**Common Instructions to Candidates :**

1) This is a question cum answer paper booklet.
2) This question cum answer booklet contains two parts. Part - A contains the questions of Physics and Chemistry and Part - B contains Biology questions.
3) Space is provided to write answers below each question. Answer should be written within the space provided.
4) This question cum answer booklet has 36 questions in Part - A and 19 questions in Part - B and together there are 55 questions including the matching type questions.
5) Candidate should not write the answer with pencil. Answer written with pencil will not be evaluated. (Except graphs, diagrams & maps).
6) In case of multiple choice, fill in the blanks and matching questions, scratching, rewriting & marking is not allowed. Answers with such errors will not be evaluated.

## Part - A
## Physics & Chemistry

**I.** Four alternatives are given for each of the following questions / incomplete statement only one of them is correct or most appropriate. Choose the most appropriate alternative and write it in the space provided below question. **[10 x 1 = 10]**

1. The important application of electromagnetic radiation of wavelength 400 nm to 750 nm is,

   a) sterilisation  b) to detect fracture of bones

   c) photosynthesis  d) to detect artificial gems

   Ans. c) photosynthesis 1

2. In the device used in exposure meters the electrons are ejected by the following energy

   a) heat energy  b) friction energy

   c) chemical energy  d) light energy

   Ans. d) light energy 1

**Space for Rough Work**

3. If the efficiency of a heat engine which uses 800 kJ heat energy to do a work is 40%. Then the loss of heat energy is,

   a) 320 kJ b) 480 kJ

   c) 200 kJ d) 400 kJ

Ans. b) 480 kJ 1

4. The device used in separating proteins, harmones, viruses from a liquid medium is

   a) Fractionating column b) Centrifugal governor

   c) Centrifuge d) Filtration apparatus.

Ans. c) Centrifuge 1

5. Doppler effect of light can be applied in the study of the following

   a) The velocity of submarines

   b) Speed of galaxies

   c) Pollutants in the atmosphere

   d) Crystal structure.

Ans. b) Speed of galaxies 1

6. An example for a reaction in which the nucleus of an atom undergoes change is

   a) Photosynthesis

   b) Combustion of carbon in air

   c) Reaction of Sodium in water

   d) Fission chain reaction of uranium.

Ans. d) Fission chain reaction of uranium. 1

**Space for Rough Work**

7. $2\ C_4H_{10} + 13\ O_2 \rightarrow 8\ CO_2 + 10\ H_2O$ + Energy. In this reaction the mass of oxygen required for the complete combustion of one mole of butane is

   a) 16 b) 416

   c) 208 d) 32

   Ans. c) 208 1

8. The acid related to the preparation of detergent is

   a) Stearic acid

   b) Hydrochloric acid

   c) Nitric acid

   d) Sulphuric acid

   Ans. d) Sulphuric acid 1

9. The following is not used to manufacture soap,

   a) Coconut oil b) Kerosine oil

   c) Castor oil d) Palm oil.

   Ans. b) Kerosine oil 1

10. Cement is used as building material because it

    a) is a good binding agent

    b) sets rapidly

    c) is prepared from cheap raw materials

    d) withstands high temperature.

    Ans. a) is a good binding agent 1

**Space for Rough Work**

**II.** Fill up the blanks: **[3 x 1 = 3]**

11. The valency of the dopent used in the base region of p-n-p transistor is _____.

Ans. FIVE **1**.

12. The velocity of ultrasonic sound waves in water is 1.5 km/s. The distance travelled by those waves in 2 seconds is _____ km.

Ans. 3 km **1**.

13. The device which converts solar energy into electrical energy is _____.

Ans. Solar Cell **1**.

**III.** 14. Match the following: **[4 x 1 = 4]**

Match the items of list 'A' with items of list 'B' and write the answers in the space provided:

| A | B | Answers |
|---|---|---|
| 1) Siderite | a) Copper oxide | 1) c) Iron Carbonate **1** |
| 2) Copper glance | b) Copper sulphate | 2) d) Copper sulphide **1** |
| 3) Magnetite | c) Iron Carbonate | 3) f) Iron oxide **1** |
| 4) Malachite | d) Copper sulphide | 4) g) Copper Carbonate **1** |
| | e) Iron sulphide | |
| | f) Iron oxide | |
| | g) Copper Carbonate | |

**Space for Rough Work**

**IV.** Answer the following: **[6 x 1 = 6]**

15. How many times the first magnitude star is brighter than the third magnitude star?

Ans. $2.5^2$ times or 6.25 times **1**

16. Compact fluorescent tubes are more suitable than the Incandescent electric bulbs to save electric energy. Why?

Ans. Incandescent bulbs produce more heat and less light where as fluorescent tubes produce little heat and more light. **1**

17. What is the reason for the enormous energy of sun.

Ans. Thermonuclear fusion. **1**

18. Calcium bicarbonate is dissolved in water. Write the equation that takes place when it is boiled?

Ans. $Ca(HCO_3)_2 \rightarrow CaCO_3 \downarrow + H_2O + CO_2 \uparrow$

Calcium bicarbonate $\rightarrow$

Calcium carbonate + Water + Carbondioxide. **1**

**Space for Rough Work**

19. What is centripetal force?

Ans. Centripetal force is defined as the radial force directed towards the centre, acting on a body moving in a circular path. **1**

20. In the power stroke of a petrol engine the piston is pushed with great force. Why?

Ans. When the compressed mixture is ignited by the spark, the gases produces of combustion expands. By this the piston pushed with great force. **1**

**Space for Rough Work**

**V.** Answer the following: **[9 x 2 = 18]**

21. State Faraday's laws of electromagnetic induction.

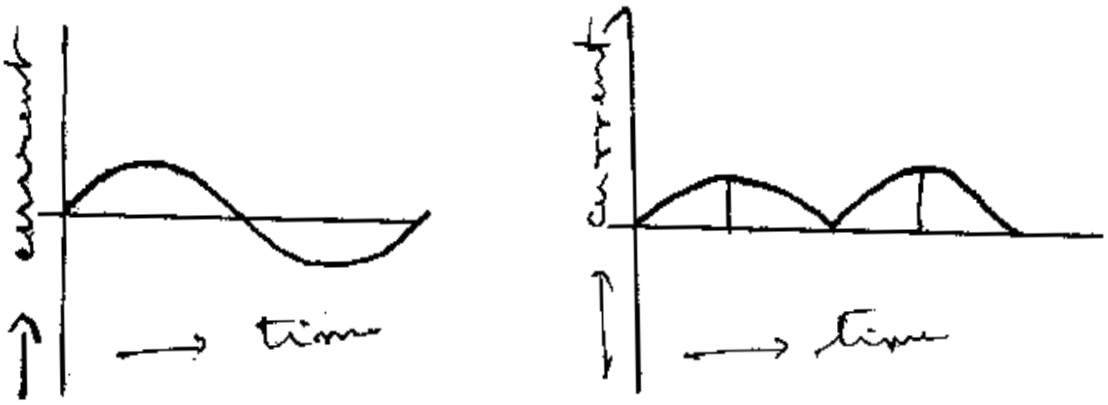
Ans. First law: A changing magnetic field linking a conductor includes an electromotive force in the conductor.

Second law : The induced electromotive force is proportional to the rate of change of magnetic field linking the conductor. **2**

**Space for Rough Work**

22. Draw the graph of induced current in each of A.C. and D.C. Dynamo.

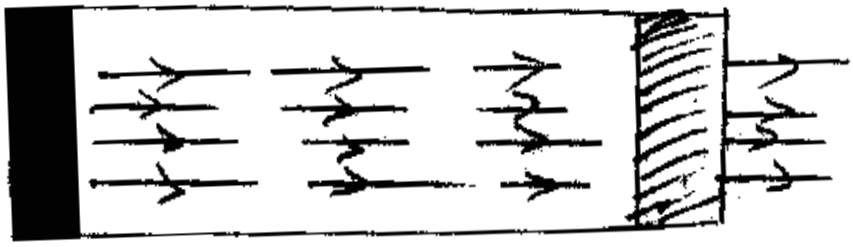
Ans.




**2**

23. Draw a neat diagram of gas laser tube.

Ans.



**2**

**Space for Rough Work**

24. Mention any four limitations of external combustion engine.

Ans. 1) External combustion engines are bulk.

2) Cannot be used to run small vehicles.

3) A major portion of heat energy in wasted.

4) The engine can not start instantaneously. **2**

25. It is found that pig iron obtained from blast furnace contains more quantity of silica and carbon. What are the reasons for the presence of these impurities. How can this mistake be corrected in future?

Ans. If the quantity of lime stone used in the raw materials to extract iron from blast furnance contain loss than retained released.

Silica impuritin cannot be removed even plenty remains.

To correct this error the raw materials store the mixer in suitable proportion. **2**

**Space for Rough Work**

26. What is the role of magnesium and hydrochloric acid used in the extraction of silicon.

Ans. Magnesium removes Oxygen from Silica or Silicon dioxide dil.Hydrochloric acid, removes unchanged Silica. **2**

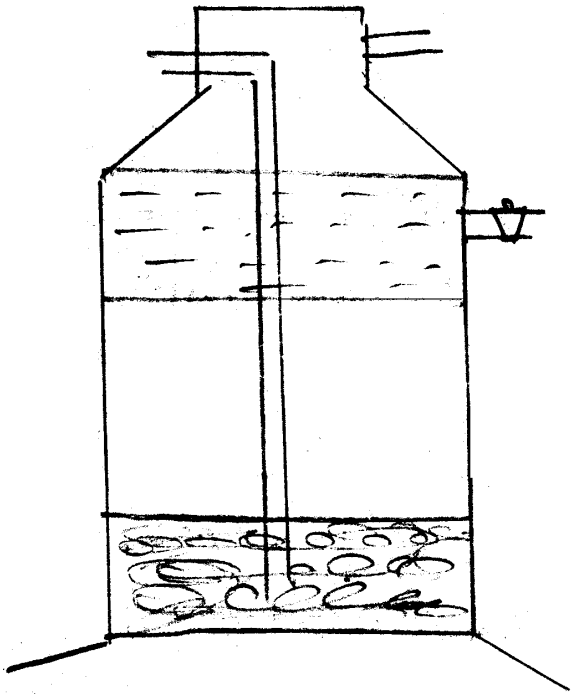
27. What is annealing of glass? Why it is done?

Ans. The process of slow cooling glass is known as annealing. By this glass gains the capacity to withstand stress and loses brittleness. **2**

**Space for Rough Work**

28. Draw a neat diagram of the column used in the softening of hard water by permutit process.

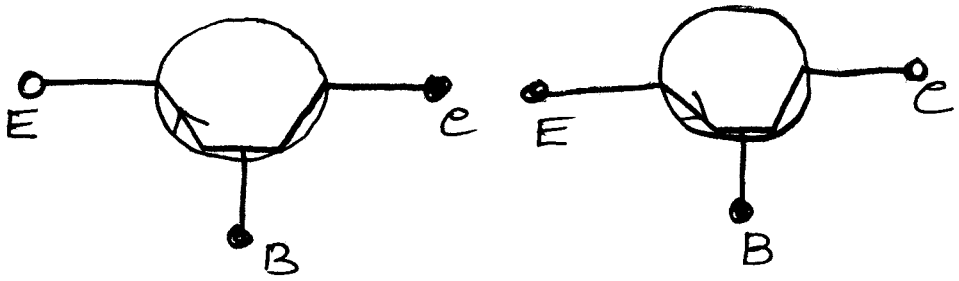
Ans.



**2**

29. Write the circuit symbol of n-p-n and p-n-p transistors.

Ans.




**2**

**Space for Rough Work**

**VI.** Answer the following: **[4 x 3 = 12]**

30. State Kepler's laws of planetary motion.

Ans. First law : The planets move in elliptical orbits around the sun, with the sun at one focus.

Second law: An imaginary line drawn from the sun to a planet, sweeps equal areas in equal intervals of time.

Third law : The cube of the average distance ($r$) of a planet from the sun is proportional to the square of its period (T) of revolution or $r^3 \propto T^2$.

**3**

**Space for Rough Work**

31. What is a spectroscope? Mention the functions of the following parts in the spectroscope.

a) Collimator b) Telescope.

Ans. Spectroscope is an instrument to obtain pure spectrum of a composite light using a prism.

a) Collimator : Light from the slit is rendered parallel by the lens.

To get a narrow parallel beam of light.

b) Telescope : It helps to observe a magnified image of the spectrum.

To obtain magnified image of the spectrum.

**3**

**Space for Rough Work**

32. Eventhough there are no electrons in the nucleus of an atom, during beta decay electrons are ejected from the nucleus. How? ${}_{Z}X^{A} \rightarrow Y$. This is an example for Alpha decay. What will be the atomic number and atomic mass of Y.

${}_{Z}X^{A} \rightarrow Y$. This is an example for Beta decay. What will be atomic number and atomic mass of Y.

Ans. It is assumed that a nutron in a nucleus changes to a proton and an electron. Newly formed electron is emitted and comes out.

${}_{Z}X^{A} \rightarrow Y$

In this example for Alpha decay the atomic number of X is Z - 2 and the atomic mass is A - 4.

${}_{Z}X^{A} \rightarrow Y$

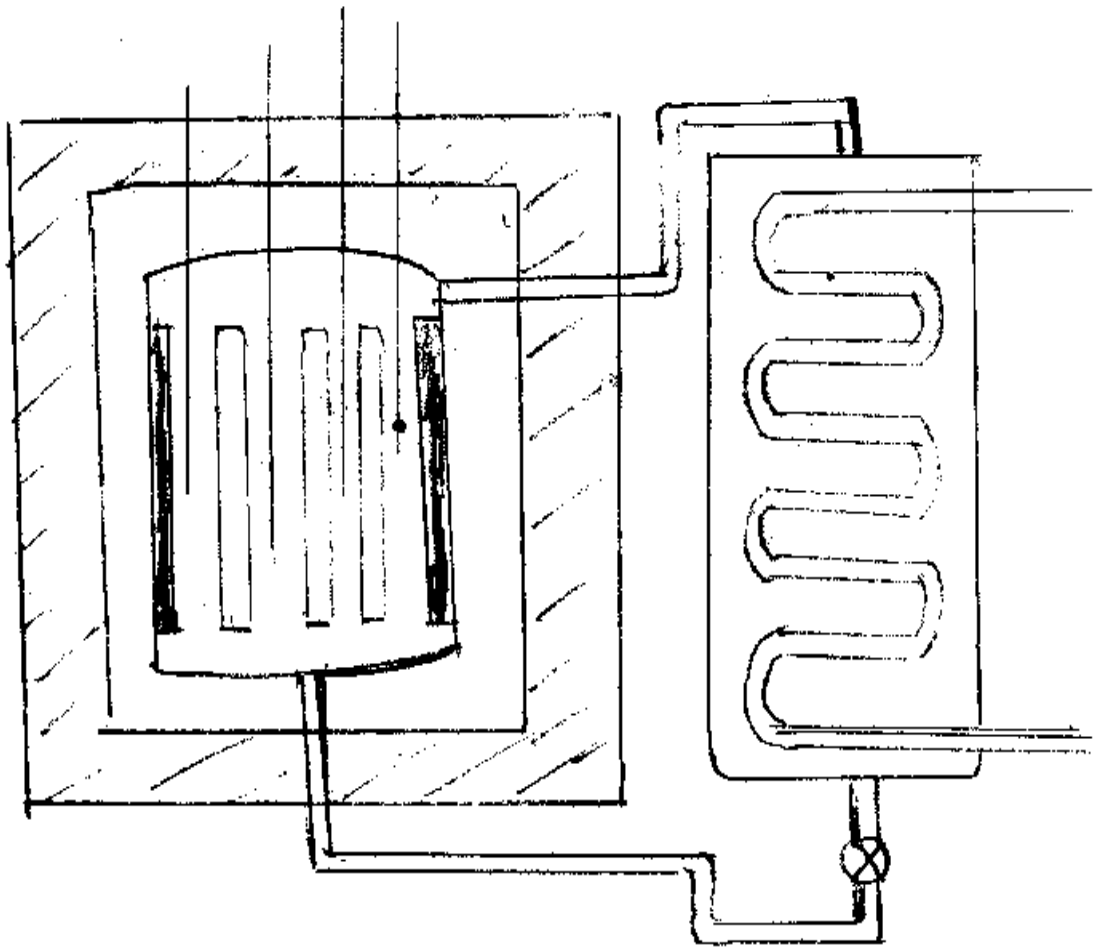
In this example for Beta decay the atomic number of Y is Z + 1 and the atomic mass is remains same as A.

**3**

**Space for Rough Work**

33. Draw a neat diagram of nuclear power reactor.

Ans.



3

**Space for Rough Work**

**VII.** Answer the following: **[3 x 4 = 12]**

34. a) What are Geostationary satellites?

b) Mention the orbital period and the distance from the surface of the earth of geostationary satellites.

c) Write any one use of the geostationary satellite.

Ans. a) An satellite launched, so that they remain in fixed positions relative to the earth at a specific hight above the equator is known as geostationary satellite.

b) The period of revolution is 24 hours. The distance from the earth surface is 36,000 km.

c) Uses : geostationary satellites works as a communication satellites means helps to radio and TV broadcasting. It helps us to survey of geological resources.

**4**

**Space for Rough Work**

35. a) What is a galaxy?
    b) Mention the type of galaxies.
    c) Name the galaxy in which sun is present.
    d) What is the type of this galaxy?

Ans. a) Galaxy is the group of about 10″ stars which have common gravity.

b) Galaxies are classified as

1) spiral galaxies.
2) elliptical galaxies.
3) irregular galaxies.

c) Milkyway is the galaxy where our sun is located.

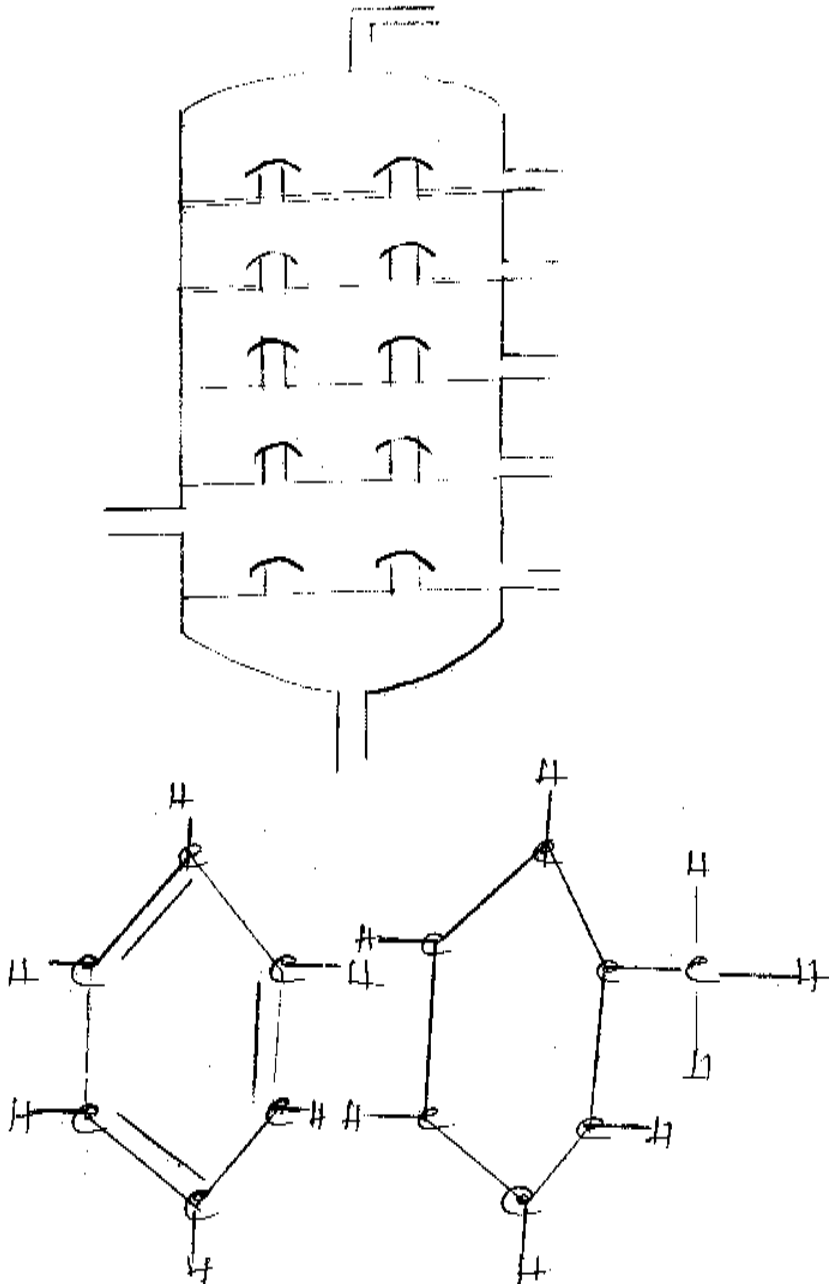
d) The shape of Milkyway is Spiral. **4**

**Space for Rough Work**

36. a) Draw the neat diagram of fractional tower used in the fractional distillation of petroleum refining.

b) Write the structural formula of benzene and toluene?

Ans.



4

**Space for Rough Work**

## Part - B
## Biology

**VIII.** Four alternatives are given for each of the following questions. Choose the most appropriate alternative and write it in the space provided below each question. **[5 x 1 = 5]**

37. Which of the following group of plants bear Inflorescence.
    a) Bryophytes
    b) Pteridophytes
    c) Gymnosperms
    d) Angiosperms

Ans. d) Angiosperms 1

38. The egg shell of birds may break easily if one of the following is insufficient.
    a) Magnesium carbonate
    b) Ferrous sulphate
    c) Calcium carbonate
    d) Calcium bicarbonate.

Ans. c) Calcium carbonate or d) Calcium bicarbonate. 1

39. One of the main function of Parenchyma tissue is, it
    a) Supports other tissues
    b) Takes part in Photosynthesis
    c) Gives tensile strength to the plant body
    d) Conducts water to different parts of the plant body.

Ans. a) Supports other tissues or b) Takes part in Photosynthesis. 1

**Space for Rough Work**

40. The function of Adipose tissue can be compared to, Heat

a) Regulator b) Insulator

c) Conductor d) Generator

Ans. a) Regulator or b) Insulator 1

41. Which of the following life processes may be affected if the two cells around the stomata not function.

a) Respiration and Growth b) Transpiration and Respiration

c) Respiration and Reproduction d) Transpiration and Food conduction.

Ans. b) Transpiration and Respiration 1

**IX.** 42. Column 'A' has names of bacteria and Column 'B' has related functions. Match the two and write the answers in the space provided. **[4 x 1 = 4]**

| A | B | Answers |
|---|---|---|
| 1) Nitrobactor | a) Releases $CO_2$ into atmosphere. | 1) f) Converts Nitrites into Nitrates. 1 |
| 2) Pseudomonos | b) Converts Nitrates into Nitrites. | 2) d) Releases Nitrogen into atmosphere. 1 |
| 3) Rhizobium | c) Releases oxygen into atmosphere. | 3) g) Participate in Biological fixation. 1 |
| 4) Nitrosomonos | d) Releases Nitrogen into atmosphere. | 4) e) Converts Ammonium salts into nitrites. 1 |
| | e) Converts Ammonium salts into nitrites. | |
| | f) Converts Nitrites into Nitrates. | |
| | g) Participate in Biological fixation. | |

**Space for Rough Work**

**X.** Answer the following questions in a sentence each: **[4 x 1 = 4]**

43. Mention the genetic material and enzyme present in HIV.

Ans. Genetic material - R.N.A. $\frac{1}{2} + \frac{1}{2}$

enzyme - Reverse transcriptase

44. Mention two Agricultural wastes which flows into the Natural water bodies.

Ans. Residues of fertilizers and Pesticides. $\frac{1}{2} + \frac{1}{2}$

45. Write any one function of Phagocytes present in Lymph tissue.

Ans. Phagocytes remove bacteria and foreign bodies from the tissue.

46. Why should FPO conduct quality tests of food products periodically? 1

Ans. To avoid "Food adulteration". 1

**XI.** Two marks questions. **[6 x 2 = 12]**

47. What is the significant characteristic acquired by Pteridophytes in the process of Evolution? Give two examples for Pteridophytes.

Ans. Development of Vascular tissues. or (Xylem and phloem). 2

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**Space for Rough Work**

48. a) How is the Stomach wall protected against the acidic contents secreted in it?

Ans. The mucus secreted by the columnar epithelium cells in the Stomach protects the wall of the Stomach from acidic contents secreted in it. 1

b) Why should heart have involuntary muscle?

Ans. Because Involuntary muscles are responsible for the continuous heart beat throughout One's life. 1

or

They do not fatigue easily.

**Space for Rough Work**

49. a) Due to what reason blood from retina would seep into Vitreous humour?

Ans. Because of severe Diabetes the blood from the retina may seep in to vitreous humour. 1

or Glucoma

or Injuries caused due to other Reason

or Retinal infection

b) What is the treatment for this condition?

Ans. Vitrectomy. 1

or Surgery

Early treatment with laser beam.

Prevent this problem.

**Space for Rough Work**

50. Mention any two precautionary measures taken to prevent infection of HIV.

**Any two 1+1**

Ans. a) Sexual contact with the persons affected by HIV should be totally avoided.

b) The syringe used by the AIDS patient should not be used by others.

c) Before donating or receiving blood one should make sure that the person has no HIV.

d) A mother affected by AIDS should not breast feed her child.

e) One must not become a drug addict injection of Sedative drugs by needles can cause AIDS disease.

51. Mention the four aspects that a person must check while purchasing a sealed drinking water bottle.

Ans. a) ISI Stamp. $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$

b) Date of Manufacture.

c) Date of Expiry.

d) Weight.

e) Quantity in place of weight.

f) M.R.P. or Cost

**Space for Rough Work**

52. Which aspect of biotechnology do you suggest to a farmer who is at loss in cultivating rose plants? And why?

Ans. a) Tissue culture. or Genetic Engineering **1**

b) Because. (any one of the following points). **1**

1) It is possible to obtain disease - resistant and high yielding variety of plants through this technique.

2) It is possible to reduce the period of life span of many plants. Ex: One can have two seasons of flowering in Rose which normally has a single season.

3) It is possible to develop large number of plants in a limited space and in a short period of time.

**Space for Rough Work**

**XII.** Three marks questions: **[2 x 3 = 6]**

53. Give Scientific reason:

a) An adolescent boy is found to be Sexually underdeveloped.

Ans. Because :

Deficiency of testosterone hormone. **1**

or

Inadequate secretion of testosterone hormone.

b) Some young babies may show stunted growth, retarded Mental development, bowed legs, protrusion of the tongue and wrinkled skin.

Ans. This condition is produced in children born without a

properly functioning thyroid. **1**

**Space for Rough Work**

c) At the time of emergency faced by human body, there is a possibility of dialation of Pupil in Eye.

Ans. ∵ Adrenaline is secreted in excess quantity. **1**

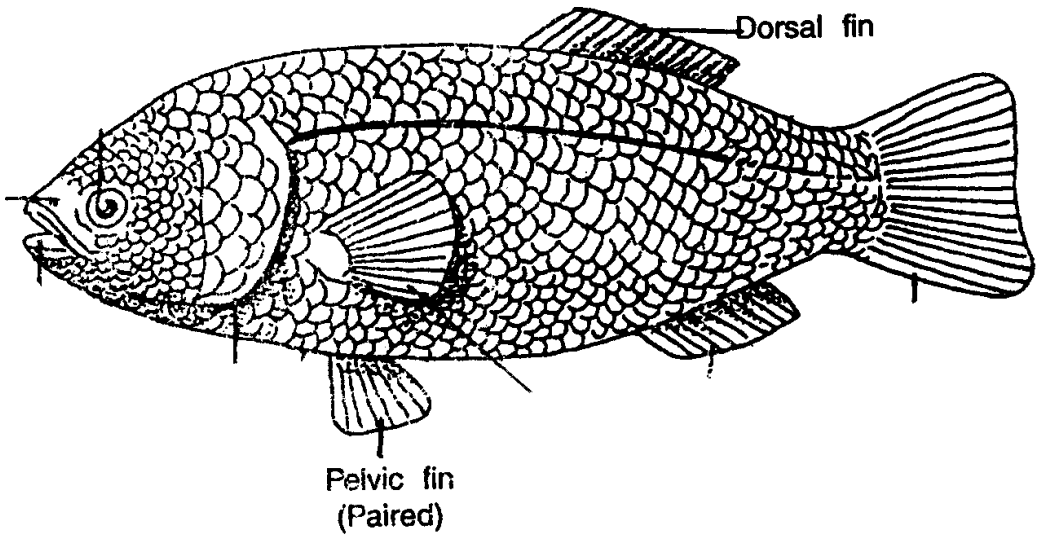
**Space for Rough Work**

54. Draw a neat diagram to show the external feature of Fish and label the following parts:

a) Pelvic fin.

b) Dorsal fin.

Ans. External feature of Fish $2+\frac{1}{2}+\frac{1}{2}$




**Space for Rough Work**

**XIII.**Four marks question:

55. Draw a neat diagram of cross section of spinal cord and label the following parts: **[4 x 1 = 4]**

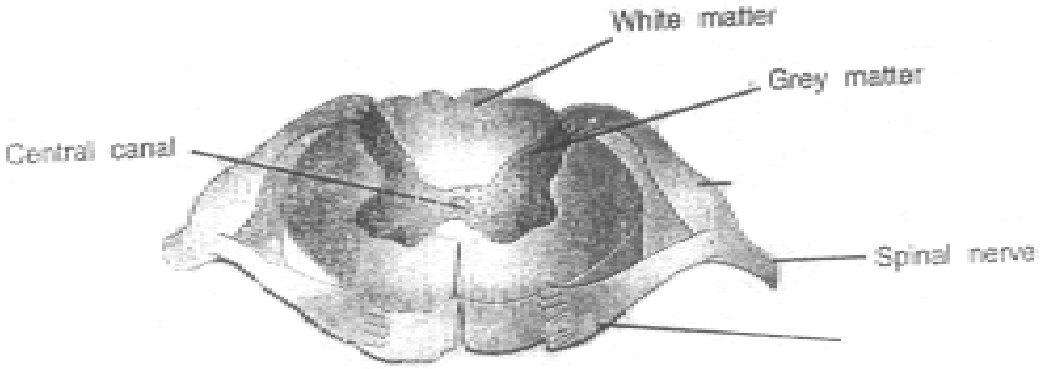
a) Central Canal

b) White matter

c) Grey matter

d) Spinal nerve.

Ans. Cross section of spinal cord $\mathbf{2+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}}$




**Space for Rough Work**