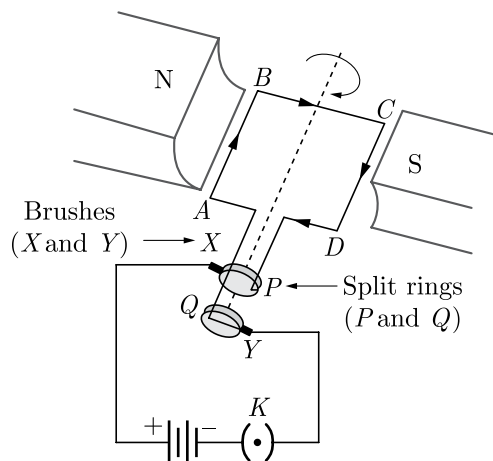
the reason for the observation.

[1]

OR

What is the nature and radius of curvature of the mirror having focal length -15 cm ?

- Q7. In the device shown in figure, there is a rectangular coil $ABCD$ of insulated copper wire. The ends of the coil are connected to the two halves of a split ring. [1]



What is the role of split ring in the given device?

- Q8. Draw the magnetic field lines around a bar magnet. [1]
- Q9. What happens to resistance of a conductor when its area of cross-section is increased? [1]

OR

Heating element of electrical heating devices is made up of an alloy rather than a pure metal. Give two reasons.

- Q10. Which enzyme present in saliva breaks down starch? [1]
- Q11. Name the tissue which transports soluble products of photosynthesis in a plant. [1]

OR

What will happen to a plant if its xylem is removed?

- Q12. Which class of chemicals is linked to the decrease in the amount of ozone in the upper atmosphere of the earth? [1]

OR

The first trophic level in a food chain is always a green plant. Why?

- Q13. Write the full form of DNA. [1]

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 :** Covalent compounds have generally low melting and boiling points. [1]
Reason : Covalent compounds are soluble in water.
- Q15. **Assertion :** The enzymes released by micro-organisms help in breaking down biodegradable wastes. [1]
Reason : Biodegradable wastes are generally inorganic wastes.
- Q16. **Assertion :** The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. [1]
Reason : Placenta transfers glucose and oxygen from the mother to the embryo.

OR

Assertion : Fertilisation cannot take place in flowers if pollination does not occur.
Reason : Fertilisation requires both male and female gametes in a flower.

- Q17. **Read the following and answer any four question 17.1 to 17.5.** 1 × 4
 Sexually Transmitted Diseases (STDs) or Sexually Transmitted Infections (STIs) are caused by bacteria, viruses or parasites that are transmitted through unprotected sex and skin to skin genital contact. Bacterial infections include gonorrhoea, syphilis and Lymphogranuloma Venerum (LGV) whereas viral infections include warts, genital herpes and HIV-AIDS. STIs are an important public health problem in India. ICMR estimates the occurrence of about 30-35 million new infections in the country every year, almost half of them among adolescents and young people. Birth control methods such as oral contraceptives or IUDs do not prevent STD transmission, however, correct and consistent use of male condom is highly effective in reducing STD transmission.

17.1 Which of the following is not a sexually transmitted disease?

- (a) gonorrhoea (b) hepatitis
 (c) syphilis (d) AIDS

17.2 The sexually transmitted disease which is caused by bacteria is:

- (a) diarrhoea (b) AIDS
 (c) gonorrhoea (d) genital herpes

17.3 Which of the following method of contraception protects a person from acquiring a STD?

- (a) oral pills (b) copper-T
 (c) surgery (d) condom

17.4 Study the table below and select the row that has the incorrect Information.

	Disease	Cause
(a)	LGV	Bacteria
(b)	Genital Herpes	Virus
(c)	Syphilis	Virus
(d)	Gonorrhoea	Bacteria

17.5 STIs are most common in which age group?

- (a) people 60 and older
 (b) people aged 40 to 50
 (c) adolescents and young people upto age 25.
 (d) none of these

- Q18. **Read the following and answer any four questions from 18.1 to 18.5.** 1 × 4
 In the year 1817, a German chemist, arranged certain elements with similar properties (both physical and chemical) in groups of three. The basis of the arrangement was the atomic masses of

the elements. In a particular group, the elements (e.g., A, B, C) with atomic masses 7, 23 and 39 respectively were arranged in order of increasing atomic masses and the atomic mass of the middle element (B) was almost the mean or the average of the atomic masses of the first and third elements i.e., A and C .

18.1 Which of the following scientist had proposed such a classification of elements?

- (a) Henry Mosely (b) Dmitri Mendeleev
(c) John Newlands (d) Johann Dobereiner

18.2 What could be the elements A, B and C ?

- (a) Calcium, Strontium and Barium (b) Lithium, Sodium and Potassium
(c) Lithium, Sodium and Calcium (d) Nitrogen, Calcium and Iodine

18.3 The three imaginary elements X, Y and Z represent elements according to the given law. If the atomic mass of element X is 14 and that of Y is 46, then the atomic mass of element Z will be:

- (a) 78 (b) 32
(c) 18 (d) 60

18.4 What is the limitation of law discussed in the given paragraph?

- (a) This law could not explain the position of isotopes
(b) This law proved to be true for elements only up to calcium.
(c) This law could define a total of 9 elements only
(d) This law could not define the position of hydrogen

18.5 Out of A, B and C which element(s) catches fire in air?

- (a) A and B (b) B Only
(c) C only (d) B and C

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

1×4

A student of class X wanted to understand the phenomenon of refraction of light through a glass slab. For this, he fix a sheet of white paper on a drawing board using drawing pins and place a rectangular glass slab over the sheet in the middle. Now, he draw the outline of slab with a pencil. Using two pins, such that line joining the pins is inclined to edge of slab he look for images through the opposite edge such that images of pins also lie on a straight line and obtained the following ray diagrams as shown below:

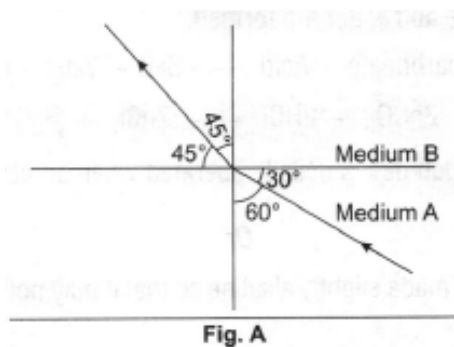
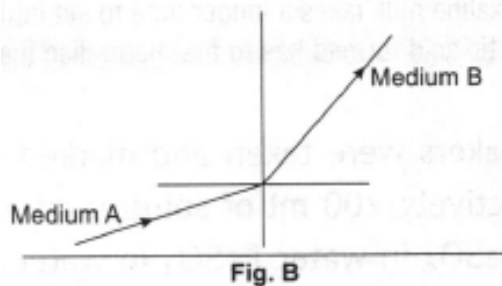


Fig. A



19.1 What is the focal length of a glass slab?

- (a) Zero (b) One
(c) Vary from zero to one (d) Infinite

19.2 In fig. B, the refractive index of medium B relative to A will be:

- (a) greater than unity (b) equal to unity
(c) zero (d) less than unity

19.3 Refer to fig. A, find the refractive index of medium B relative to medium A is:

- (a) $\frac{2}{\sqrt{6}}$ (b) $\frac{\sqrt{2}}{\sqrt{3}}$
(c) $\frac{\sqrt{3}}{\sqrt{2}}$ (d) $\frac{\sqrt{6}}{2}$

19.4 In one case, the student observes that no refraction of light occurs when ray of light passes from medium A to medium B. In this case, the angle made by the ray of light at boundary of medium B is:

- (a) 0° (b) 90°
(c) 45° (d) 60°

19.5 You are given alcohol, mustard oil, glycerine and kerosene. In which of these media a ray of light incident obliquely at same angle would bend the most?

- (a) mustard oil (b) glycerine
(c) kerosene (d) alcohol

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

1 × 4

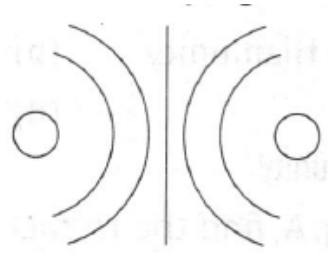
The magnetic field lines around a straight conductor (straight wire) carrying current are concentric circles whose centres lie on the wire. It has been shown by experiments that the magnitude of magnetic field produced by a straight current carrying wire at a given point is: (i) directly proportional to the current passing in the wire, and (ii) inversely proportional to the distance of that point from the wire.

The magnetic field lines are circular near the current carrying circular loop. As we move away, the concentric circles representing magnetic field lines become bigger and bigger and at the centre the magnetic field lines are straight.

20.1 The direction of magnetic field developed around a current-carrying conductor can be easily found by the use of:

- (a) Fleming's left-hand rule (b) Left-hand thumb rule
(c) Right-hand thumb rule (d) Fleming's right hand rule

20.2 The diagram given below represents magnetic field caused by a current-carrying conductor which is:



- (a) a solenoid
(b) a long straight wire
(c) a circular coil
(d) a short straight wire
- 20.3** The strength of magnetic field due to a straight conductor depends on the:
(a) nature of conductor
(b) current passing through the wire
(c) direction of current
(d) all of above
- 20.4** Which of the following correctly describes the magnetic field near a long straight wire?
(a) The field consists of straight Lines perpendicular to the wire
(b) The field consists of straight lines parallel to the wire
(c) The field consists of radial Lines originating from the wire
(d) The field consists of concentric circles centred on the wire
- 20.5** The strength of magnetic field inside a long current carrying straight solenoid is:
(a) same at all points
(b) minimum in the middle
(c) found to increase from one end to the other
(d) more at the ends than at the centre.

SECTION B

- Q21. (i) What is meant by heredity? [2]
(ii) How many types of genes are there? Name them.

OR

Why did Mendel choose garden pea for his experiments?

- Q22. List two distinguishing features between sexual and asexual types of reproduction in tabular form. [2]

- Q23. (i) What happens when an acid reacts with a metal carbonate? Give chemical equation involved.
(ii) Which gas is usually liberated when an acid reacts with a metal. [2]

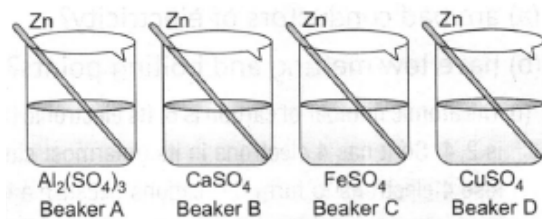
OR

A milkman adds a very small amount of baking soda to fresh milk.

- (i) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?
(ii) Why does this milk take a long time to set as curd?

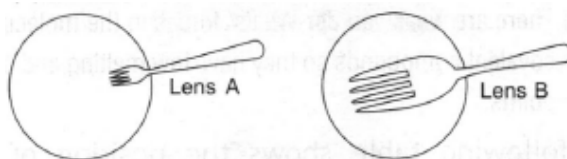
- Q24. Four beakers were taken and marked *A, B, C* and *D* respectively 200 ml of solution of $\text{Al}_2(\text{SO}_4)_3$ in water, CaSO_4 in water, FeSO_4 in water and CuSO_4 in water was filled in the beakers *A, B, C* and *D* respectively. Clean piece of metal zinc was placed in each solution and kept undisturbed for two

hours.



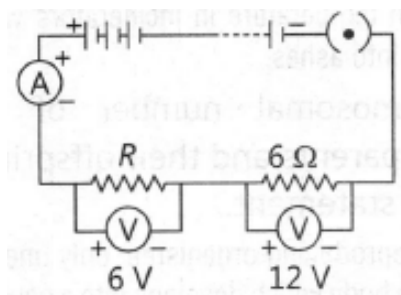
- (a) What colour change would you observe in beaker *D*? [2]
- (b) Arrange the metals Zn, Al, Ca, Fe and Cu in the order of decreasing reactivity. [2]

Q25. A student performs an experiment in the lab to study image formation by different types of lenses. When a fork is seen through lenses *A* and *B* one by one, it appears as shown in the above figures.



- (a) What is the nature of lens *A*? Give reason for your answer. [2]
- (b) What is the nature of lens *B*? Give reason for your answer. [2]

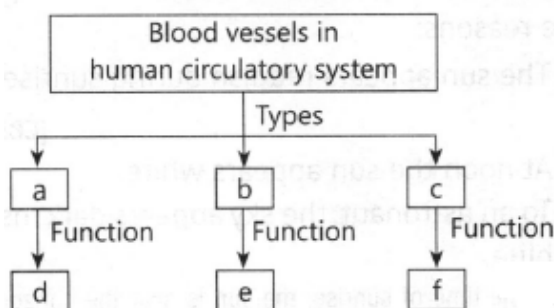
Q26. A circuit is shown in the diagram given below.



- (i) Find the value of *R*. [2]
- (ii) Find the potential difference across to terminals of the battery. [2]

SECTION C

Q27. Complete the following flow chart as per the given [3]



OR

What are the components of the transport system in human beings? What are the functions of these components?

- Q28. State in brief two ways in which non-biodegradable substances would affect the environment. List two methods of safe disposal of the non-biodegradable waste. [3]
- Q29. 'The chromosomal number of the asexually producing parents and their offspring is the same.' Justify this statement. [3]
- Q30. (i) Study the following reaction between lead sulphide and hydrogen peroxide:

$$\text{PbS(s)} + 4\text{H}_2\text{O}_2(\text{aq}) \longrightarrow \text{PbSO}_4(\text{s}) + 4\text{H}_2\text{O(l)}$$
 (a) Which substance is oxidised?
 (b) Which substance is reduced?
 (ii) What happens when lead nitrate is heated? Write the equation involved. [3]
- Q31. State the reason why carbon can neither form C^{4+} cation nor C^{4-} anions, but forms covalent bonds. Also state reasons to explain why covalent compounds:
 (a) are bad conductors of electricity?
 (b) have low melting and boiling points? [3]
- Q32. The following table shows the position of five elements p, q, r, s and t in the modern periodic table: [3]

1							18
p	2	13	14	15	16	17	
		q					r
s						t	

Answer the following:

- (a) Select the letter which represents:
 (i) an alkali metal.
 (ii) a halogen.
 (b) What type of bond is formed between p and t ?
 (c) What type of bond is formed between s and t ?
- Q33. Give reasons:
 (i) The sun appears reddish during sunrise.
 (ii) At noon the sun appears white.
 (iii) To an astronaut, the sky appears dark instead of blue. [3]

SECTION D

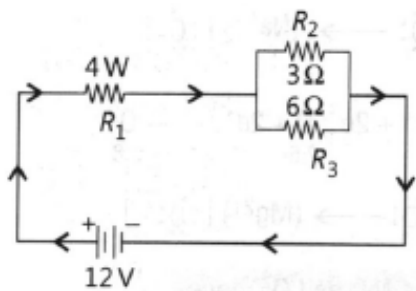
- Q34. (i) Define reactivity series of metals. Arrange the metals lead, calcium, gold and magnesium in order of their increasing reactivity.
 (ii) Why are ionic compounds usually hard?
 (iii) Write chemical equations that shows aluminium oxide reacts with acid as well as base. [5]

OR

- (i) A copper coin is kept immersed in a solution of silver nitrate for sometime. What will happen to the coin and the colour of the solution?
 (ii) Write the equation involved.
 (iii) Show the formation of Na_2O and MgO by transfer of electrons. Name the ions present in these compounds.
- Q35. (i) Give two differences between the two modes of pollination in flowering plants.
 (ii) Explain with the help of labelled diagram the process by which Hydra reproduces asexually.

[5]

- Q36. (i) The circuit diagram given below shows the combination of three resistors R_1 , R_2 and R_3 :
[5]



Find:

- Total resistance of the circuit.
 - Total current flowing in the circuit.
 - The potential difference across R_1 .
- (ii) What is meant by electric power? Write the formula for electric power in terms of potential difference and resistance.

OR

- (i) Electrical resistivities of some substance at 20°C are given below :

Silver	$1.60 \times 10^{-8} \Omega\text{-m}$
Copper	$1.62 \times 10^{-8} \Omega\text{-m}$
Tungsten	$5.2 \times 10^{-8} \Omega\text{-m}$
Iron	$10.0 \times 10^{-8} \Omega\text{-m}$
Mercury	$94.0 \times 10^{-8} \Omega\text{-m}$
Nichrome	$100 \times 10^{-6} \Omega\text{-m}$

Answer the following questions in relation to them:

- Among silver and copper which one is better conductor? Why?
 - Which material would you advise to use in electrical heating device? Why?
- (ii) Justify the following statements:
- Two magnetic field lines never intersect each other.
 - Magnetic field lines are closed curves.

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