# Science
# Design of Sample Question Paper
# Class IX
# SA-I  (2010-2011)

| | | |
|---|---|---|
| Total | : | 80 |
| MCQ | : | 16 |
| Theory | : | 64 |

**I Term**

| S.No. | Content | Marks Theory | MCQ | Total |
|---|---|---|---|---|
| 1. | Food | 9 | 2 | 11 |
| 2. | Matter-Its nature & behaviour | 16 | 10 | 26 |
| 3. | Organization in living world | 12 | 4 | 16 |
| 4. | Motion, Force & Work (Motion, Force, Gravitation) | 27 | - | 27 |
| | **Total** | **64** | **16** | **80** |

**I)    Weightage to form of questions**

| S.No. | Content | Marks for each question | No. of questions | Total Marks |
|---|---|---|---|---|
| 1. | VSA | 1 | 4 | 4 |
| 2. | SA I | 2 | 9 | 18 |
| 3. | SA II | 3 | 9 | 27 |
| 4. | LA | 5 | 3 | 15 |
| | | | | 64 |
| | MCQ Pract. Based | | | 16 |
| | | | | **80** |

**II)    Scheme of options**

There will be no overall choice. However there is an internal choice in every question of 5 marks category.

**III)    Weightage to difficulty level of questions:**

| | |
|---|---|
| Easy | 15% |
| Average | 70% |
| Difficult | 15% |

**Typology of Questions:**

In order to assess different abilities related to the subject, the question paper includes open ended questions, drawing/illustrations based questions, communication skill based questions and activity based questions.

About 20% weightage has been assigned to questions testing higher order thinking skills of learners.

| Form of Questions Unit | VSA | SA(I) | SA(II) | LA | MCQ | Total |
|---|---|---|---|---|---|---|
| **Food** | 1(1) | 2(1) | 6(2) | - | 2(2) | 11(6) |
| **Matter-Its Nature & Behaviour** | | | | | 10(10) | |
| (a)   Matter in our Surroundings | - | 2(1) | 6(2) | | | 26(16) |
| (b)   Is matter around us pure? | 1(1) | 2(1) | - | 5(1) | | |
| **Motion, force and work** | | | | | | |
| a)   Motion | 1(1) | 4(2) | 3(1) | - | - | 8(4) |
| b)   Force and laws of motion | - | 2(1) | 3(1) | 5(1) | - | 10(3)  } 27(11) |
| c)   Gravitation | 1(1) | 2(1) | 6(2) | - | | 9(4) |
| **Organisation in living World** | | | | | | |
| Fundamental Unit of Life | - | 2(1) | | 5(1) | 4(4) | 11(6) } 16(8) |
| Tissues | - | 2(1) | 3(1) | | | 5(2) |
| **Total** | 4(4) | 16(8) | 27(9) | 15(3) | 16(16) | 80(41) |

# Sample Question Paper
## Science (Theory)
## First Term (SA-I)
## Class IX
## 2010-2011

*Time: 3 to 3½ hours*                                                                 *M.M.: 80*

**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. However, internal choice has been provided in all the three questions of five marks category. Only one option in such questions is to be attempted.

iv)    All questions to section A and all questions of section B are to be attempted separately.

v)     Question numbers 1 to 4 in section A are one mark question. These are to be answered in one word or one sentence.

vi)    Question numbers 5 to 13 are two mark questions, to be answered in about 30 words.

vii)   Question numbers 14 to 22 are three mark questions, to be answered in about 50 words.

viii)  Question numbers 23 to 25 are five mark questions, to be answered in about 70 words.

ix)    Question numbers 26 to 41 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to choose one most appropriate response out of the four provided to you.

## Section-A

1.     Choose a homogeneous mixture out of the following:

       a) Ink        b) milk  c) brass        d) muddy water.

2.     Velocity time graph of a body is given in the following diagram
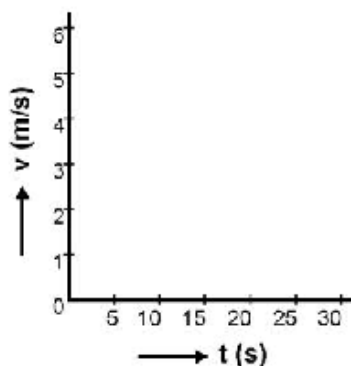


What conclusion can be drawn about the velocity of the body from this graph?

3. The value of 'G' on the surface of earth is $6.67 \times 10^{-11}$ Nm$^2$/kg$^2$. What will be its value on the surface of moon?

4. How do checkdams help in increasing ground water level?

5. a) Name the state of matter in which -

    i)    Layers of particles can slip and slide over each other.

    ii)   Particles just move around randomly, because of very weak force of attraction.

   b)   List two ways by which a gas can be converted into a liquid.

6. Name the process or the separation technique you would follow to separate the following mixtures:

   a)   muddy water

   b)   kerosene and water

   c)   iron filings and sand

   d)   sulphur and charcoal

7. Can an object be accelerated if it is moving with constant speed? Justify your answer with an example.

8. The minute hand of a clock is 7 cm long. Find the displacement and the distance covered by it from 9.00 a.m. to 9.30 a.m.

9. Why is a person hit harder when he falls on a concrete floor than when he falls on a heap of sand from the same height?

10. The weight of an object on the surface of moon is 1.67N and its mass on its surface is 1 kg. Calculate its weight and mass on the surface of earth. (g on earth = 10 m/s$^2$).

11. (a) Name the plant tissues found in the husk of a coconut and also identify the chemical which is responsible for its stiffness.

   (b)   Give one way in which it differs from parenchymatous cells.

12. Give one example of an Indian and a foreign poultry breed when crossed, produce an improved variety. List any one desirable trait expected from such corssed breeding.

13. What happens to an animal cell when it is placed in a very dilute external medium? Why?

14. With the help of a labeled diagram, describe an activity to show that the particles of matter are very small. Use the following material that has been provided to you:

4 beakers, spatula, 4 test tubes, distilled water and few crystals of potassium permanganate.

15. Account for the following:

   a)   The temperature of water remains constant during boiling.

   b)   Evaporation is a surface phenomenon.

   c)   The spaces between the constituent particles are maximum in gases.

16. (a) What are the two ways of obtaining fish?

   (b)   What is the major problem faced in fish farming? How can it be overcome?

17. (a) Discuss two ways of incorporating desirable characteristics in crop varieties.

(b) What is inter cropping? How are crops selected for intercropping?

18. (a) Name the living component common to both the complex permanent tissues found in plants. What is its function.

(b) Give any two ways is which these tissues differ functionally from each other.

19. Study the given graph and answer the following questions from it -
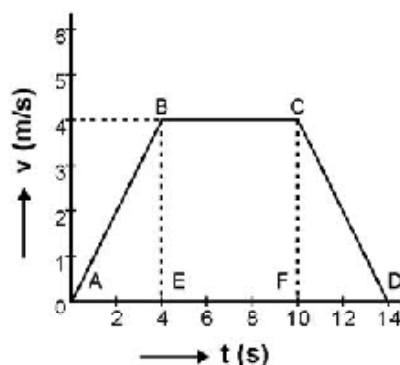


i) Which part of the graph shows accelerated motion? Calculate the acceleration.

ii) Which part of the graph shows retarded motion? Calculate the retardation.

iii) Calculate the distance travelled by the body in first 4 seconds of journey, graphically.

20. i) When a horse suddenly starts running, a careless rider falls backwards. Explain why?

ii) State the action and reaction in the swimming action of a swimmer.

21. A stone is thrown vertically upwards with a velocity of 40 m/s and is caught back. Taking $g=10$ m/s$^2$, calculate the maximum height reached by the stone.

What is the net displacement and the total distance covered by the stone?

22. State the universal law of Gravitation.

The mass of the sun is $2 \times 10^{30}$ kg and that of the earth is $6 \times 10^{24}$ kg. If the average distance between the sun and the earth is $1.5 \times 10^{11}$ m, calculate the force exerted by the sun on the earth and also by the earth on the sum.

23. Rama tested the solubility of four substances at different temperatures and found in grams, of each substance dissolved in 100 g of water to form a saturated solution.

| S.No. | Substance Dissolved | Temperature (K) | | |
|---|---|---|---|---|
| | (in grams) | 293 K | 313 K | 333 K |
| (i) | Ammonium chloride | 37g | 41g | 55g |
| (ii) | Potassium chloride | 35g | 40g | 46g |
| (iii) | Sodium chloride | 36g | 36g | 37g |
| (iv) | Potassium Nitrate | 32g | 62g | 106g |

i) Which substance is least soluble in water at 293K?

ii) Which substance shows maximum change in its solubility when temperature is raised from 293K to 313K?

5

iii)    Find the amount of ammonium chloride that will separate out when 155g of its solution at 333K is cooled to 293K?

iv)    What is the effect of change of temperature on the solubility of a salt?

v)    What mass of sodium chloride would be needed to make a saturated solution in 10g of water at 293K?

OR

With the help of labeled diagram, describe an activity to separate a mixture containing ammonium chloride, sodium chloride and sand.

24.    State Newton's second law of motion.

How does the second law of motion give us a method to measure force?

A man pushes a box of mass 50 kg with a force of 80N. What will be the acceleration of the box due to this force?

What would be the acceleration if the mass were halved?

Or

Define momentum of a body. Prove with the help of III law of motion that the total momentum of two bodies is conserved during collision provided no external force acts. A car 'A' of mass 1500kg, travelling at 25m/s collides with another car 'B' of mass 1000 kg travelling at 15m/s in the same direction. After collision, the velocity of car A becomes 20 m/s. Calculate the velocity of car B after collision.

25.    (a)    Draw a plant cell and label seven important organelles found in it.

(b)    Name one organelle that can make some of its protein in a plant cell and mention one function of it in a cell.

Or

(a)    Name and draw a cell which does not have well defined nuclear region. Label any four parts.

(b)    Mention two ways by which a photosynthesizing cell belonging to this group differs from a cell of your body.

## SECTION B

26.    The following substances were added to water in a beaker as shown below. The mixture was stirred well. A suspension was observed in the beaker:

a.  I
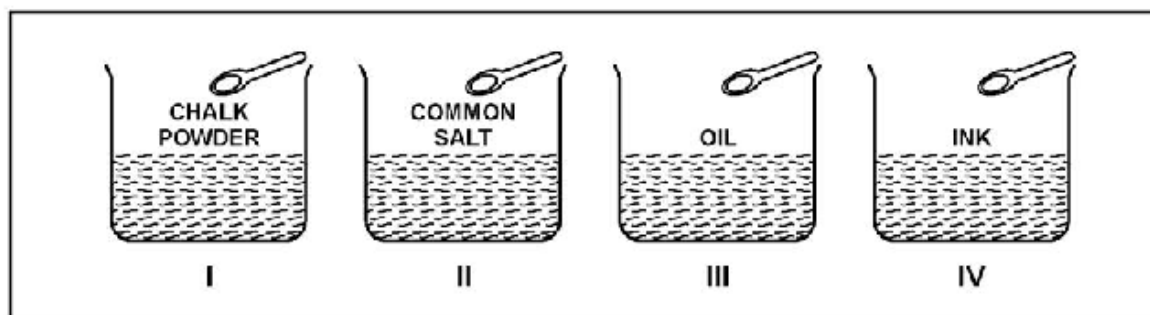
b.  I

c.  III

d.  IV

27.  Out of the given four mixtures, the one that appears clear and transparent is :

a)  Chalk powder and water

b)  Sand and water

c)  Starch and water

d)  Sugar and water

28.  Rama heated a mixture of iron filings and sulphur in a hard glass test tube for sometime till a grey-black product was formed. She cooled the test tube and then added 2 ml carbon-di-sulphide in it and shook the contents of the test tube. The observation made by her was likely to be as shown below:



a.  I
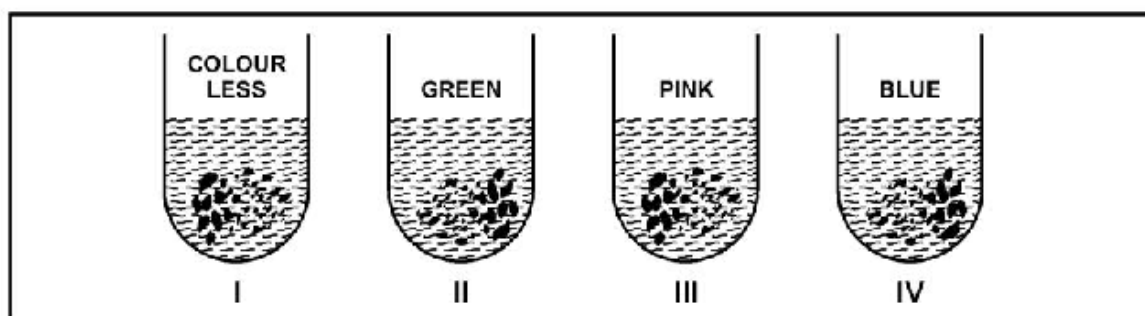
b.  I

c.  III

d.  IV

29.  The equipment required to prepare iron sulphide by heating a mixture of iron filings and sulphur powder is :

a.  Petri-dish

b.  Watch glass

c.  China-dish

d.  beaker

30.  On placing an iron nail in a copper sulphate solution, it is observed that:

a.  a soft and black coating is deposited on the iron nail.

b.  a reddish brown coating is deposited on the iron nail.

c.  a smooth and shiny coating is deposited on the iron nail.

d.  a grey and hard coating is deposited on the iron nail.

31. Rahul added 2 ml of Barium chloride solution to 2 ml soldim sulphate solution in a test tube and observed that :

    a) a clear solution was obtained

    b) two solutions formed separate layers in the test tube

    c) the solution turned pink

    d) a white solid settled at the bottom

32. To separate a mixture of sand, common salt, camphor and iron filings, Dhoni added water to the mixture in a test tube, and shook it well. He found that one component dissolved in water. It was :

    a) sand

    b) iron filings

    c) camphor

    d) common salt

33. The sequence of steps taken for separating a mixture of ammonium chloride, sand and common salt is :

    a) sublimation, adding water, filteration, evaporation.

    b) evaporation, adding water, filteration, sublimation.

    c) Filtration, evaporation, sublimation, adding water.

    d) Evaporation, sublimation, adding water, filteration.

34. While determining the boiling point of water, the teacher suggested to add some pum-ice stone pieces to the hard glass test tube containing water. This was done to :

    a) avoid bumping

    b) avoid melting of hard glass test tube

    c) prevent unnecessary loss of heat energy

    d) spread the heat uniformly.

35. To determine the melting point of ice, a student immersed the thermometer bulb in crushed ice in a beaker and heated the beaker on a low flame. He would observe:

    a) an increase in temperature during melting of ice

    b) a decrease in temperature during melting of ice

    c) a decrease first and then an increase in temperature during melting of ice

    d) the temperature remains constant during melting of ice

36. Multinucleated condition is seen in

    a) only smooth muscle cells

    b) only skeletal muscle cells

    c) both smooth and skeletal muscle cells

    d) neither smooth nor skeletal muscle cells

37. The features that best describe the cells of parenchyma cells are :

   a)   Dead cells, thick walled, no intercellular spaces

   b)   Living cells, thin walled, no intercellular spaces

   c)   Dead cells, thin walled, large intercellular spaces

   d)   Living cells, thin walled, large intercellular spaces

38. The correct order of the parts of a nerve cell through which the nerve impulse is transmitted is :

   a)   Nerve endings, dendrites, axon, cell body

   b)   cell body, axon, dendrites, nerve endings

   c)   dendrites, nerve endings, cell body, axon

   d)   dendrites, cell body, axon, nerve endings.

39. A coverslip must always be placed very gently while mounting in order to :

   a)   Avoid the entry of oil bubbles.

   b)   Stop the stain from oozing out.

   c)   Avoid crushing of the material.

   d)   Stop the material from drying.

40. Aditya added 1 or 2 drops of iodine to three test tubes A, B and C containing 2 ml of food sample. A dark blue black colour appeared in test tubes A and B. The correct order of the food samples taken in the three test tubes A, B and C is :

   a)   Rice, dal, potato

   b)   Rice, potato, dal

   c)   Potato, dal , rice

   d)   Rice, dal, dal

41. The following statements describe the steps to detect the presence of meta nil yellow in dal. One of the four statements given below is incorrect.

   a)   Take 2 ml of food extract

   b)   Grind 3-5 gm of dal and prepare solution.

   c)   Add 2-4 drops of concentrated $H_2SO_4$

   d)   Filter the contents and collect the filterate

   The incorrect statement is

   a)   d

   b)   a

   c)   c

   d)   b

## Marking Scheme
## Science (Theory)
## First Term (SA-1)
## Class IX
## 2010-2011

### Section A

| | | | | |
|---|---|---|---|---|
| 1. | Brass | | | 1 |
| 2. | Body is moving with a constant velocity of 4 m/s. | | | 1 |
| 3. | $6.66 \times 10^{-11}$ $Nm^2/kg^2$. same as that on the surface of moon. | | | 1 |
| 4. | By stopping the rainwater from flowing away. | | | 1 |

5.    a)    i)    liquid       ½

            ii)    gas       ½

      b)    decreasing temperature, increasing pressure       ½, ½

6.    a)    filteration/decantation       ½

      b)    by using a separating funnel       ½

      c)    by using a magnet       ½

      d)    by adding the mixture to carbon-di-sulphide.       ½

7.    Yes, if direction of its motion changes.       1

      Example : An object moving with a constant speed in a circular path.       1

8.    Length of minute hand l = 7 cm

      Distance coverd by it = 1/2 circumference $= \pi r = \frac{22}{7} \times 7 = 22 cm$       1

      Displacement = 2l = 2 x 7 cm = 14 cm       1

9.    On a hard surface he is brought to rest in a very short time, so greater force is called into play, whereas, on a heap of sand, he is brought to rest in a longer time, so lesser force is called into play (or explanation in terms of momentum)       2

10.    $W_m = 1.67$ N

      Mass = 1 kg

      $W_e = 6 \times W_m = 6 \times 1.67 = 10.02$ N       1

      Mass of an object remains the same.

      ∴ Its mass on earth = 1 kg       1

11.    a)    Sclerenchyma       ½

            Lignin       ½

      b)    Sclerenchyma consists of dead cells/with very thick walls/provides strength to plant parts.

Parenchyma consists of live cells/with thin cell walls/stores food. 1

12. (a) Assel, Leghorn ½ x 2

(b) (i) number and quality of chicks 1

(ii) dwarf broiler parent for commercial chick production

(iii) summer adaptation capacity/tolerance to high temperature

(iv) low maintenance requirements

(v) reduction in the size of the egg laying bird with ability to utilize more fibrous cheaper diets formulated using agricultural biproducts. (any one)

13. The animal cell will gain water and would swell up/may burst. 1

Due to osmosis, water moves from the dilute external medium through the semipermeable cell membrane into the cell with low water concentration. 1

14. Diag. of Fig. 1.2; p-2, N.C.E.R.T. Text Book. 1

Description : Take a crystal of potassium permanganate and dissolve it into 100 ml of water. Observe the colour of the solution. Take 1 ml of this solution and put it into 9 ml of water, taken in another beaker and shake it well. Observe the colour of this solution.

Keep diluting this solution like this 8 to 10 times and observe the colour. It will be observed that with every dilution, the colour becomes light but is still visible. So it can be concluded that one crystal of $KMnO_4$ must be made of millions of tiny particles. 2

15. a) Heat energy is used up in changing the state of matter, i.e. from liquid water to water vapour. 1

b) The particles on the surface gain energy from surroundings which increases their kinetic energy and they change into vapour state. 1

c) The attractive forces between the constituent particles are weakest in gases. 1

16. a) From natural sources/capture fishing ½

From fish farming/culture fishery. ½

b) Lack of availability of good quality seed. 1

By using hormonal stimulation. 1

17. a) By hybridization. ½

By introducing a gene that would provide the desired characteristics/through genetically modified crops. ½

b) Growing two or more crops simultaneously on the same field in a definite pattern. 1

Crops with different nutrient requirement/crops with different maturity duration. 1

18. a) Parenchyma ½

Stores food/conduction of water ½

b) Xylem - transports water and minerals/the direction of flow is vertical.

Phloem - transports food from leaves to other parts/flow of the materials is in both direction. 1+1

11

19. i) AB        ½

$$a = \text{slope of } AB = \frac{(4-0)\text{m/s}}{(4-0)\text{s}} = 1\text{m/s}^2$$   ½

ii) CD        ½

$$\text{retardation} = \frac{4\text{m/s}^2}{2} = 2\text{m/s}^2$$   ½

iii) distance in first four seconds is found by area under the figure AEB

s = area of AEB

$$= \frac{1}{2}(4-0) \text{ seconds} \times (4-0)\text{m/s}$$

= 8 m       1

20. i) Initially, the horse and rider are in state of rest w.r.t. the ground. When the horse starts running suddenly, he comes into state of motion w.r.t. the ground but the rider tends to remain in state of rest and experiences a backward pull.   2

ii) action - force exerted by hands and feet of swimmer on water.   ½

Reaction - water exerts force on the swimmer and pushes him forward.   ½

21. $$v^2 - u^2 = 2gh$$

$$\therefore h = \frac{v^2 - u^2}{2g}$$

$$= \frac{0 - (40)^2}{-2 \times 10} = 80\text{m}$$   1

After reaching maximum height, the stone falls freely and comes back to its initial position     1

$\therefore$ net displacement = 0     1

Total distance = h + h = 160 m     1

22. Correct statement of the Universal law of gravitation.     1

Force of sun on earth is,

$$F = \frac{GM_1M_2}{d^2}$$

$$= \frac{6.7 \times 10^{-11} \times 2 \times 10^{30} \times 6 \times 10^{24}}{(1.5 \times 10^{11})^2}$$

$$= 3.57 \times 10^{22}\text{N}$$   1½

Force of the earth on the sun is the same   ½

a) Potassium Nitrate     1

| | | |
|---|---|---|
| b) | Potassium Nitrate | 1 |
| c) | 18 g | 1 |
| d) | Solubility of a salt increases with increase in temperature. | 1 |
| e) | 3.6 g | 1 |

Or

Diag. of Fig. 2.7, p-20, N.C.E.R.T. Text Book.                                          2

Description : Crush the given mixture and put it in a china dish.

Put an inverted funnel over the china dish. Put a cotton plug on the stem of the funnel. Now heat slowly. Ammonium chloride will be collected on the cooler parts of the funnel. Now add water to the remaining mixture and stir it well. Filter it. Sand will be collected as a residue on the filter paper. Evaporate the filtrate to dryness. Common salt will be collected.                                          3

24.  i)    Correct statement of the law                                          1

ii)   $F \propto$ rate of change of momentum

$$= \frac{mv - mu}{t}$$

$$= \frac{m(v-u)}{t}$$

$F \quad = ma$                                          2

iii)  m = 50 kg    F = 80 N

F = ma

$$a = \frac{F}{m} = \frac{80N}{50 \text{ kg}} = 1.6 \text{m/s}^2$$

$$a \propto \frac{1}{m}$$                                          1

Hence acceleration would be doubled, when its mass is halved.                                          1

OR

i)    Momentum of a body is the product of mass of the body and its velocity.          1

ii)   Consider two bodies A and B of masses $m_A$ and $m_B$, initial velocities $u_A$ & $u_B$ respectively colliding with each other, collision lasts for 't' seconds

Ball A exerts a force $F_{AB}$ on ball B and the ball B exerts a force $F_{BA}$ on ball A.

$$F = \frac{m(v-u)}{t}$$

$$\therefore F_{AB} = m_A \frac{(v_A - u_A)}{t} \quad \& \quad F_{BA} = m_B \frac{(v_B - u_B)}{t}$$

Accord. to the III law of motion,

$$F_{AB} = -F_{BA}$$

$$\Rightarrow m_A \frac{(v_A - u_A)}{t} = -m_B \frac{(v_B - u_B)}{t} \qquad \qquad 2$$

$$\Rightarrow m_A u_A + m_B u_B = m_A v_A + m_B v_B$$

According to the law of conservation of momentum,

$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$

$1500 \times 25 + 1000 \times 15 = 1500 \times 20 + 1000 v_2$

$\therefore 1000 v_2 = 52500 - 30000$

$$\therefore v_2 = \frac{22500}{1000} = 22.5 \text{m/s} \qquad \qquad 2$$

25.  a)  Fig. 5.6 (plant cell) on pg 64 of N.C.E.R.T. book :

7 labels :                                                                          ½

i)  chloroplast

ii)  ribosomes

iii)  mitochondrion                                                    7×½=3½

iv)  Golgi apparatus

v)  Lysosome

vi)  Endoplasmic reticulum

vii)  Nucleus

b)  Mitochondrion/Releases energy required for various chemical activities needed for life.                                                    ½+½=1

<div align="center">OR</div>

(a)  Bacterium                                                                 1

Diagram - fig. 5.4 pg 62 N.C.E.R.T. Book.                         ½

4 Labels -                                                                  ½×4=2

(i)  Cell wall

(ii)  Plasma membrane

(iii)  Ribosomes

(iv)  Nucleoid

b)  **Photosynthesising cell**

Presence of chloroplast/absence of membrane bound cell organelles/single chromosome/small size                                              1

**Cell of your body**

Absence of chloroplast/presence of membrane bound cell organelles/more than one chromosome/larger size. 1

26.  a

27.  d

28.  a

29.  c

30.  b

31.  d

32.  d

33.  a

34.  a

35.  d

36.  b

37.  d

38.  d

39.  a

40.  b

41.  c