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

General Instructions:

a) All Questions are compulsory
b) The Question Paper consists of 31Questions divided in to four sections A, B, C and D
c) Section - A comprises of 3 Very Short Questions of 1 mark each
d) Section - B comprises of 3 Short Questions I of 2 marks each
e) Section - C comprises of 12 Short Questions II of 3 marks each
f) Section - D comprises of 6 Long Questions of 5 marks each
g) Section – E comprises of 9 Practical Based Very Short Questions of 1 mark each
h) Section – F comprises of 3 Practical Based Short Questions I of 2 marks each

Section - A

1. Distinguish between the molecular mass of two neighboring homologues?
2. Distinguish between the human male gamete and female gamete?
3. Discuss the importance of bacteria and fungi in ecosystem?

Section – B

4. Define a gene?
5. What will happen when:
    a. A mature Spirogyra filament attains considerable length?
    b. Planarian gets cut into two pieces?
6. Among O^{2-} ion and Al^{+3} ion, which one have larger size and why?

Section – C

7. How many types of nitrogenous bases are present in DNA? Name them?
8. Let X be a compound with formula C3H6 that gets ignited with a sooty fire and decolorizes bromine water. Distinguish `X`. Will it get break down in water or not? Also discuss about its conductivity of electricity in aq. solution and melting point as well?
9. Observe the food chain Plant (2000 kJ) --- >Goat ---> Lion
    a. If autotrophs occupying the first trophic level are called producers what are herbivores Called as?
    b. How much energy does the lion get in the above food chain?
10. Calcium is an element with Z = 20
    a. Is it a metal or a non-metal?
    b. Will its size be more or smaller than that of potassium?
    c. Write the formula of its chloride?
11. Differentiate between pollination and fertilization?
12. Why Mendel did chose pea plant for his experiments?
13. Write 3 applications each of concave and convex lens?
14. State the conditions under which a glass lens placed in a transparent liquid becomes invisible? Discuss the way to arrange two converging lenses so that parallel beam of light entering one lens can emerge as a parallel beam after passing through the second lens?
15. Distance at what the object should be placed to get the image at a distance 10 cm from a concave lens of focal length 20 cm is?

16. What is hydrogenation? Write its industrial application?
17. List and describe in brief any three ways devised to avoid pregnancy?
18. Explain why
    a. Li and Na are considered as active metals?
    b. Atomic size of Mg is less than that of Na?
    c. Fluorine is more reactive than chlorine?

Section – D

19.
(i) Write chemical equations of the reactions of Ethanoic acid with:
a) Sodium b) Sodium Carbonate
(ii) Give a test to distinguish between:
a) Ethane and Ethane b) Ethanol with Ethanoic acid.

20.
(i) State in brief the functions of the following parts of the human male reproductive system:
a) Scrotum b) Testes
(ii) State the role of ovary and fallopian tube in human body?

21.
(i) Answer these questions
a) Name the elements present in the third period and classify them into metals and nonmetals?
b) On which side of the table do you find the metals?
c) On which side of the table do you find the non-metals?
(ii) How were the positions of different isotopes decided in the modern periodic table?

22. Besides conservation of wildlife and forest, suggest some ways which can improve our environment?
23. (a) With the help of suitable examples, explain why certain traits cannot be passed on to the next generation. What are such traits called?
(b) Name the two homologous structures in vertebrates. Why are they so called? How do such organs help in understanding an evolutionary relationship?
24. Show that passing a ray of light through a parallel sided transparent glass slab results in equal value of angle of incidence and emergence?

Section – E

25. A convex lens of focal length 20 cm forms image of magnification 3 for one position of the object. The object is shifted by 16/3 cm towards the lens. By what distance and which direction the image will move?
26. What is the unit of refractive index?
27. State the law of refraction of light?
28. Draw a ray diagram to show the image formation in convex lens, when an object is kept between focus and optical Centre? Also write the property of image formed?
29. How can we find the age of a fossil? Explain them?
30. Explain the structure of flower with the help of a labeled diagram?
31. (a) What is saponification? Write chemical equation?
(b) Discuss the method of preparation of soap in the laboratory?
32. A ray of light enters from water to glass. Refractive index of glass with respect to water is 1.2. Find absolute refractive index of water if absolute refractive index of glass is 1.5?

33. For the same angle of incidence in media P, Q and R, the angles of refraction are 37˚, 41˚, 43˚ respectively. In which medium will the velocity of light be minimum?

Section – F

34. What are the Conventional sources of energy?
35. What are the major components of ecosystem?
36. Explain the bonding in oxygen.