

Time allowed: **3 hours**; Maximum marks: **90**

General Instructions:

- All Questions are compulsory
- The Question Paper consists of 30 Questions divided in to four sections A, B, C and D
- Section - A comprises of 3 Very Short Questions of 1 mark each
- Section - B comprises of 3 Short Questions I of 2 marks each
- Section - C comprises of 12 Short Questions II of 3 marks each
- Section - D comprises of 6 Long Questions of 5 marks each
- Section – E comprises of 9 Practical Based Very Short Questions of 1 mark each
- Section – F comprises of 3 Practical Based Short Questions I of 2 marks each

Section – A

- Name any one substance which is added to denature ethyl alcohol?
- Can a woman be protected from STDs by using a copper-T?
- Which plant underwent experiments by Mendel?

Section – B

- How much of total energy is transferred to the next trophic level in a food chain?
- Name and state the function of the sex hormones secreted by human male and female sex organs?
- Why did Mendeleev treated the hydrides and oxides of element as the basic properties of elements for their classification?

Section – C

- Calculate the speed of light in water if the given values of speed of light in vacuum are 3×10^8 m/sec and that of Refractive index of water is $\frac{4}{3}$?
- A concave mirror produces four times magnified (enlarged) real image of object placed at 8 cm in front of it. Where is the image located?
- Discuss the formation of ozone in the upper atmosphere, cause for the damage to ozone layer and its harmful effects on earth?
- Define atomic radius of an element. How does it vary along the period and group?
- What is 'vegetative propagation'? Write two examples where it is used. State two reasons of practicing vegetative propagation for giving same types of plants?
- Write a brief account on salient points of Lamarck's theory. Who disproved this theory?
- What is lateral displacement? State two factors on which it depends?
- Calculate the time taken by a ray of light to cross 4 mm thick glass pane?(Given refractive index of glass = $\frac{3}{2}$)
- Calculate the distance at which an object should be placed to get an image of it 10 cm away from a concave lens of focal length 15cm. Calculate the magnification of the given lens?
- Write down the difference between soap and detergents?
- Give a short account of menstruation in females?
- Write down the limitations of Mendeleev's periodic table? Compare between the Mendeleev's with the modern periodic table?

Section – D

- Let A be an unknown organic compound with molecular formula $C_2H_4O_2$. It reacts evolves a gas B after reacting with Sodium metal Na. The gas evolved readily catches fire.

A likewise responds with Ethanol within the sight of concentrated sulphuric corrosive to shape a sweet noticing substance C in making aromas.

Find out compounds A, B and C.

Write down the balanced chemical equation for the following:

- a. Conversion of compound A to compound B.
 - b. Conversion of Compound A to compound C.
20. Describe briefly four ways in which individuals with a particular trait may increase in a population.
- a. Let two elements 'A' and 'B' belong to same period and Group-1 and Group-2 respectively in modern periodic table. Compare their following properties:
 - The sizes of their atoms
 - Their metallic characters
 - Their tendencies to lose electrons
 - The formula of their oxides
 - The formula of their chlorides
 - b. Name two metalloids?
- 21.
- a. What are homologous organs? How do they provide evidence in support of evolution?
 - b. What is a gene?
- 22.
- a. Write down some steps to reduce consumption of various nature resources and environment conservation at an individual level?
 - b. When does Snell's law fail?
- 23.
- a. Light of wavelength λ in air enters a medium of refractive index n . What will be its wavelength, velocity and frequency in the medium?
 - b. A convex lens forms the image of the sun at 18 cm on a screen. When an object is placed at 24 cm from the optical center of the lens, the image forms on a screen. Without disturbing the position of the object, the lens is moved by 3 cm towards the object. By what distance and in what direction, the screen is to be moved to catch the image on it again?
24. Calculate the minimum distance between object and its real image formed by convex lens of focal length F ?

Section – E

25. What is speciation? What factors could lead to the rise of new species?
26. Draw labeled diagram of the female reproductive system in human beings?
27. Draw labeled diagram of the male reproductive system in human beings?
28. Give 4 important properties of ethanol (ethyl alcohol)?
29. Write 4 ill effects of alcohol drinking?
30. Explain the process of sex determination in human beings?
31. Distinguish between alcohol and a carboxylic acid on the basis of their chemical property?
32. Explain the bonding in nitrogen.
33. What are the ways to prevent corrosion?

Section – F

34. Why do metals conduct electricity?
35. Why sodium is kept away from water?
36. What are the limitations of Newlands' Law of Octaves?