SAINIK SCHOOL NALANDA

CLASS XB

SUBJECT: SCIENCE(BIOLOGY)

SUMMER VACATION HOME WORK (25-26)

QUESTION BANK OF BIOLOGY FOR UPCOMING EXAM IN THE MONTH OF JULY 25

(COMPILED BY PK VERMA)

ALL QUESTIONS ARE COMPULSORY TO SOLVE IN HOMEWORK NOTEBOOK

1. **<u>Read the passage and answer the questions</u>:**

Photosynthesis is a process in which light energy is absorbed by chlorophyll in plant leaves and converted into chemical energy. This energy is used to split water molecules into hydrogen and oxygen and to reduce carbon dioxide into carbohydrates like glucose. The cross-section of a leaf reveals various structures involved in this process, such as the upper and lower epidermis, guard cells, air spaces, and chloroplasts, which contain the chlorophyll essential for photosynthesis. The vascular bundle, comprising xylem and phloem, helps in the transport of water and food. These coordinated structures and reactions highlight the leaf's role in photosynthesis.

Multiple Choice Questions (MCQs):

i. Which of the following structures contains chlorophyll in the leaf?
(a) Xylem
(b) Phloem
(c) Chloroplast
(d) Guard cell

ii. What is the primary function of the vascular bundle in a leaf?
(a) Absorption of light
(b) Transport of water and food
(c) Production of glucose
(d) Protection against water loss

<u>Very Short Answer Questions</u>:

i. Name the green organelle found in the leaf that is essential for photosynthesis.

ii. What gas is released during the splitting of water molecules in photosynthesis?

2. **Based on this image 5.3, answer the following questions given below.**

Now, let us study how the plant obtains carbon dioxide. In Class IX, we had talked about stomata (Fig. 5.3) which are tiny pores present on the surface of the leaves. Massive amounts of gaseous exchange takes place in the leaves through these pores for the purpose of photosynthesis. But it is important to note here that exchange of gases occurs across the surface of stems, roots and leaves as well. Since large amounts of water can also be lost through these stomata, the plant closes these pores when it does not need carbon dioxide for photosynthesis. The opening and closing of the pore is a function of the guard cells. The guard cells swell when water flows into them, causing the stomatal pore to open. Similarly the pore closes if the guard cells shrink.

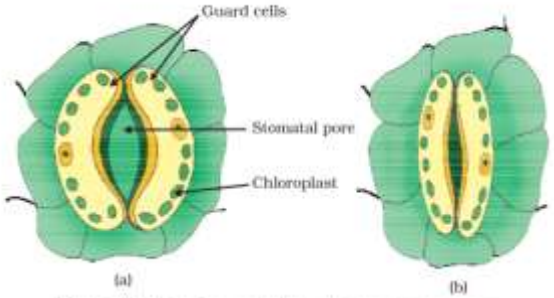


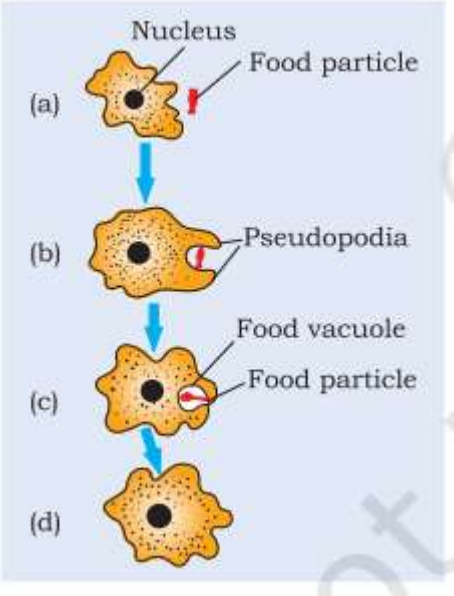
Figure 5.3 *(a) Open and (b) closed stomatal pore*

a. Why do plants close their stomatal pores when they do not need carbon dioxide for photosynthesis?

b. What would happen to the stomatal pores if guard cells fail to swell due to lack of water?

c. Analyze the role of guard cells in maintaining the balance between gas exchange and water loss in plants.

3. **Based on this image, answer the following questions given below.**



a. Why do you think pseudopodia are essential for the Amoeba's survival?

b. What would happen if the Amoeba were unable to form a food vacuole after engulfing the food particle?

c. How is the process shown in the diagram similar to or different from the way human white blood cells capture pathogens?

d. If the food particle were toxic, how might the Amoeba protect itself during or after ingestion?

4. **Based on this image 5.6 , answer the following questions given below**

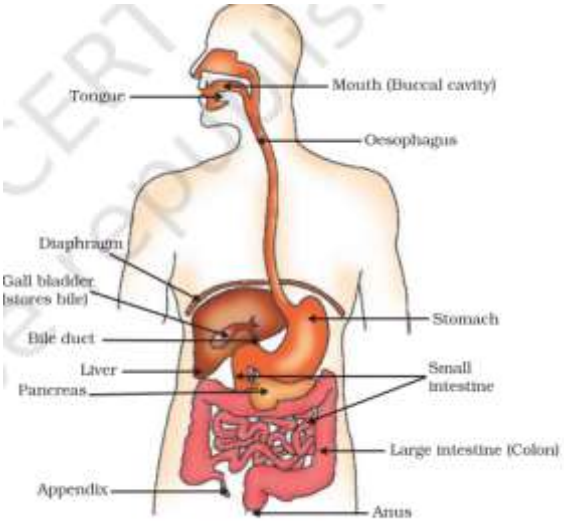


Figure 5.6 Human alimentary canal

a. **How might the digestion process be affected if the liver stopped producing bile?**

b. **Why is it beneficial for the small intestine to be long and coiled rather than short and straight?**

c. **If the pancreas were damaged, what specific digestive functions would be most affected and why?**

d. **Why do you think the stomach is located before the small intestine in the alimentary canal?**

e. **What could happen if the sphincter between the stomach and small intestine failed to function properly?**

5. **Based on this image 5.8 , answer the following questions given below**

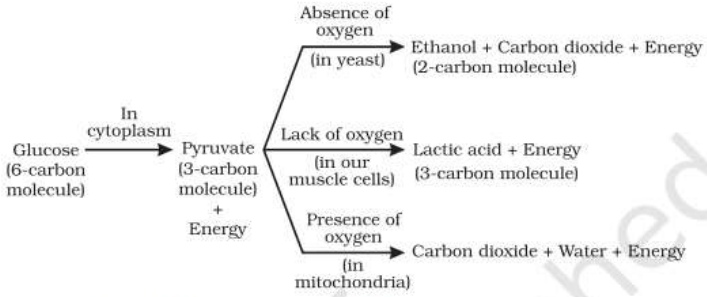


Figure 5.8 *Break-down of glucose by various pathways*

a. **Why do muscle cells produce lactic acid during intense exercise, and what could be the consequences if this continues for a long time?**

b. **Compare the efficiency of energy production in the presence and absence of oxygen. Why might organisms prefer aerobic respiration?**

c. **How does the breakdown of glucose in yeast differ from that in human muscle cells when oxygen is absent? What are the implications for industrial uses?**

d. **If mitochondria in a cell were damaged, which pathway of glucose breakdown would most likely occur, and why?**

e. **How is the structure of the glucose molecule related to the different breakdown products in each pathway?**

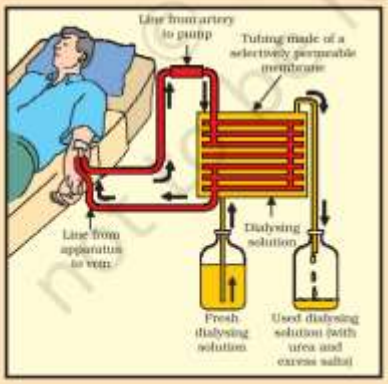
6. **Based on this image, answer the following questions given below**.

More to Know!

Artificial kidney (Hemodialysis)

Kidneys are vital organs for survival. Several factors like infections, injury or restricted blood flow to kidneys reduce the activity of kidneys. This leads to accumulation of poisonous wastes in the body, which can even lead to death. In case of kidney failure, an artificial kidney can be used. An artificial kidney is a device to remove nitrogenous waste products from the blood through *dialysis*.

Artificial kidneys contain a number of tubes with a semi-permeable lining, suspended in a tank filled with dialysing fluid. This fluid has the same osmotic pressure as blood, except that it is devoid of nitrogenous wastes. The patient's blood is passed through these tubes. During this passage, the waste products from the blood pass into dialysing fluid by diffusion. The purified blood is pumped back into the patient. This is similar to the function of the kidney, but it is different since there is no re-absorption involved. Normally, in a healthy adult, the initial filtrate in the kidneys is about 180 L daily. However, the volume actually excreted is only a litre or two a day, because the remaining filtrate is re-absorbed in the kidney tubules.



f. Why is it important that the dialysing fluid has the same osmotic pressure as blood but is devoid of nitrogenous waste?

g. How does the semi-permeable membrane in the dialysis machine mimic the natural filtration process of the kidneys?

h. In what way is haemodialysis similar to and different from the normal functioning of kidneys?

i. What might happen if the tubing in the dialysis machine were not semi-permeable or if the dialysing fluid contained nitrogenous wastes?

j. Why is only about 1–2 litres of urine excreted daily if the kidneys initially filter about 180 litres of fluid? What does this indicate about the role of kidney tubules?

ALL QUESTIONS ARE COMPULSORY

(SOLVE IT IN NDA NOTE BOOK)

1. **Which of the following phenomena occurs due to the Earth's rotation?**
   A. Seasons
   B. Day and Night
   C. Equinox
   D. Solstice

2. **The precession of equinoxes is caused due to:**
   A. Tilt of the Earth’s axis
   B. Gravitational pull of the Moon and Sun
   C. Revolution of the Earth
   D. Rotation of the Earth

3. **Which of the following is the correct sequence from smaller to larger celestial bodies?**
   A. Planet < Star < Galaxy < Universe
   B. Star < Planet < Galaxy < Universe
   C. Planet < Galaxy < Star < Universe
   D. Galaxy < Planet < Star < Universe

4. **Which constellation is known as the 'Hunter'?**
   A. Cassiopeia
   B. Orion
   C. Ursa Major
   D. Canis Major

5. **Which of the following best describes a galaxy?**
   A. A group of stars arranged in a pattern
   B. A huge system of billions of stars and other celestial bodies
   C. A star that emits radio waves
   D. A planet with multiple moons

6. **Which of the following is a physical property of matter?**
   A. Combustibility
   B. Reactivity with acid
   C. Boiling point
   D. Corrosiveness

7. **Which of these is an example of a chemical change?**
   A. Dissolving sugar in water
   B. Melting of wax
   C. Rusting of iron
   D. Breaking of glass

8. **Which of the following is not a characteristic of a physical change?**
   A. No new substance is formed
   B. Easily reversible
   C. Involves change in state or appearance
   D. Produces energy in the form of light or heat

9. **Which of the following methods is used to separate salt from seawater?**
   A. Filtration
   B. Sedimentation
   C. Distillation
   D. Sublimation

10. **Which method is best suited to separate cream from milk?**
    A. Filtration
    B. Decantation
    C. Centrifugation
    D. Distillation

11. **Winnowing is used to separate:**
    A. Water from oil
    B. Husk from grain
    C. Iron fillings from sand

D. Sugar from water

12. **Which of the following millets is richest in iron content?**
    A. Pearl Millet
    B. Ragi (Finger Millet)
    C. Foxtail Millet
    D. Sorghum

13. **Which among the following is considered a 'Smart Food' for combating malnutrition and climate change?**
    A. Rice
    B. Maize
    C. Millets
    D. Wheat

14. **Which nutrient is essential for tissue building and repair?**
    A. Carbohydrates
    B. Proteins
    C. Fats
    D. Vitamins

15. **Vitamin D is essential for absorption of:**
    A. Iron
    B. Calcium
    C. Potassium
    D. Phosphorus

16. **Which of the following materials is not attracted by a magnet?**
    A. Cobalt
    B. Iron
    C. Plastic
    D. Nickel

17. The magnetic compass works on the principle that:
    A. The Earth is a giant magnet
    B. Compass is attracted by gravity
    C. Compass reacts to sunlight
    D. Compass is charged with static electricity

18. **The tilt of the Earth's axis is approximately:**
    A. 23.5°
    B. 90°
    C. 0°
    D. 45°

19. **Revolution of the Earth causes:**
    A. Day and Night
    B. Formation of eclipses
    C. Change in Seasons
    D. Phases of the Moon

20. **Which of the following turns red in acidic medium and blue in basic medium?**

A. Phenolphthalein
B. Methyl orange
C. Litmus
D. Turmeric

CADETS TO NOTE

25 MCQ TO BE DONE BY YOUR SELF STUDY ON OTHER NDA BASED CHAPTERS AND TO BE UPDATED ACCORDINGLY.

PHYSICS

SHORT ANSWER TYPE QUESTIONS.

1. A copper wire has diameter 0.5 mm and resistivity of 1.6 x 10^{-6} Ω m. What will be the length of this wire to make its resistance 10 Ω ? How much does the resistance change if the diameter is doubled?

2. When a 12 V battery is connected across an unknown resistor, there is a current of 2.5 mA in the circuit. Find the value of resistance of the resistor.

3. A battery of 9 V is connected in series with resistors 0.2 Ω , 0.3Ω, 0.4Ω, 0.5 Ω and 12 Ω, respectively. How much current would flow through the 12Ω resistor?

4. How many 176 Ω resistors in parallel are required to carry 5 A on a 220 V line?

5..Show how you would connect three resistors , each of resistance 6 Ω, so that the combination has a resistance of (i) 9 Ω and (ii) 4 Ω

6. Several electric bulbs designed to be used on a 220 V line, are rated 10 W. How many lamps can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 5 A.

7. A hot plate of electric oven connected to a 220 V line has two resistance coils A and B, each of

24 Ω resistance, which may be used separately, in series ,or in parallel. What are the currents in the three cases?

8. Compute the heat generated while transferring 96000 C of charge in one hour through a potential difference of 50 V.

9. An electrtic bulb is connected to a 220 V generator. The current is 0.5 A. What is the power of the bulb?

10. An electric refrigerator rated 400 W operates 8 hour per day . What is the cost of the energy to operate iot for 30 days at Rs 3.00 per kW h?

11. Compare the power used in the 2 Ω resistor in each of the following circuits:

(i) a 6 V battery in series with 1 Ω and 2 Ω resistors and
(ii) a 4 V battery in parallel with 12Ω and 2 Ω resistors .

12Two lamps ,one rated 100 W at 220 V and the other 60 W at 220 V, are connected in parallel to electric mains supply. What current is drawn from the line if the supply voltage is 220 V?

13. Which uses more energy , a 250 W T V set in I hr, or 1200 W toaster in 110 minutes?

14. An electric heater of resistance 8 Ω draws 15 A from the service mains 2 hours. Calculate the rate at which heat is developed in the heater.

CHEMISTRY
CLASS-X

1. **MAKE A PROJECT ON DIFFERENT TYPES OF CHEMICAL REACTION AND EQUATION APPLY IN EVERYDAY LIFE.**
2. **FRAME 30 MCs ON TAUGHT CHAPTER.(CHEMICAL REACTIONS & EQUATION)**
3. **MAKE A POWER POINT PRESENTATION ON ACID, BASE AND SALTS.**

CLASS-IX

Sub: Biology

1.THE DIAGRAM OF VARIOUS CELLS OF DIFFERENT SIZE.
2. ON CHART ON PAPER DRAW AND LABEL THE DIAGRAM OF A TYPICAL PLANT CELL.
3. ILLUSTRTE THE HISTORY OF A TYPICAL CELL AND ITS ORGANELLES.
4. DRAW AND LABEL SOME COMMON CELLS OF DIFFERENT SHAPES.

Subject- Chemistry

TOPIC: PROPERTIES OF MATTER
ACTIVITY: COMPARE IN TABULAR FORM THE PROPERTIES OF SOLIDS LIQUIDS AND GASES WITH RESPECT TO----
1.SHAPE. 2. VOLUME. 3.COMORESSIBILITY, 4. DIFFUSION,5. FLUIDITY OR. RIGIDITY
MATERIALS REQUARED: A4 SIZE PAPER SHEETS & COLOUR OEN.
2. FRAME 30 MCs ON TAUGHT CHAP : MATTER IN OUR SURROUNDINGS

Subject – Physics

1. SOLVE NCERT EXEMPLAR NUMERICALS CH.1-MOTION (FAIR NOTEBOOK).
2. WRITE THE IMPORTANT CONTRIBUTION AND ACHIEVEMENTS OF FAMOUS INDIAN SCIENTIST.

(a) C.V. Raman
(b) Jagadish Chandra Bose
(c) Homi J. Bhabha
(d) Vikram Sarabhai and
(e) A.P.J. Abdul Kalam

3. MAKE A FLOW CHART OF CH.1 -MOTION

SAINIK SCHOOL NALANDA
CLASS VII
SUBJECT: SCIENCE
SUMMER VACATION HOME WORK (25-26)
QUESTION BANK FOR UPCOMING EXAM IN THE MONTH OF JULY 25
(COMPILED BY PK VERMA)
ALL QUESTIONS ARE COMPULSORY TO SOLVE IN HOMEWORK NOTEBOOK

1. **You are provided with three unknown solutions labelled A, B, and C, but you do not know which of these are acidic, basic, or neutral. Upon adding a few drops of red litmus solution to solution A, it turns blue. When a few drops of turmeric solution are added to solution B, it turns red. Finally, after adding a few drops of red rose extract to solution C, it turns green.**
   Based on the observations, which of the following is the correct sequence for the nature of solutions A, B, and C?
   (i) Acidic, acidic, and acidic (ii) Neutral, basic, and basic (iii) Basic, basic, and acidic (iv) Basic, basic, and basic
2. **Manya is blindfolded. She is given two unknown solutions to test and determine whether they are acidic or basic. Which indicator should Manya use to test the solutions and why?**
3. **Could you suggest various materials which can be used for writing the message on the white sheet of paper (given at the beginning of the chapter) and what could be in the spray bottle? Make a table of various possible combinations and the colour of the writing obtained.**

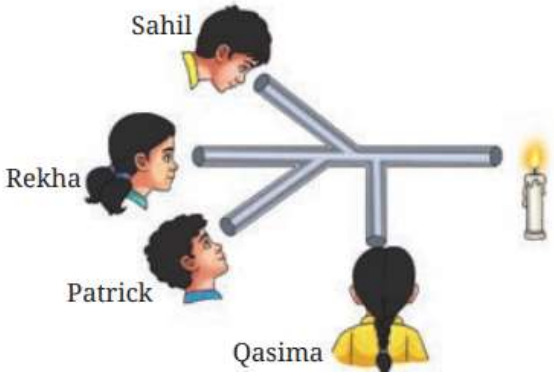
4. A liquid sample from the laboratory was tested using various indicators:

Indicator	Red litmus	Blue litmus	Turmeric
Change	No change	Turned red	No change in colour

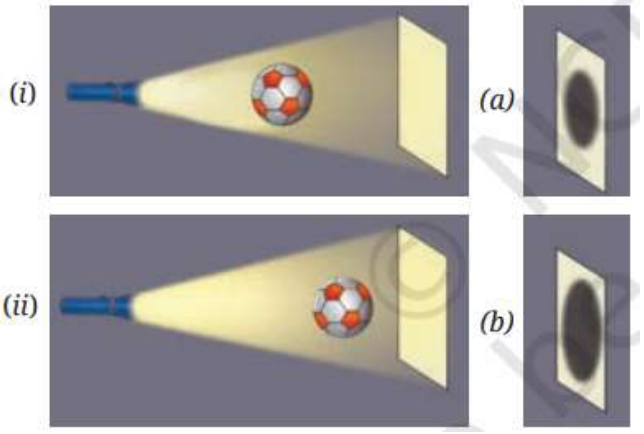
Based on the tests, identify the acidic or basic nature of the liquid and justify your answer.

5. **Grape juice was mixed with red rose extract; the mixture got a tint of red colour. What will happen if baking soda is added to this mixture? Justify your answer**
6. **Keerthi wrote a secret message to her grandmother on her birthday using orange juice. Can you assist her grandmother in revealing the message? Which indicator would you use to make it visible?**
7. **How can natural indicators be prepared? Explain by giving an example.**

8. **Three liquids are given to you. One is vinegar, another is a baking soda solution, and the third is a sugar solution. Can you identify them only using turmeric paper? Explain.**
9. **The extract of red rose turns the liquid X to green. What will the nature of liquid X be? What will happen when excess of amla juice is added to liquid X?**
10. **Sahil, Rekha, Patrick, and Qasima are trying to observe the candle flame through the pipe as shown in Fig. Who can see the flame?**



11. **The shadow of a ball is formed on a wall by placing the ball in front of a fixed torch as shown in Fig. 11.18. In scenario (i) the ball is closer to the torch, while in scenario (ii) the ball is closer to the wall. Choose the most accurate representation of the shadows formed in both scenarios from the options provided (a and b).**



12. **Suppose you view the tree shown in Fig. 11.19 through a pinhole camera. Sketch the outline of the image of the tree formed in the pinhole camera.**

13. **Write your name on a piece of paper and hold it in front of a plane mirror such that the paper is parallel to the mirror. Sketch the image. What difference do you notice? Explain the reason for the difference.**
14. **Measure the length of your shadow at 9 AM, 12 PM, and 4 PM with the help of your friend.**
    Write down your observations:
    (i) At which of the given times is your shadow the shortest?
    (ii) Why do you think this happens?

15. **We do not see the shadow on the ground of a bird flying high in the sky. However, the shadow is seen on the ground when the bird swoops near the ground. Think and explain why it is so.**

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