General Instructions:

(i) The question paper comprises of two Sections, A and B. You are to attempt both the sections.
(ii) All questions are compulsory.
(iii) There is no overall choice.
(iv) All questions of Section-A and all questions of Section-B are to be attempted separately.
(v) Question numbers 1 to 3 in Sections-A are one marks questions. There are to be answered in one word or in one sentence.
(vi) Question number 4 to 7 in Section-A are two marks questions. There are to be answered in about 30 words each.
(vii) Questions numbers 8 to 19 in Section-A are three marks questions. These are to be answered in about 50 words each.
(viii) Question number 20 to 24 in Section-A are five marks questions. These are to be answered in about 70 words each.
(ix) Questions numbers 25 to 42 in Section-B are multiple choice questions based on practical skills. Each question is a one mark questions. You are to select one most appropriate response out of the four provided to you.

Section-A

1. Write the valency and usual number of valence electrons of group 18 of the periodic table?  
2. A student found that children with light coloured eyes are likely to have parents with light coloured eyes. On this basis, can he say something about whether the light eye colour trait is dominant or recessive?  
3. Which gas is formed when fossil are burnt in insufficient air (oxygen) instead of carbon dioxide?  
4. Name a green house gas. What happens when its amount increases in the atmosphere?  
5. Why do we need to build dams?  
6. A mirror always produces erect small and virtual image whatever may be the position of the object in front of it. Give the nature of the mirror and draw ray diagram to illustrate image formation by it. Write its one use.
7. In the diagram given below label the parts marked X and Y and name the process depicted by this diagram.

8. An organic compound ‘X’ liberates a gas ‘Y’ when treated with metal carbonates and metal hydrogen carbonates. Identify X and Y. Write the equations of corresponding reaction. How can the liberation of ‘Y’ be proved?

9. Name the type of carbon compounds that can be hydrogenated. With the help of suitable example explain the process of hydrogenation.

10. A part from the organic beings, where else do we find carbon? Mention the form in which it is available there and also its percentage.

11. Draw the structure of hexane which has (i) straight chain (ii) branched chain and (iii) ring chain of carbon atoms.

12. One day Sarla found her friend Seema very sad in class. She talked to Seema and tried to know the reason behind it. Seema very reluctantly said that my brother is always given more love and affection in family, specially by my father and also be grandmother. He is permitted to do whatever he wants and I am criticized for everything I do or I need.

   (a) Which kind of social evil it is?

   (b) What creates this difference?

   (c) As a student what can be your role to remove this Social evil?

13. (i) What is the importance of DNA copying in reproduction?

   (ii) Give one benefit of variation.

14. Name the sex organ in human male reproduction system. Write two functions of it.

15. Place the following in the correct sequence:

   (i) Natural selection/migration/new species/Gene flow.

   (ii) Why are the wings of Bat and wings of Bird Called analogous organs?
16. (a) State Snell's Law of refraction.
   (b) Using Snell's Law and with the help of a diagram illustrate the path of ray of light incident normally from a medium of refractive index \( n_1 \) to medium of refractive index \( n_2 \).

17. An object 2 cm high is placed at a distance of 64 cm from a white screen. On placing a convex lens at a distance of 32 cm from the object it is found that a distinct image of the object is formed on the screen. Calculate the focal length of the lens and size of the image formed on the screen.

18. A convex lens has focal length of 30 cm. Calculate at what distance should the object be placed from the lens so that it forms an image at 60 cm on the other side of the lens? Find the magnification produced by the lens in this case.

19. (i) What is meant by garbage management?
   (ii) Suggest four methods to manage the garbage.

20. Give two example of covalent compounds which you have studied. State any four properties in which covalent compounds differ from ionic compounds.

21. (i) What is meant by traits of an individual?
   (ii) Explain inherited trait and acquired trait.
   (iii) Define speciation. List the factors which could lead to rise of a new species?

22. How can we say the DNA controls a character expression in an organism? Explain with the help of an example.

23. (a) State the laws of Refraction.
   (b) Define absolute refractive index and Relative refractive index.
   (c) Refractive index of water, crown glass, kerosene and benzene are 1.33, 1.52, 1.44, 1.50 respectively, complete the following diagram with the information.

   ![Diagram of refraction](image)

24. Draw the ray diagram in each case to show the position, nature of image formed when the object is placed:
   (a) at the centre of curvature of concave mirror.
   (b) Within focal length of a convex lens
   (c) Between Pole and Focus of concave mirror
   (d) In front of a convex mirror
   (e) In front of a concave lens

(3) $5e-5e$
Section-B

25. The gas that is released in the reaction of acetic acid with sodium-bi-carbonate is:  
(a) highly inflammable  
(b) inflammable but does not support burning  
(c) puts off the burning splinter with a pop sound  
(d) Non-supporter of combustion.

26. Acetic acid turns:  
(I) dry blue litmus paper red  
(II) moist blue litmus paper red  
(III) dry red litmus paper blue  
(IV) moist red litmus paper blue  
(a) I and II  
(b) II and IV  
(c) I and III  
(d) II and IV

27. For preparation of soap 10% NaOH is used which is commonly know as:  
(a) vinegar  
(b) ester  
(c) Lye  
(d) None of above.

28. After completion of the saponification reaction, the final mixture is poured in a solution of:  
(a) CACl₂  
(b) KOH  
(c) NaOH  
(d) NaCl

29. In which of the figure labeling is done correctly:  
(a) Both A and B  
(b) Only A  
(c) Only B  
(d) Both are wrongly marked
30. A teacher gives to a student a concave mirror for determination of focal length by focusing a distant object. She tells that its focal length lies in the range of 15-20 cm. She places the mirror on the optical benches at 25.2 cm mark. For getting a sharp image on the screen, the student should adjust the position of screen between the marks:
(a) 40.2 cm – 45.2 cm
(b) 5.2 cm – 10.2 cm
(c) either (a) or (b) depending upon which end of optical bench is towards the object
(d) 15 cm – 25.2 cm

31. Listed below are some precautions. Select the ones that need to be taken while performing the experiment of determination of focal length of a convex lens by focusing a distant object:
(a) The place of the convex lens must be perpendicular to optical bench.
(b) The place of the convex lens and that of screen should be parallel to each other.
(c) The lens must not be held from center.
(d) All the above.

32. A student trace the path of ray of light through a glass slab for four different angles $i_1$, $i_2$, $i_3$, and $i_4$ and his results are as given below:
His correct result is for the angle of incidence:

- For $i_1$
- For $i_2$
- For $i_3$
- For $i_4$

33. A student was shown two diagram of the path of a ray of light incident at 30° on two glass slabs made of different types of glasses $g_1$ and $g_2$. The correct direction of the ray of light is shown in the diagram.
34. An important evidence in favour of organic evolution is the occurrence of:
(a) Homologous organs only
(b) Analogous and vestigial organs
(c) Homologous and vestigial organs
(d) Homologous and analogous organs

35. A student draws the following diagram of budding in yeast but could not label the parts ‘b’ and ‘d’. The correct labeling of parts ‘b’ and ‘d’ respectively is:
(a) nucleus of bud, nucleus of yeast
(b) dividing nucleus of bud; nucleus of yeast
(c) dividing nucleus of yeast, nucleus of bud
(d) nucleus of yeast, nucleus of bud

36. What can be added to laundry soap to help washing clothes in hard water?
(a) washing soda
(b) baking soda
(c) caustic soda
(d) potash

37. Which of the following options is/are correct regarding the trace of the path of the rays of light through a glass prism?
(a) Refraction of light takes place when light passes from a denser to a rarer medium
(b) Refraction of light takes place when light passes from a rarer to a denser medium
(c) Refraction of light takes place whenever there is a change in the medium in the path of light.
(d) All the above.
38. Parallel beams of light falling on a convex lens is as shown in figure. Its image will be formed at:

(a) focus F  
(b) 2F  
(c) between F and 2F  
(d) Infinity

39. A teacher asked her students to draw ray diagram for the formation of image by a convex lens so that the image is real, diminished and inverted. The students should draw diagram with object placed at:

(a) infinity  
(b) between F and optical center  
(c) beyond 2F  
(d) F

40. A student was given following three specimen for study.

Which of these depict homologous organs?

(a) (i) and (iii)  
(b) (i) and (ii)  
(c) (ii) and (iii)  
(d) all (i), (ii) and (iii)

41. Seeds are the mature:

(a) ovules  
(b) flower  
(c) ovary  
(d) calyx

42. The structure of seed which contains rudimentary plant:

(a) Testa of seed  
(b) Embryo of seed  
(c) Cotyledons of seed  
(d) All of the above