

Ambience Public School
Pre-Board Exam: 2023-24
Class-X
Subject-Science
Date- 4/12/23

Max. Marks: 80

Time Allowed: 3 hours

General Instructions:

- i. This question paper consists of 6 pages with **39 questions** divided in **5 sections**.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. **Section A** consists of 20 objective type questions carrying **1 mark** each.
- iv. **Section B** consists of 6 Very Short questions carrying **2 marks** each. Answers to these questions should be in the range of 30 to 50 words.
- v. **Section C** consists of 7 Short Answer type questions carrying **3 marks** each. Answers to these questions should be in the range of 50 to 80 words
- vi. **Section D** consists of 3 Long Answer type questions carrying **5 marks** each. Answers to these questions should be in the range of 80 to 120 words.
- vii. **Section E** consists of 3 case-based units of assessment of **4 marks** each with sub-parts.

SECTION A

Select and write one most appropriate option out of the four options given for each of the questions (1-20)

1. The yellow colour of turmeric changes to red in addition to soap solution. When substance P is added to turmeric, there is no change in colour. Which of the following is definitely true about substance P?
(a) P is an acid. (b) P is not a salt.
(c) P is not a base. (d) P is a neutral substance.
2. Which of the above metals are likely to be obtained in their pure states from the Earth's crust?
(a) gold only (b) sodium only
(c) gold and Silver (d) zinc and sodium
3. In which of the following forms do electrovalent compounds conduct electricity?
(a) only in solid form (b) both in solid form and in aqueous solution
(c) both in aqueous solution and in molten form (d) in solid form, molten form and in aqueous solution

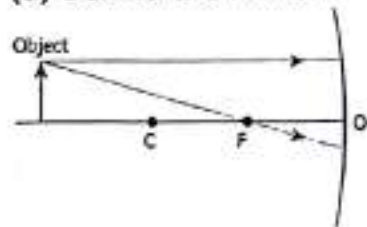
OR

Neetu has two test tubes containing dilute hydrochloric acid and dilute sodium hydroxide solution, but they are not labeled. Adding which of the following solutions to the test tubes will help her visually identify the acidic and basic solution?

- (a) only vinegar (b) only baking soda
(c) only sodium chloride (d) either vinegar or sodium chloride

4. The image shows the path of incident rays to a concave mirror. Where would the reflected rays meet for the image formation to take place?

- (a) Behind the mirror (b) Between F and O (c) Between C and F (d) Beyond C



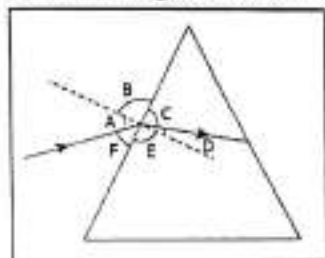
5. A student conducts an experiment using a convex lens. He places the object at a distance of 60 cm front of the lens and observes that the image is formed at a distance of 30 cm behind the lens. What is the power of the lens?

- (a) 0.005 dioptre (b) 0.05 dioptre (c) 5 dioptre (d) 50 dioptre

6. The danger signals installed at the top of tall buildings are red in colour. These can be easily seen from a distance because, among all other colours, the red light

- (a) is scattered the most by smoke or fog (b) is scattered the least by smoke or fog
(c) is absorbed the most by smoke or fog (d) moves fastest in the air

7. The image shows a light ray incident on a glass prism.



$\frac{1}{50}$

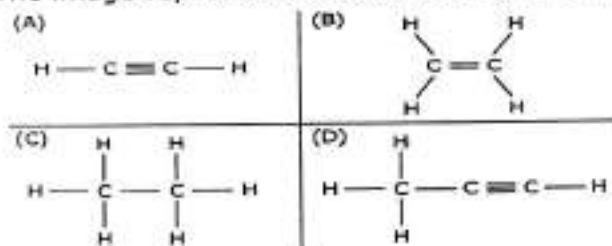
The various angles are labelled in the image. Which angle shows the angle of incidence and angle of refraction, respectively?

- (a) A and D (b) B and E (c) C and F (d) D and F

8. A student very cautiously traces the path of a ray through a glass slab for different values of the angle of incidence (angle i). He then measures the corresponding values of the angle of refraction (angle r) and the angle of emergence (angle e) for every value of the angle of incidence. On analyzing these measurements of angles, his conclusion would be

- (a) angle $i >$ angle $r >$ angle e (b) angle $i =$ angle $e >$ angle r
(c) angle $i <$ angle $r <$ angle e (d) angle $i =$ angle $e <$ angle r

9. The image represents the structure of a few hydrocarbon compounds.



Which of these compounds can be classified as alkynes?

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

10. C_3H_6 belongs to the homologous series of

- (a) Alkynes (b) Alkenes (c) Alkanes (d) Cyclo alkanes

11. Generally food is broken and absorbed within the body of organisms. In which of the following organisms, is it done outside the body?

- (a) Amoeba (b) Mushroom (c) Paramecium (d) Lice

12. A farmer wants to grow banana plants genetically similar enough to the plants already available in his field. Which one of the following methods would you suggest for this purpose?

- (a) Regeneration (b) Budding (c) Vegetative propagation (d) Sexual reproduction

3. Height of a plant is regulated by:
- (a) DNA which is directly influenced by growth hormone.
 - (b) Genes which regulate the proteins directly.
 - (c) Growth hormones under the influence of the enzymes coded by a gene.
 - (d) Growth hormones directly influence a gene.

OR

A sportsman, after a long break of his routine exercise, suffered muscular cramps during a heavy exercise session. This happened due to:

- (a) lack of carbon dioxide and formation of pyruvate.
 - (b) presence of oxygen and formation of ethanol.
 - (c) lack of oxygen and formation of lactic acid.
 - (d) lack of oxygen and formation of carbon dioxide.
14. In 1987, an agreement was formulated by the United Nations Environment Programme (UNEP) to freeze the production of "X" to prevent depletion of "Y". "X" and "Y" respectively referred here are:
- (a) Ozone; CFCs
 - (b) CFCs; rays UV
 - (c) CFCs; Ozone
 - (d) UV rays; Diatomic oxygen
15. Which of the following features relates to biodegradable substances?
- (a) Broken down by biological processes
 - (b) Remain inert
 - (c) Persist in environment for long time
 - (d) May harm the ecosystem
16. A cross involving tallness and dwarfism along with the observation of pink and white colour of the flower will fall under the category of
- (a) monohybrid cross
 - (b) dihybrid cross
 - (c) trihybrid cross
 - (d) polyhybrid cross

Q. No 17 to 20 are Assertion - Reasoning based questions.

These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- (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

17. **Assertion(A):** Generally sulphide ores are calcined with the given off SO_2 . d
Reason(R): Moisture and organic impurities are removed and the ore become porous
18. **Assertion(A):** Probability of survival of an organism produced through sexual reproduction is more than that of organism produced through asexual mode. A
Reason (R): Variations provide advantages to individuals for survival.
19. **Assertion(A):** Biodegradable substances result in the formation of compost and natural replenishment. A
Reason(R): It is due to breakdown of complex inorganic substances into simple organic substances
20. **Assertion(A):** A normal human eye can clearly see all the objects at the different distance.
Reason(R): The human eye has the capacity to suitably adjust the focal length of its lens to a certain extent. d

SECTION B**Q. no. 21 to 26 are very short answer questions**

21. Explain the following statements with suitable reasons:

- (a) Hydrogen gas is not evolved when most of the metals react with nitric acid.
 (b) Some metals are extracted by electrolysis method.

OR

(a) Name a compound of each type and draw the figure.

- (i) Cyclic compound with single bond.
 (ii) Cyclic compound with triple bond.

22. Variations are beneficial to the populations but not necessarily to the individuals. Comment.

23. Why do arteries have thick and elastic walls whereas veins have valves?

24. Complete the following equation with balancing:

- (a) $\text{Al} + \text{HCl} \rightarrow$
 (b) $\text{Mg} + \text{HNO}_3 \rightarrow$

25.(a) State a difference between the wire used in the element of an electric heater and in a fuse wire

(b) Why is tungsten used for making filament of electrical bulbs?

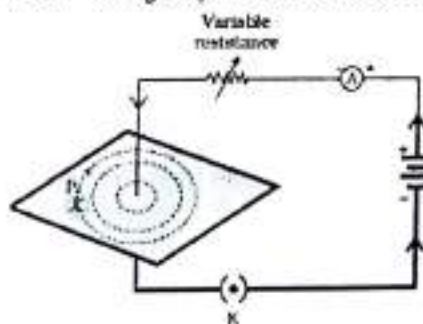
OR

Two wires of equal length, one of copper and the other of manganin (an alloy) have the same thickness. Which one can be used for

- (i) Electric transmission lines and
 (ii) Electrical heating devices? Why?

26. (a) AB is a current carrying conductor in the plane of paper as shown in figure. Given $r_1 > r_2$, where will the strength of the magnetic field be larger?

(b) In the given figure, a battery, a rheostat, an ammeter and a plug key are connected in a circuit. A long straight thick copper wire is inserted through the center of the cardboard. Iron filings sprinkled uniformly around the cardboard show a pattern of concentric circles.



State the rule by which you can find out the direction of the magnetic field produced around the conductor

SECTION C**Q. No. 27 to 33 are short answer questions**

27. Name the functional groups present in the following compounds, also write their IUPAC names

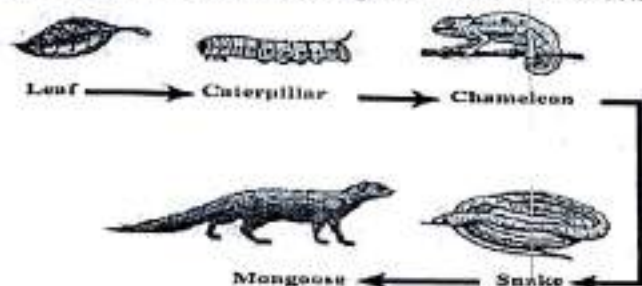
- (a) CH_3COCH_3 (b) CH_3COOH (c) CH_3CHO

28. State what would happen if: (only chemical reactions)
- Sodium metal is reacted with Ethanoic acid
 - Sodium bicarbonate is reacted with Acetic acid .
 - Ethanol and acetic acid are reacted .

OR

Acetic acid reacts with Alcohol 'X' in the presence of dil H_2SO_4 to form a solution 'Y' which produces a sweet smell. 'Y' is used for making compound "z"

- Name X , Y and z
 - Write the chemical equation of the reaction of Alcohol and Acetic acid,
29. Study the food chain given below and answer the questions that follow:



- If the amount of energy available at the third trophic level is 100 joules, then how much energy will be available at the producer level? Justify your answer.
- Is it possible to have 2 more trophic levels in this food chain just before the fourth trophic level? Justify your answer.

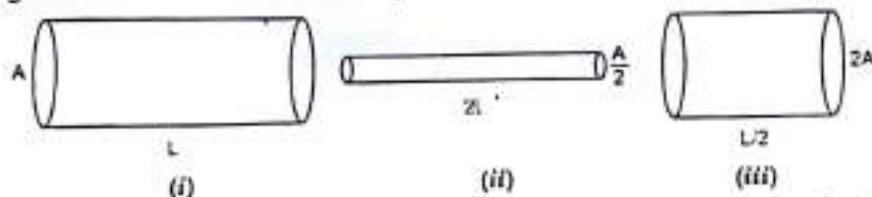
30. A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 50 cm from the mirror. (a) Write the type of mirror. (b) Find the distance of the image from the object. (c) What is the focal length of the mirror? (d) Draw the ray diagram to show the image formation in this case.

OR

Draw ray diagrams showing the image formation by a concave mirror when an object is placed

- between pole and focus of the mirror
 - between focus and centre of curvature of the mirror
 - a little beyond centre of curvature of the mirror
31. (a) An electric bulb is rated at 200 V and 100 W. What is its resistance?
 (b) Calculate the energy consumed by 3 such bulbs if they glow for 10 hour for the month of November.
 (c) Calculate the total cost if the rate is Rs 6.50 per unit.

32. The figure below shows three cylindrical copper conductors along with their face areas and lengths.



Compare the resistance and the resistivity of the three conductors. Justify your answer.

33. (a) We are advised to take Iodised salt in our diet by doctors. Justify its importance in our body.
 (b) Why do we say that educational qualifications and skills are not inherited? Justify with an example.

SECTION D
Q. No. 34 to 36 are long answer questions

34. Write the structures of the following IUPAC Names:

- (a) Pentan-1-oic Acid (b) But-1-yne
(c) butan-1-al (d) Pentan-1-ol
(e) 2-Chloropentanoic acid

OR

Justify the following statements with proper reasons:

- (a) Carbon does not form C^{-4}
(b) Element carbon forms compounds mainly by covalent bonding.
(c) Acetic acid is called glacial acetic acid.
(d) Graphite is a good conductor of electricity.
(e) Versatile nature of Carbon.

35. A doctor has advised Sameer to reduce sugar intake in his diet and do regular exercise after checking his blood test reports. Which disease do you think Sameer is suffering from?

- (a) Name the hormone responsible for this disease and the organ producing the hormone.
(b) Which hormone is present in the areas of rapid cell division in a plant and which hormone inhibits the growth?

OR

(a) A male plant with round yellow seeds is crossed with a female plant with green wrinkled seeds, work out the F1 and F2 progeny to obtain the dihybrid ratio.

36. (i) A person needs a lens of power $-4.5D$ for correction of her vision. (a) What kind of defect in vision is she suffering from? (b) What is the focal length of the corrective lens? (c) What is the nature of the corrective lens?

- (ii) Why does the Sun appear reddish early in the morning?
(iii) Why does the sky appear dark instead of blue to an astronaut?

SECTION - E

Q.No. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

37. Read the passage given below and answer the following questions.

On the basis of the reactivity of different metals with oxygen, water and acids as well as displacement reactions, The metals have been arranged in the decreasing order of their reactivities. This arrangement is known as the activity series or reactivity series of metals. The basis of Is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a metal loses electrons less rapidly to form a positive ion it will react slowly with water. Therefore, such a metal will be less reactive.

Name two metals are less reactive than hydrogen?

(i) Which of the following metals is less reactive than hydrogen?

- (a) Copper (b) Zinc (c) Magnesium (d) Lead

(ii) Which of the following metals is more reactive than hydrogen?

- (a) Mercury (b) silver (c) calcium (d) Gold

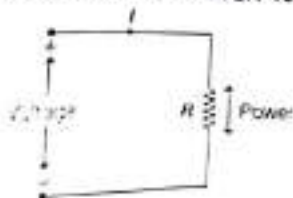
(iii) Which of the following metals reacts vigorously with oxygen?

- (a) Zinc (b) Magnesium (c) Sodium (d) Copper

(iv) How will you explain anode mud?

38. Read the following and answer the questions given below:

The electrical energy consumed by an electrical appliance is given by the product of its power rating and the time for which it is used. The SI unit of electrical energy is Joule (as shown in the figure).



Actually, Joule represents a very small quantity of energy and therefore it is inconvenient to use where a large quantity of energy is involved.

- (i) The commercial unit of energy is
 (a) joule (b) joule-second (c) kilowatt hour (d) watt-second
- (ii) Kilowatt-hour is equal to
 (a) 3.6×10^4 (b) 3.6×10^6 (c) 36×10^6 (d) 36×10^4
- (iii) The power of a lamp is 60 W. The energy consumed in 1 minute is
 (a) 360 J (b) 36 J (c) 3600 J (d) 3.6 J
- (iv) Calculate the energy transformed by a 5 A current flowing through a resistor of 2Ω for 30 minutes.
 (a) 40 kJ (b) 60 kJ (c) 10 kJ (d) 90 kJ

39. Figures (a) to (d) given below represent the type of ear lobes present in a family consisting of 2 children - Rahul, Nisha and their parents.



(a) Rahul's father



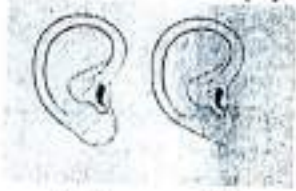
(b) Rahul



(c) Rahul's mother



(d) Rahul's sister



(e) (f)

Excited by his observation of different types of ear lobes present in his family, Rahul conducted a survey of the type of ear lobes found {Figure (e) and (f)} in his classmates. He found two types of ear lobes in his classmates as per the frequency given below:

Sex	Free	Attached
Male	36	14
Female	31	19

On the basis of above data answer the following questions.

- (i) Which of the two characteristics - 'free earlobe' or 'attached ear lobe' appears to be dominant in this case? Why?
- (ii) Is the inheritance of the free ear lobe linked with sex of the individual? Give reason for your answer.
- (iii) What type of ear lobe is present in father, mother, Rahul and his sister? Write the genetic constitution of each of these family members which explains the inheritance of this character in this family?
 (Gene for Free ear lobe is represented by F and gene for attached ear lobe is represented by f for writing the genetic constitution).
- (iv) Suresh's parents have attached earlobes. What type of ear lobe can be seen in Suresh and his sister Siya? Explain by giving the genetic composition of all.