Series P/PB2/1

SET 1

CLASS X PRE-BOARD EXAMINATION – 2024-25

Q.P. Code: 086/2/1

Roll No.								

Candidate must write the Q.P. Code on the title page of the answer-book.

- Please check that this question paper contains **12** printed pages.
- Please check that this question paper contains **39** questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

SCIENCE

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions:

Read the following instructions very carefully and strictly follow them:

(i) This question paper contains 39 questions. All questions are compulsory.

(ii) This Question Paper is divided into five Sections A, B, C, D and E.

(iii) Section A - Questions nos. 1 to 20 are multiple choice questions (MCQs). Each question carries 1 mark.

(iv) Section B - Questions nos. 21 to 26 are very short answer type questions. Each question carries 2 marks. Answer to these questions should be in the range of 30 to 50 words.

(v) Section C - Questions nos. 27 to 33 are short answer type questions. Each question carries 3 marks. Answer to these questions should be in the range of 50 to 80 words.

(vi) Section D - Questions nos. 34 to 36 are long answer type questions. Each question carries 5 marks. Answer to these questions should be in the range of 80 to 120 words.

(vii) Section E - Questions nos. 37 to 38 are of source based/case-based units of assessment carrying 4 with sub-parts.

(viii) There is no overall choice. However, an internal choice is provided in in some questions. Only one alternative has to be attempted in such questions.

SECTION- A

1. Which of the given options correctly represents the Parent acid and base of Calcium Carbonate?

OPTION	PARENT ACID	PARENT BASE
A	HCl	NaOH
B	H_2CO_3	$Ca(OH)_2$
C	H_3PO_3	$CaSO_4$
D	H_2SO_4	$CaSO_4$

2. The electronic configurations of three elements X, Y and Z are :

   X : 2 Y : 2, 8, 7 Z : 2, 8, 2

   Which of the following is correct regarding these elements ?

   a) X is a metal
   b) Y is a metal
   c) Z is a non-metal
   d) Z is a metal

3. Which of the following substances will not give carbon dioxide on treatment with dilute acid?

   a) Marble
   b) Limestone
   c) Quick Lime
   d) Baking soda

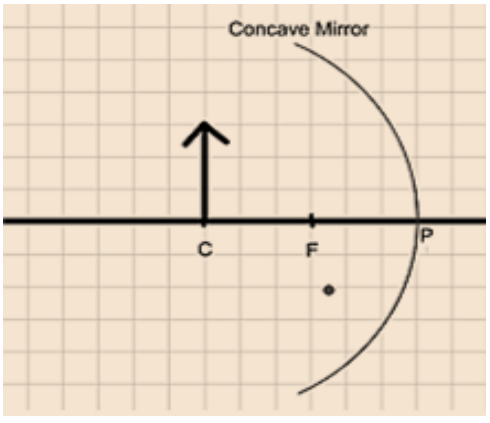
4. Brine is an

   a) aqueous solution of sodium hydroxide
   b) aqueous solution of sodium carbonate
   c) aqueous solution of sodium chloride
   d) aqueous solution of sodium bicarbonate

5. Which two chambers of the human heart have arteries connected to them?

   a) left atrium and left ventricle
   b) right atrium and right ventricle
   c) left atrium and right atrium
   d) left ventricle and right ventricle

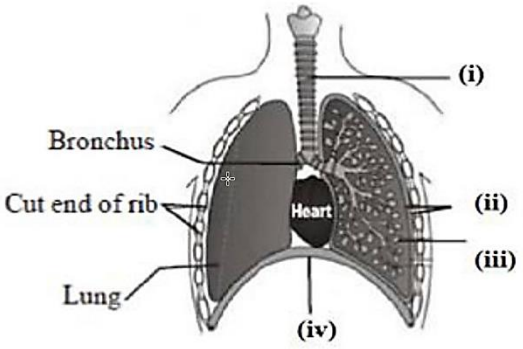
6. Examine the above figure and state which of the following option is correct? [one small box in the figure has side equal to 1 cm]



a) The mirror has a focal length of -6 cm and will produce an image of magnification +1.
b) The mirror has a focal length of -3 cm and will produce an image of magnification -1.
c) The mirror has a focal length of -3 cm and will produce an image of magnification +1.
d) The mirror has a focal length of -6 cm and will produce an image of magnification -1.

7. A cylindrical conductor of length l and uniform area of cross section A has resistance R. Another conductor of length 2l and resistance R of the same material has area of cross section
   a) A /2
   (b) A
   (c) 2A
   (d) 3A

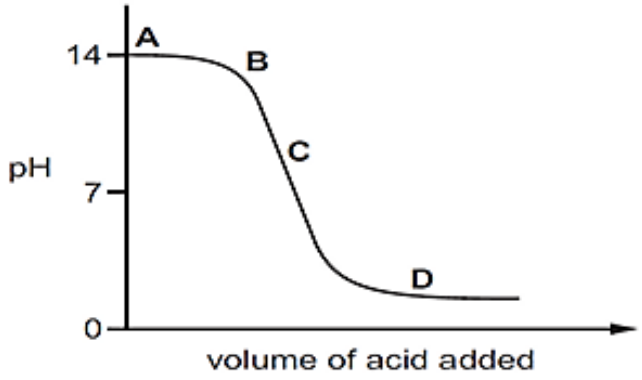
8. Examine the provided diagram of the human respiratory system, labeled A, B, C, and D. Choose the option that accurately identifies each component along with its primary function.
   a) (i) Trachea: Supported by bony rings for air conduction.
   b) (ii) Ribs: Lifted during exhalation
   c) (iii) Alveoli: Thin-walled sacs facilitating gas exchange.
   d) (iv) Diaphragm: Elevated during inhalation.



9. If a cross is made between hybrid tall and red flowered plant (Tt Rr) with dwarf and white flowered one(tt rr). What will be the genotypes of plants of F1 generation?
   a) Tt Rr, Tt RR, TT Rr, Tt rr in the ratio of 1:1:1:1
   b) Tt Rr, Tt rr , tt Rr , tt rr in the ratio of 1:1:1:1
   c) Tt RR, TT RR, ttRr, Ttrr in the ration of 1:1:1:1
   d) TTRR, TtRR, TTRr, Ttrr in the ration of 1:1:1:1

10. What is observed when a solution of potassium iodide is added to silver nitrate solution?
    a) No reaction takes place
    b) White precipitate of silver iodide is formed
    c) Yellow precipitate of silver iodide is formed
    d) White precipitate of potassium nitrate is formed

11. The graph given below depicts a neutralization reaction (acid + alkali → salt + water). The pH of a solution changes as we add excess of acid to an alkali. Which letter denotes the area of the graph where both acid and salt are present?



a) A
b) B
c) C
d) D

12. In the following food chain, how much energy will the hawk get if the energy available at the producer level is 100 J?

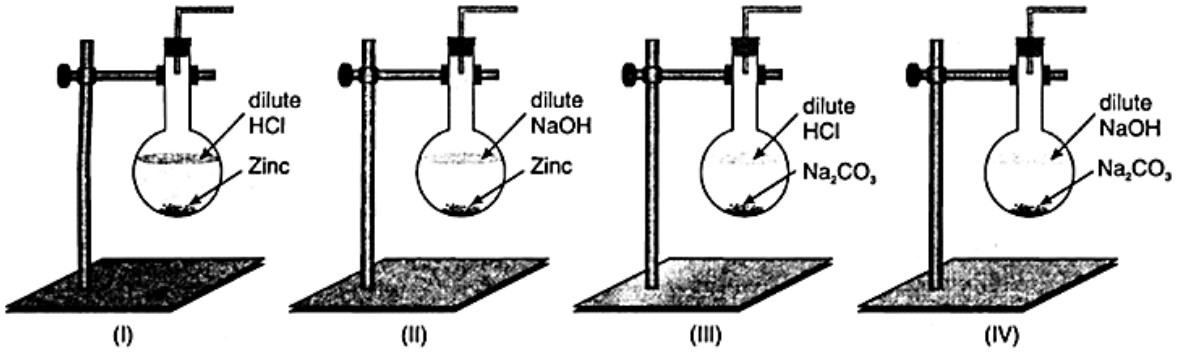
Plants → Mice → Snake → Hawk

a) 1000 J
b) 10 J
c) 1 J
d) 0.1 J

13. For the experiment – To prepare temporary mount of yeast to study budding process; Yeast granules are made to first grow by adding them to
a) Hydrochloric acid
b) Distilled water
c) 10% sugar solution
d) Alcohol

14. Consider these indices of refraction: glass: 1.52; air: 1.0003; water: 1.333. Based on the refractive indices of three materials, arrange the speed of light through them in decreasing order.
a) The speed of light in water > the speed of light in air > the speed of light in glass.
b) The speed of light in glass > the speed of light in water > the speed of light in air.
c) The speed of light in air > the speed of light in water > the speed of light in glass.
d) The speed of light in glass > the speed of light in air > the speed of light in water.

15. Four experiment setups are shown below :



The setups that would result in a rapid evolution of gas would be

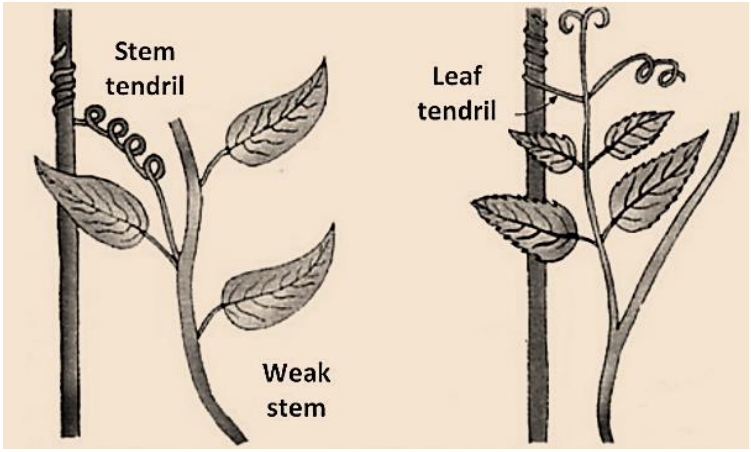
a) I and III
b) II and IV
c) l and II
d) III and I

16. Manisha is an Indian actress. She was born in Delhi to a homemaker mother and an engineer father. She is around 5 feet tall. She has naturally curly hair. She has trained in contemporary and ballet dancing. Which of these is MOST LIKELY to be true about her children?
a) They may dance well.
b) They may grow up to have curly hair.
c) They may be born to an engineer father.
d) They may become famous actors one day.
17. Assertion: The total mass of each element remains the same before and after a chemical reaction.
Reason : Chemical reactions obey the law of conservation of mass.
18. Assertion : The Bowman's capsule and the tubule together make a major part of nephron.
Reason : The function of tubule is to allow the selective reabsorption of substances like glucose, amino acids, urea, salts and water into the blood capillaries.
19. Assertion : The closing of a Venus flytrap is different from the growth of roots towards gravity.
Reason : The closing of the Venus flytrap is an example of thigmonastic movement, triggered by touch, while root growth in response to gravity is a form of geotropism.
20. Assertion : The sky appears blue during the day.
Reason : The scattering of sunlight by the atmosphere causes shorter wavelengths, like blue, to scatter more than longer wavelengths, such as red.

SECTION- B

21. Analyze the following redox reactions and identify the reducing agent in each. Explain the reason behind your identification.
(i) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$
(ii) $CuO+H_2 \rightarrow Cu+H_2O$

22. Observe the provided image and explain how auxins contribute to the growth of tendrils around a support.



23. Describe two distinct metabolic pathways through which glucose is oxidized to generate energy in the human body. For each pathway, explain the specific conditions under which it occurs.

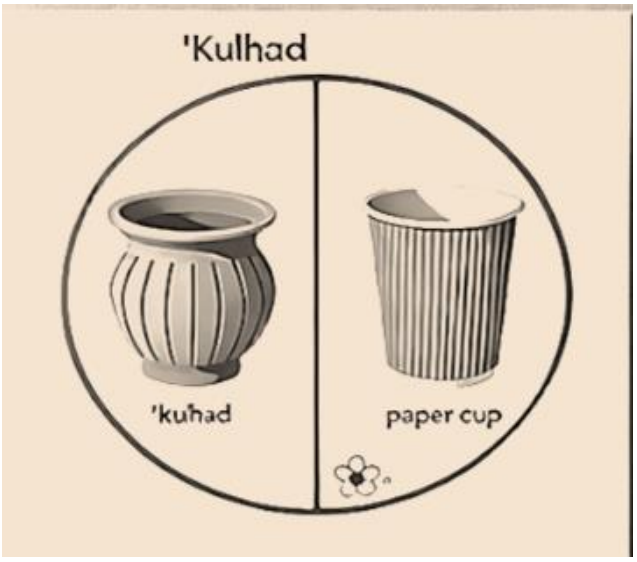
OR

Identify the glands located on the wall of stomach and list out the three main components of the secretions produced by these glands.

24. A. Why do Sunglasses have zero power even though their surfaces are curved?
    B. How can a size of eyeball be one of the reason for Myopia.
25. A) State the laws of refraction of light.
    B) The refractive index of some medium is given below:

    Crown Glass : 1.52
    Sapphire : 1.77
    Water : 1.33

    What change happens to the speed of light when it travels from
    i)water to sapphire ii)sapphire to crown glass
26. Observe the given diagram and answer the following questions:
    The diagram shows two types of disposable cups:



(i) Which cup would have a lesser environmental impact during production and disposal?
(ii) Discuss the biodegradability of both types of cups

SECTION- C

27. A. What is chlor-alkali process? Write its chemical equation. Which gas is evolved at cathode and anode?

OR

B**.** When a few drops of phenolphthalein are added to a dilute sodium hydroxide solution, a pink colour is observed. Predict and explain the final colour change when an excess of hydrochloric acid (HCl) is added to this mixture. Justify your answer by describing the chemical reactions and the role of phenolphthalein in indicating the pH of the solution.

28. A. (i)Illustrate the formation of Na_2O and MgO by the transfer of electrons.
(iii) What are cations present in these compounds?

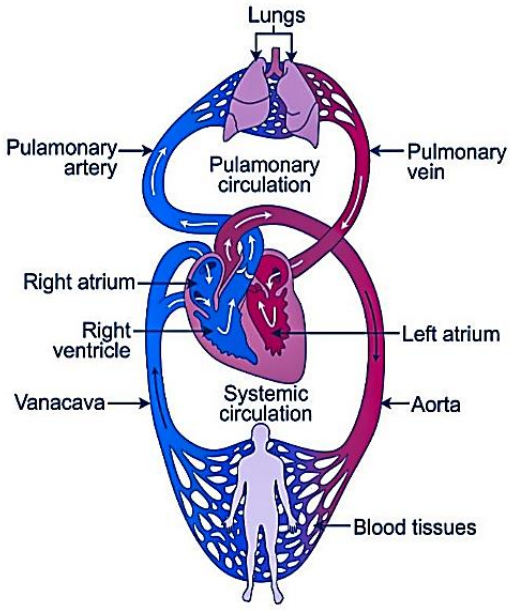
OR

B. (a) Arrange the following metals in order of their chemical reactivity, placing the most reactive metal first :

Magnesium, Copper, Iron, Sodium, Zinc, Lead, Calcium.

(b) What happens when a rod of zinc metal is dipped into a solution of copper sulphate ? Give chemical equation of the reaction involved.

29. Refer to the schematic representation of the double circulation system shown below. Based on your understanding, answer the following question:



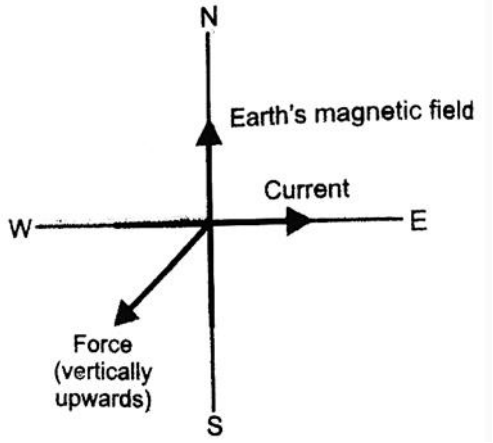
Describe the pathway of blood flow through the heart and the lungs. Include details about the oxygenation of blood during this process.

30. A) A farmer planted two homozygous varieties of pea plants in his garden. One variety produced round seeds, while the other produced wrinkled seeds. When these plants were cross pollinated, none of the plants produced wrinkled seeds. But when he self pollinated the new round seeded

plants, he was able to get wrinkled seeded plants in the next generation. Explain the genetic mechanism behind the observation.

B) A total of 300 tall heterozygous plants were self-pollinated. What would be the number of short homozygous plants in the next generation?

31. A current carrying straight conductor is placed in the east-west direction. A force is experienced by this conductor due to the Earth's magnetic field as shown in the diagram.



How will this force get affected on:

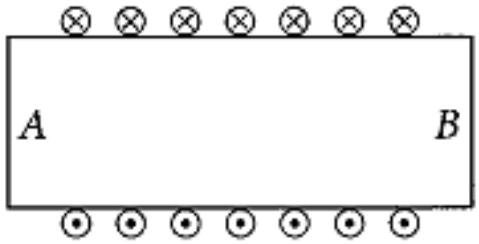
a) Reversing the direction of flow of current ? Also name the rule applied in the situation.

b) Doubling the magnitude of current ?

32. A) Why is the series arrangement not used for domestic circuits?

B) Which uses more energy a 200 watt Television set in 40 minutes or 1000 watt toaster in 20 minutes?

33. Diagram shows the lengthwise section of a current carrying solenoid. ⊗ indicates current entering into the page, ⊙ indicates current emerging out of the page. Decide which end of the solenoid A or B, will behave as north pole. Give reason for your answer. Also draw field lines inside the solenoid.



SECTION- D

34. A. i) How do soaps and detergents differ in terms of their composition and cleansing actions?

ii) Why do soaps do not work effectively in hard water? How is the problem overcome by detergents?

iii)Explain the cleansing action of soap.

OR

B. i) Combustion analysis of compound X revealed the ratio of its elements in a molecule to be carbon : hydrogen : oxygen – 3 : 6 : 2. The compound undergoes esterification to yield an ester and water.

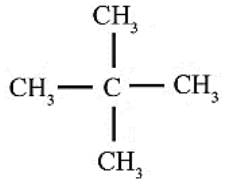
(a) Identify the compound X. Write its chemical formula.

(b) Write the balanced equation for the reaction of ethanol with sodium metal.

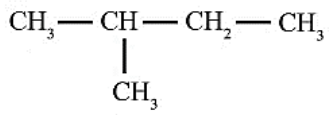
ii) Name the compound formed when ethanol is warmed with ethanoic acid in the presence of few drops of conc. H_2SO_4.

iii) Write the IUPAC name of the following and then write the condensed structural formula.

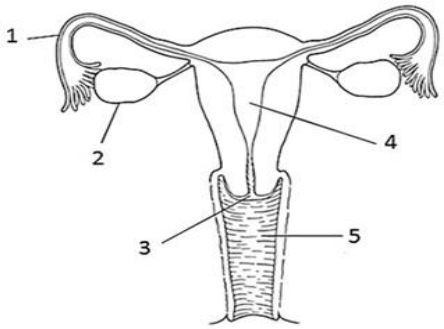
(a)



(b)



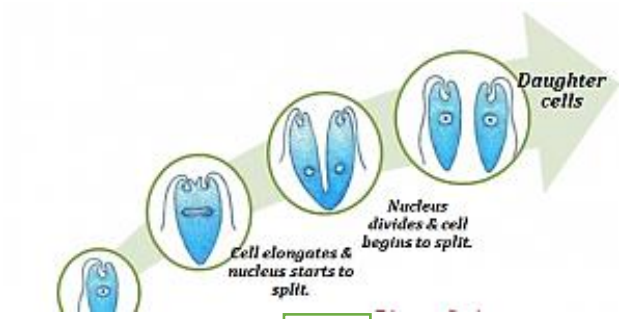
35. A. Refer to the diagram below:



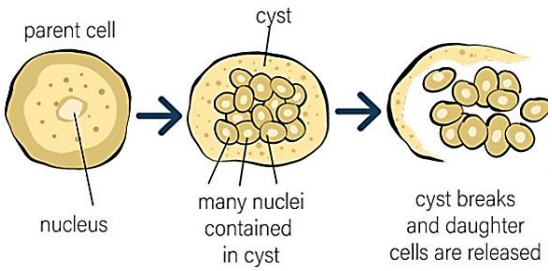
a) Identify the parts labelled 1 to 5 in the female reproductive system.
b) Name the art where implantation takes place.
c) What is the function of the fallopian tubes in the female reproductive system, and how do they facilitate the process of fertilization?
d) What changes occur in the uterine wall along with ovulation , and what happens if ovum is not fertilised?

OR

B. Observe the diagram and answer the following questions:



I



II

a) Identify the processes I and II .
b) How does the process II benefit these organisms in terms of survival and reproduction, especially in adverse conditions?
c) What are the key differences in these two processes ?In what types of organisms does each typically occur?

36. A. Draw a ray diagram in each of the following cases to show the formation of image, when the object is placed:
(i) between the optical centre and principal focus of a convex lens
(ii) at infinity in front of a concave lens
(iii) beyond 2F1 of a convex lens.

State the signs and values of magnification produced in the following cases:

Sl no	Object height	Image height	Nature of image
i)	8cm	16cm	Real inverted
ii)	10cm	5cm	Virtual erect

OR

B. A person is suffering from both myopia and hypermetropia.

(i) What kind of lenses can correct this defect?
(ii) How are these lenses arranged in a spectacle?
(b) A person needs a lens of power +3 D for correcting his near vision and -3 D for correcting his distant vision. Calculate the focal lengths of the lenses required to correct these defects.

SECTION– E

Question No. 37 to 39 are case-based/data -based questions.

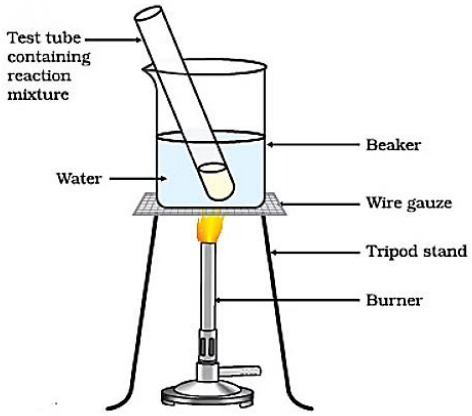
37. A garden is home to various flowering plants. Each morning, bees, butterflies, and other insects visit these flowers, attracted by their vibrant colours and fragrance. When a bee visits a flower, it picks up pollen grains from the anthers, which stick to its body. As the bee flies to another flower of the same species, it brushes against the stigma, transferring some of the pollen grains. This process of pollination allows for fertilization to occur, where a pollen tube grows from the stigma to the ovary, leading the male gamete to meet the female ovules inside the ovary. This union of gametes results in the formation of seeds, which develop into new plants.

(i) Which of the following is NOT true about pollination in plants?
(a) Pollination is essential for fertilization in flowering plants.
(b) Insect pollination is the only type of pollination in plants.
(c) Pollen grains are transferred from anther to stigma.
(d) Pollination can occur within the same flower or between different flowers.

(ii) Describe the difference between self-pollination and cross-pollination.

(iii) In a situation where the population of bees decreases significantly, how might this impact the process of pollination and, consequently, the plant population in the garden?

38. When an alcohol is treated with a carboxylic acid in the presence of sulphuric acid a compound is formed. This compound has a sweet smell. The compound obtained is called ester. The chemical reaction occurring in the formation of the ester is known as an esterification reaction. Saponification the reverse of esterification. The given figure shows the formation of an ester ethyl ethanoate.

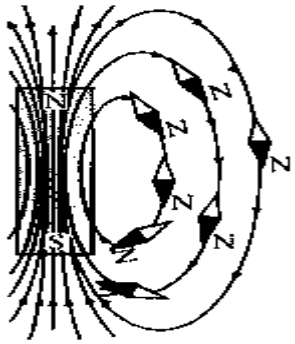


(i) What are the two main reactants involved in the formation of ethyl ethanoate?
(ii) How does the formation of esters contribute to the world of perfumes and flavours?
(iii) What is the role of sulphuric acid in this process?
(iv) Write a balanced chemical equation for saponification reaction in which one of the reactants is ethyl ethanoate?

OR

Write a balanced chemical equation for the above esterification reaction.

39. A magnetic field is described by drawing the magnetic field lines. The path traced by a north magnetic pole free to move under the influence of a magnetic field is called a magnetic field line. Since the direction of magnetic field line is the direction of force on a north pole, the magnetic field lines always begin from the N-pole of a magnet and end on the S-pole of the magnet. Inside the magnet, however the direction of magnetic field lines is from the S-pole of the magnet to the N-pole of the magnet. Thus, the magnetic field lines are closed curves. When a small compass is moved along a magnetic field line, the compass needle always sets itself along the line tangential to it. So, a line drawn from the south pole of the compass needle to its north pole indicates the direction of the magnetic field at that point.



i) Draw magnetic field lines around a bar magnet.
ii) Why don't two magnetic field lines intersect each other?
iii) What change in the deflection of the compass needle placed at a point near current carrying straight conductor shall be observed if the current through the conductor increased?
iv) The magnetic field in a given region is uniform. Draw a diagram to represent it?

OR

Consider a circular loop of wire lying in the plane of the table. Let the current passes through the loop clockwise. Apply the right- hand rule to find out the direction of the magnetic field inside and outside the loop.

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