



## Sample Paper 3

**Class X 2022-23**

**Science (086)**

**Time: 3 Hours**

**Max. Marks: 80**

**General Instructions:**

1. This question paper consists of 39 questions in 5 sections.
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.
3. Section A consists of 20 Objective Type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 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. Equal volumes of hydrochloric acid and sodium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is checked with a pH paper. What would be the colour obtained?

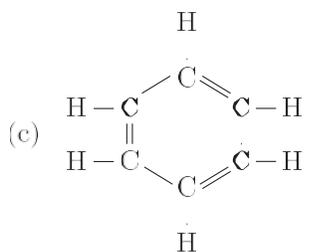
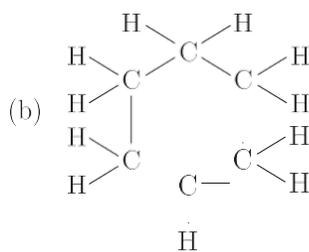
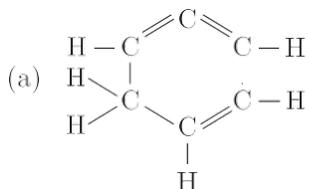
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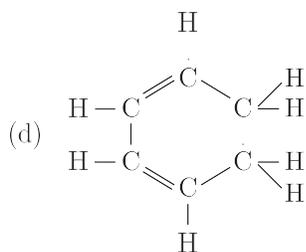


- (a) Red      (b) Yellow      (c) Yellowish green      (d) Blue
2.  $Y + 2HCl \rightarrow ZnCl_2 + H_2$ . In the above reaction, Y is:
- (a) Aluminium  
(b) Copper  
(c) Sodium  
(d) Zinc
3. Which one of the following pair is correct?

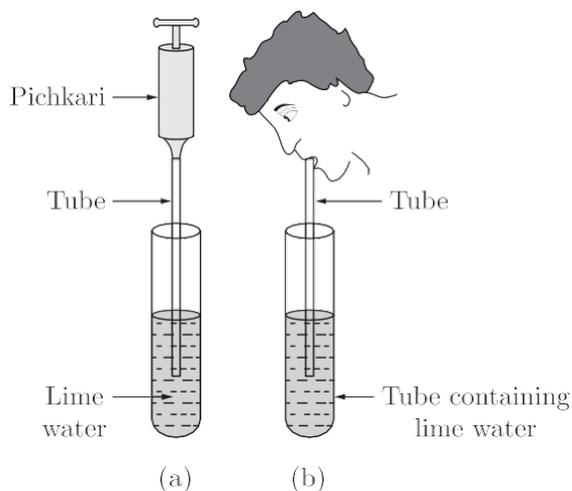
	Reaction	Reaction Type
(a)	$2KNO_3(s) \rightarrow 2KNO_2(s) + O_2(g)$	Displacement reaction
(b)	$Zn(s) + 2AgNO_3(aq) \rightarrow Zn(NO_3)_2 + 2Ag(s)$	Combination reaction
(c)	$Ni(NO_3)_2(aq) + 2NaOH \rightarrow Ni(OH)_2 + 2NaNO_3(aq)$	Double displacement reaction and precipitation reaction
(d)	$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$	Decomposition reaction

4. Which of the following is correct for a physical change?
1. Only physical properties change.
  2. Large amount of heat is absorbed or evolved.
- Which of the above statements is/are correct?
- (a) Only 1
  - (b) Only 2
  - (c) Both 1 and 2
  - (d) Neither 1 and 2
5. An element *X* has electronic configuration 2, 8, 1 and another element *Y* has electronic configuration 2, 8, 7. They form a compound *Z*. The property that is not exhibited by *Z* is
- (a) It has high melting point.
  - (b) It is a good conductor of electricity in its pure solid state.
  - (c) It breaks into pieces when beaten with hammer.
  - (d) It is soluble in water
6. Which of the following are used as an antacid to reduce acidity in stomach?
- (a) Sodium carbonate and magnesium hydroxide
  - (b) Magnesium hydroxide and sodium hydroxide
  - (c) Sodium bicarbonate and calcium hydroxide
  - (d) Sodium bicarbonate and magnesium hydroxide
7. Structural formula of benzene is





8. In the given activity, the lime water of which test tube will get milky faster?

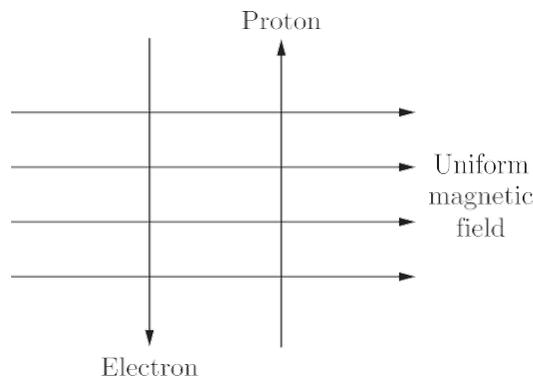


- (a) Test tube (a)
  - (b) Test tube (b)
  - (c) Both test tube will take same time
  - (d) Can't say
9. When a person eats some egg white, proteins and water enter the stomach. Which substances are found leaving the stomach and leaving the small intestine?

	Leaving the Stomach	Leaving the Small Intestine
(a)	Protein, amino acids and water	Water
(b)	Amino acids and water	Amino acids and water
(c)	Fatty acids, glycerol and water	Fatty acids, glycerol and water
(d)	Protein and water	Fatty acids and glycerol

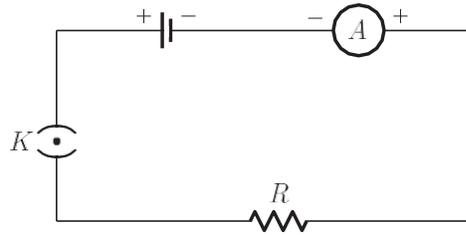
10. Exchange of genetic material takes place in
- (a) vegetative reproduction
  - (b) asexual reproduction
  - (c) sexual reproduction
  - (d) budding

11. When a person is suffering from severe cold, he or she cannot
- differentiate the taste of an apple from that of an ice cream.
  - differentiate the smell of a perfume from that of an agarbatti.
  - differentiate red light from green light
  - differentiate a hot object from a cold object.
12. Which among the following statements are true for sexual reproduction in flowering plants?
- It requires two types of gametes
  - Fertilisation is a compulsory event
  - It always results in formation of zygote
  - Offsprings formed are clones
- (a) (i) and (iv)            (b) (i), (ii) and (iv)  
(c) (i), (ii) and (iii)    (d) (i), (iii) and (iv)
13. The resistivity does not change if
- the material is changed
  - the temperature is changed
  - the shape of the resistor is changed
  - both material and temperature are changed
14. A uniform magnetic field exists in the plane of paper pointing from left to right as shown in Figure. In the field an electron and a proton move as shown. The electron and the proton experience.

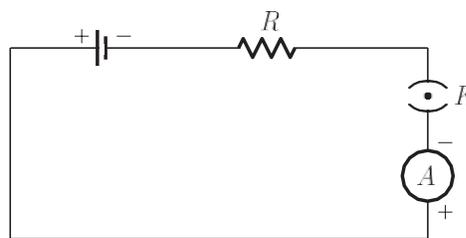


- forces both pointing into the plane of paper
- forces both pointing out of the plane of paper
- forces pointing into the plane of paper and out of the plane of paper, respectively.
- force pointing opposite and along the direction of the uniform magnetic field respectively.

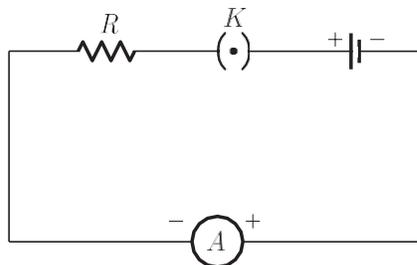
15. A cell, a resistor, a key and ammeter are arranged as shown in the circuit diagrams of Figure. The current recorded in the ammeter will be



(i)



(ii)



(iii)

- (a) maximum in (i)
  - (b) maximum in (ii)
  - (c) maximum in (iii)
  - (d) the same in all the cases
16. The most important safety method used for protecting home appliances from short circuiting or overloading is
- (a) earthing
  - (b) use of fuse
  - (c) use of stabilizers
  - (d) use of electric meter.

**Question no. 17 to 20 are Assertion - Reasoning based questions.**

17. **Assertion :** When water is added to calcium oxide, a large amount of heat is produced.  
**Reason :** It is an endothermic reaction.
- Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
  - Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
  - Assertion is True but the Reason is False.
  - Both Assertion and Reason are False.
18. **Assertion :** The genetic complement of an organism is called genotype.  
**Reason :** Genotype is the type of hereditary properties of an organism.
- Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
  - Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
  - Assertion (A) is true but reason (R) is false.
  - Assertion (A) is false but reason (R) is true.
19. **Assertion :** During the night the effect of root pressure in transport of water is more important.  
**Reason :** Stomata is open during day, transpiration takes place which help in transport of water.
- Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
  - Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
  - Assertion is true but Reason is false.
  - Both Assertion and Reason are false.
20. **Assertion :** A solenoid tends to expand, when a current passes through it.  
**Reason :** Two straight parallel metallic wires carrying current in same direction attract each other.
- Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
  - Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
  - Assertion (A) is true but reason (R) is false.
  - Assertion (A) is false but reason (R) is true.

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

21. Why do the articles made of aluminium not corrode?

OR

- $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
- $\text{Cu} + \text{FeSO}_4 \rightarrow \text{CuSO}_4 + \text{Fe}$

Which of the above two reactions will take place and why ?

22. Stomata of desert plants remain closed during day time. How do they take up carbon dioxide and perform photosynthesis ?
23. Which is the largest digestive gland present in human body ? What is the name and function of its secretion?

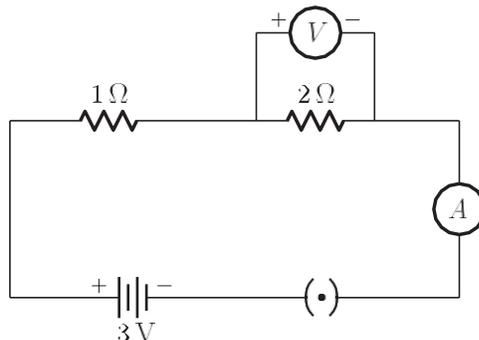
24. What are the end products formed during fermentation in yeast ? Under what condition a similar process takes place in our body that leads to muscle cramps ?
25. Why there is no dispersion of light refracted through a rectangular glass slab.
- OR**
- What is meant by near point and far point of an eye? State their values of the normal human eye.
26. In a food chain comprising frogs, insects, birds and grass, which one of the organisms is likely to have maximum concentration of harmful non-biodegradable chemicals in its body ?

## SECTION-C

**Question no. 27 to 33 are short answer questions.**

27. Name the type of chemical reaction represented by the following equations :
- (i)  $\text{CaCO (s)} \xrightarrow{\text{Heat}} \text{CaO(s)} + \text{CO (g)}$
- (ii)  $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)}$
- (iii)  $\text{Zn(s)} + \text{H}_2\text{SO}_4\text{(aq)} \rightarrow \text{ZnSO}_4\text{(aq)} + \text{H}_2\text{(g)}$
28. (a) A non-metal  $X$  exists in two different forms  $Y$  and  $Z$ .  $Y$  is the hardest natural substance whereas  $Z$  is a good conductor of electricity. Identify  $X$ ,  $Y$ ,  $Z$ .
- (b) An element  $X$  on reaction with oxygen forms an oxide  $\text{XO}_2$ . The oxide when dissolved in water turns blue litmus red. State whether element  $X$  is a metal or non-metal.
- (c) Name the metal which is alloyed with copper to make bronze.
29. Explain the process of assimilation of proteins in human digestive system.
- OR**
- Write three events which occur during the process of photosynthesis.
30. An object 4 cm in height is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed to obtain a sharp image of the object. Calculate the height of the image.
31. (a) Name the kind of lens that can form;
- (i) an inverted magnified image.
- (ii) an erect diminished image.
- Draw ray diagrams to illustrate your answer in each case.
- (b) Draw a ray diagram to show the image formed of an object placed between  $f$  and  $2f$  distances from a convex lens.

32. What would be the reading of ammeter and voltmeter in the given circuit?



OR

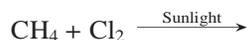
Two resistors with resistances  $10\ \Omega$  and  $15\ \Omega$  are to be connected to emf  $12\ \text{V}$  so as to obtain : (i) minimum current (ii) maximum current. How will you connect the resistance in each case ? Calculate the strength of the total current in the circuit in the two cases.

33. It is said that, there is a need to put a complete ban on the products containing aerosols. What are aerosols ? Why is there a demand to put a ban on them.

## SECTION-D

Question no. 34 to 36 are Long answer questions.

34. (a) Draw the structure of ethanoic acid.  
 (b) Name the compound formed when ethanol is heated with ethanoic acid in the presence of conc.  $\text{H}_2\text{SO}_4$ .  
 (c) Complete the following equations :



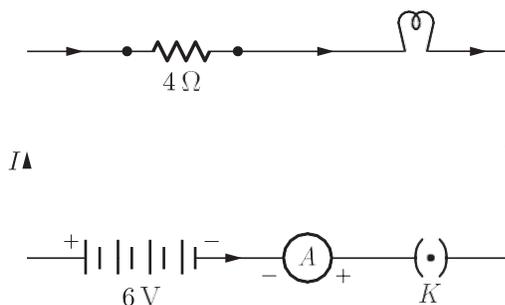
OR

- (a) A compound X having formula  $\text{C}_2\text{H}_4\text{O}_2$  when treated with ethanol and a few drops of conc.  $\text{H}_2\text{SO}_4$  forms a sweet smelling substance Y. Name X and Y. Write the equation of the reaction leading to the formation of Y from X. What is the function of conc.  $\text{H}_2\text{SO}_4$  in the above reaction?  
 (b) Why do soaps form scum instead of lather in hard water ?
35. (a) Differentiate between pollen grain and ovule.  
 (b) State in brief the functions of the following parts of the human female reproductive system :  
 (i) Ovary  
 (ii) Fallopian tube  
 (iii) Uterus

OR

- (a) What is variation? How is variation created in a population? How does the creation of variation in a species promote survival?  
 (b) Explain how, offspring and parents of organisms reproducing sexually have the same number of chromosomes.

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



- the total resistance of the circuit,
- the current through the circuit,
- the potential difference across the (i) electric lamp and (ii) conductor, and
- power of the lamp.

## SECTION-E

**Question 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. The earth's crust is the major source of metals-seawater contains some soluble salts such as sodium chloride, magnesium chloride, etc. The elements or compounds, which occur naturally in the earth's crust are known as minerals. At some places, minerals contain a very high percentage of a particular metal and the metal can be profitably extracted from it. These minerals are called ores.

- Name the chief ore of mercury and zinc.
- Write equations for the extraction of copper from its sulphide ore.

**OR**

- Define the process used to convert carbonate ores into metal oxide.

38. Chronic Kidney Disease (CKD) is a condition characterized by a gradual loss of kidney function over time. CKD is also known as chronic renal disease. With increasing life expectancy and prevalence of life style diseases, US has seen a 30% increase in prevalence of Chronic Kidney Disease (CKD) in the last decade. Unfortunately, from India there is no longitudinal study and limited data on the prevalence of CKD.

In western countries, diabetes and hypertension account for over  $\frac{2}{3}$ <sup>rd</sup> of the cases of CKD. In India too, diabetes and hypertension today account for 40-60% cases of CKD. As per recent Indian Council of Medical Research data, prevalence of diabetes in Indian adult population has risen to 7.1%, (varying from 5.8% in Jharkhand to 13.5% in Chandigarh) and in urban population (over the age of 40 years) the prevalence is as high as 28%. Likewise, the reported prevalence of hypertension in the adult population today is 17% (14.8% from rural and 21.4% from urban belt). A similar prevalence of 17.4% has been reported by Panesar et al. (in the age group of 20-59 years) even from slum-resettlement colony of Delhi. With rising prevalence of these diseases in India, prevalence of CKD is expected to rise and obviously, this is the key target population to address.

A study published in this issue is from a rural belt of Karnataka. The population had a mean age of 39.88 ± 15.87 years with 3.82% prevalence of diabetes and 33.62% of hypertension. Authors found 6.3% prevalence of CKD stage 3; which is the highest reported till date by any Indian worker. It is disturbing to note, the high prevalence of hypertension in a rural setting where over 75% population had normal or low body mass index.

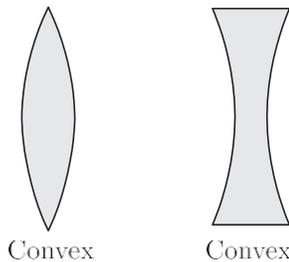
In comparison to most other published studies from India, the present study population is younger and even the prevalence of diabetes is low but surprisingly despite that prevalence of stage 3 CKD is reported to be higher (6.3%). It is disturbing to see the rising prevalence of hypertension and CKD in rural belts. Possibly, with shifting population the difference between urban and rural areas is getting blurred. Undoubtedly, we need more Indian data to validate these findings.

- (i) What is CKD ?
- (ii) What are the major causes of CKD ?
- (iii) In which segment of society is CKD more prevalent?

**OR**

- (iv) What is the highest percentage of CKD reported?

39. A concave lens is thick at the edges and thin at the centre, while a convex lens is thick at the centre and thin at the edges. We can distinguish between a concave lens and a convex lens without touching them. For this keep a book close to a lens and observe the image of the text of the book through the lens. If the letters appear enlarged, then it is a convex lens and if the letters appear diminished then it is a concave lens.



Convex lens converges light rays and hence known as converging lens. Similarly, concave lens diverges light rays and is known as diverging lens. Linear magnification produced by a lens is equal to the ratio of the image distance to the object distance. Power of a lens is defined as the reciprocal of its focal length.

- (i) What type of image is always made by a concave lens ?
- (ii) If magnification produced by a spherical lens is  $+0.75$ , then what is the nature of the lens ?
- (iii) What is the power of a convex lens with focal length 80 cm ?

**OR**

- (iii) What kind of lens is present in human eye ?