SELECTION

10

SCIENCE

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SELECTION

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SCIENCE

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CONTENT

SELECTION 10 SCIENCE

PHYSICS

UNIT-1. LAWS OF MOTION

TEXT BOOK EVALUATION

I. Choose the correct answer:

1) Inertia of a body depends on
a) weight of the object　　　　　　b) acceleration due to gravity of the planet
c) mass of the object　　　　　　　d) Both a & b　　**Ans : c) mass of the object**

2) Impulse is equals to (P.T.A - 1)
a) rate of change of momentum　　b) rate of force and time
c) change of momentum　　　　　　d) rate of change of mass
　　　　　　　　　　　　　　　　　　　　Ans : c) change of momentum

3) Newton's III law is applicable
a) for a body is at rest　　　　　　b) for a body in motion
c) both a & b　　　　　　　　　　　d) only for bodies with equal masses
　　　　　　　　　　　　　　　　　　　　Ans : c) both a & b

4) Plotting a graph for momentum on the Y-axis and time on X-axis. slope of momentum-time graph gives
a) Impulsive force　　　　　　　　b) Acceleration
c) Force　　　　　　　　　　　　　d) Rate of force　　**Ans : c) Force**

5) In which of the following sport the turning of effect of force used
a) swimming　　　b) tennis　　c) cycling　　　　d) hockey　　**Ans : c) cycling**

6) The unit of 'g' is m s^{-2}. It can be also expressed as
a) cm s^{-1}　　　　　b) N kg^{-1}　　c) N m^2 kg^{-1}　　　d) cm^2 s^{-2}　　**Ans : b) N kg^{-1}**

7) One kilogram force equals to
a) 9.8 dyne　　b) 9.8 × 10^4 N　c) 98 × 10^4 dyne　　d) 980 dyne　**Ans : c) 98×10^{4}dyne**

8) The mass of a body is measured on planet Earth as M kg. When it is taken to a planet of radius half that of the Earth then its value will be_____kg.
a) 4 M　　　b) 2M　　　c) M/4　　　d) M　　　　**Ans : d) M**

9) If the Earth shrinks to 50% of its real radius its mass remaining the same, the weight of a body on the Earth will
a) decrease by 50%　　　　b) increase by 50%
c) decrease by 25%　　　　d) increase by 300%　　**Ans : d) increase by 300%**

10) To project the rockets which of the following principle(s) is /(are) required? (G.M.Q)
a) Newton's third law of motion　　　　b) Newton's law of gravitation
c) law of conservation of linear momentum　　d) both a and c
　　　　　　　　　　　　　　　　　　　　Ans : d) both a and c

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II. Fill in the blanks.
1. To produce a displacement _____ is required.   **Ans : force**
2. Passengers lean forward when sudden brake is applied in a moving vehicle. This can be explained by _____ .   **Ans : inertia of motion**
3. By convention, the clockwise moments are taken as _____ and the anticlockwise moments are taken as_____ .   **Ans : negative, positive**
4. _____ is used to change the speed of car.   **Ans : Gear**
5. A man of mass 100 kg has a weight of _____ at the surface of the Earth.
          Ans : 980 N(w=mg= 100x9.8=980N)

III. State whether the following statements are true or false. Correct the statement if it is false:
1. The linear momentum of a system of particles is always conserved.   **Ans : False**
Correct statement : The linear momentum of a system of particles is conserved **only if no external force acts on the system.**
2. Apparent weight of a person is always equal to his actual weight.   **Ans : False.**
Correct statement : Apparent weight of a person is **not** equal to his actual weight.
3. Weight of a body is greater at the equator and less at the polar region. **Ans : False.**
Correct statement : Weight of a body is l**ess** at the equator and **greater** at the polar region.
4. Turning a nut with a spanner having a short handle is so easy than one with a long handle.   **Ans : False.**
Correct statement : Turning a nut with a spanner having a short handle is so **difficult** than one with a long handle.
5. There is no gravity in the orbiting space station around the Earth. So the astronauts feel weightlessness.   **Ans : False.**
Correct statement : The space station and astronauts have equal acceleration, they are under free fall condition. So the astronauts feel weightlessness.

IV. Match the following. (P.T.A -1)

Column I		Column II
a. Newton's I law	-	1. Propulsion of a rocket
b. Newton's II law	-	2. Stable equilibrium of a body
c. Newton's III law	-	3. Law of force
d. Law of conservation of Linear momentum	-	4. Flying nature of bird

Ans :

Column I		Column II
a. Newton's I law	-	2. Stable equilibrium of a body
b. Newton's II law	-	3. Law of force
c. Newton's III law	-	4. Flying nature of bird
d. Law of conservation of Linear momentum	-	1. Propulsion of a rocket

V. Assertion & Reasoning
1. Assertion: The sum of the clockwise moments is equal to the sum of the anticlockwise moments.
Reason: The principle of conservation of momentum is valid if the external force on the system is zero.
Mark the correct choice as
(a) If both the assertion and the reason are true and the reason is the correct explanation of the assertion.

(b) If both the assertion and the reason are true, but the reason is not the correct explanation of the assertion.
(c) Assertion is true, but the reason is false.
(d) Assertion is false, but the reason is true.
      Ans : (b) If both the assertion and the reason are true, but the reason is not the correct explanation of the assertion.

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2. Assertion: The value of 'g' decreases as height and depth increases from the surface of the Earth.
Reason: 'g' depends on the mass of the object and the Earth.
Mark the correct choice as
(a) If both the assertion and the reason are true and the reason is the correct explanation of the assertion.
(b) If both the assertion and the reason are true, but the reason is not the correct explanation of the assertion.
(c) Assertion is true, but the reason is false.
(d) Assertion is false, but the reason is true.
      Ans : (c) Assertion is true, but the reason is false.

VI. Answer briefly.
1. Define inertia. Give its classification.
Ans : Inertia :
      The inherent property of a body to resist any change in its state of rest or the state of uniform motion, unless it is influenced upon by an external unbalanced force, is known as **'inertia'.**
Types of inertia:
      (i) Inertia of rest
      (ii) Inertia of motion
      (iii) Inertia of direction

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2. Classify the types of force based on their application.
Ans :   Types of force
      (i) Like parallel forces
      (ii) Unlike parallel forces

---

3. If a 5 N and a 15 N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force
Ans :
            $F_1 = 5N$
            $F_2 = 15N$
      Resultant force (f) $= F_2 - F_1$ $\therefore F_2 > F_1 = 15N - 5N = 10N$
      The resultant force acts along the direction of the greater force 15 N.

---

4. Differentiate mass and weight. (May - 22)

S.No.	Mass	Weight
1)	The quantity of matter contained in the body.	The gravitational force exerted on it due to the earth's gravity.
2)	Its SI unit is Kilogram (Kg).	Its SI unit is Newton (N).
3)	It is a scalar quantity.	It is a vector quantity.

UNIT -3. THERMAL PHYSICS

TEXT BOOK EVALUATION

I. Choose the correct answer:

1. The value of universal gas constant
a) 3.81 Jmol^{-1} K^{-1} b) 8.03 Jmol^{-1} K^{-1}
c) 1.38 Jmol^{-1} K^{-1} d) 8.31 Jmol^{-1} K^{-1} **Ans :d) 8.31J mol^{-1} K^{-1}**

2. If a substance is heated or cooled, the change in mass of that substance is
a) positive   b) negative
c) zero   d) none of the above   **Ans : c) zero**

3. If a substance is heated or cooled, the linear expansion occurs along the axis of
a) X or - X   b) Y or - Y
c) both (a) and (b)   d) (a) or (b)   **Ans : c) both (a) and (b)**

4. Temperature is the average _____ of the molecules of a substance.
a) difference in K.E and P.E   b) sum of P.E and K.E
c) difference in T.E and P.E   d) difference in K.E and T.E
                                                          An s: c) difference in T.E and P.E

5. In the Given diagram, the possible direction of heat energy transformation is
a) A $\leftarrow$ B, A $\leftarrow$ C, B $\leftarrow$ C
b) A $\rightarrow$ B, A $\rightarrow$ C, B $\rightarrow$ C
c) A $\rightarrow$ B, A $\leftarrow$ C, B $\rightarrow$ C
d) A $\leftarrow$ B, A $\rightarrow$ C, B $\leftarrow$ C   **An s: a) A $\leftarrow$ B, A $\leftarrow$ C, B $\leftarrow$ C**

II. Fill in the blanks.
1. The value of Avogadro number _____ .   **Ans : 6.023X10^{23}/mol**
2. The temperature and heat are _____ quantities. (P.T.A-2) **Ans : scalar**
3. One calorie is the amount of heat energy required to raise the temperature of _____ of water through _____.   **Ans : 1 gram, 1^{0}C**
4. According to Boyle's law, the shape of the graph between pressure and reciprocal of volume is _____.   **Ans : Straight line**

III. State whether the following statements are true or false, if false explain why?
1. For a given heat in liquid, the apparent expansion is more than that of real expansion.   **Ans : False**
Correct statement : For a given heat in liquid, the apparent expansion is <u>less than</u> that of   real expansion.
2. Thermal energy always flows from a system at higher temperature to a system at lower temperature.   **Ans : True**
3. According to Charles's law, at constant pressure, the temperature is inversely proportional to volume. (P.T.A-2)   **Ans : False**
Correct statement : According to Charles's law, at constant pressure, the temperature is <u>directly</u> proportional to volume.

IV. Match the items in column-I to the items in column-II

S.No.	Column-I		Column-II
1.	Linear expansion	-	(a) change in volume
2.	Superficial expansion	-	(b) hot body to cold body
3.	Cubical expansion	-	(c) 1.381×10^{-23} JK^{-1}
4.	Heat transformation	-	(d) change in length
5.	Boltzmann constant	-	(e) change in area

Ans :

S.No.	Column-I		Column-II
1.	Linear expansion	-	(d) change in length
2.	Superficial expansion	-	(e) change in area
3.	Cubical expansion	-	(a) change in volume
4.	Heat transformation	-	(b) hot body to cold body
5.	Boltzmann constant	-	(c) 1.381×10^{-23} JK^{-1}

V. Assertion and reason type questions

1. Assertion: If one end of the rod is heated, other end also is heated.
Reason: Heat always flows from a region of lower temperature to higher temperature of the rod.
a. Both the assertion and the reason are true and the reason is the correct explanation of the assertion.
b. Both the assertion and the reason are true but the reason is not the correct explanation of the assertion.
c. Assertion is true but the reason is false.
d. Assertion is false but the reason is true.

Ans : c. Assertion is true but the reason is false.

2. Assertion: Gas is highly compressible than solid and liquid.
Reason: Interatomic or intermolecular distance in the gas is comparably high.
(P.T.A- 2)
a. Both the assertion and the reason are true and the reason is the correct explanation of the assertion.
b. Both the assertion and the reason are true but the reason is not the correct explanation of the assertion.
c. Assertion is true but the reason is false.
d. Assertion is false but the reason is true.

Ans : a. Both the assertion and the reason are true and the reason is the correct explanation of the assertion.

VI. Answer in briefly.

1. Define one calorie. (G.M.Q)
Ans :
Calorie: One calorie is defined as the amount of heat energy required to rise the temperature of 1 gram of water through 1°C.

$$0.833 = \alpha_v \ (50) \qquad \therefore \quad \alpha_v \ = \ \frac{0.833}{50} \ = \ 0.0167 \, K^{-1}$$

Coefficient of cubical (α_v) **= 0.0167 K^{-1}**

VIII. Answer in detail

1. Derive the ideal gas equation.

Ideal Gas Equation :

★ The ideal gas equation is an equation, which relates all the properties of an ideal gas. An ideal gas obeys Boyle's law and Charles' law and Avogadro's law.

★ According to Boyle's law,
 PV = constant .... (1)

★ According to Charles's law,
 V/T = constant ....(2)

★ According to Avogadro's law,
 V/n = constant .... (3)

★ After combining equations (1), (2) and (3), you can get the following equation.
 PV/nT = constant ......(4)

★ The above relation is called the combined law of gases. If you consider a gas, which contains µ moles of the gas, the number of atoms contained will be equal to µ times the Avogadro number, N_A.
 i.e. n = µN_A. .... (5)

★ Using equation (5), equation (4) can be written as
 PV/ µN_AT = constant

★ The value of the constant in the above equation is taken to be K_B, which is called as Boltzmann constant (1.38 × 10^{-23} JK^{-1}).

★ Hence, we have the following equation:
 PV/ µN_AT = k_B
 PV = µN_A k_B T

★ Here, µ$N_A$$k_B$ = R, which is termed as universal gas constant whose value is
 8.31 J mol^{-1} K^{-1}.
 PV = RT .... (6)

★ Ideal gas equation is also called as equation of state because it gives the relation between the state variables and it is used to describe the state of any gas.

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2. Explain the experiment of measuring the real and apparent expansion of a liquid with a neat diagram. (G.M.Q)

Ans :

Experiment to measure real and apparent expansion of liquid :

★ To start with, the liquid whose real and apparent expansion is to be determined is poured in a container up to a level.
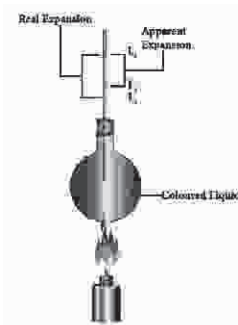
★ Mark this level as L_1.

★ Now, heat the container and the liquid using a burner as shown in the Figure.

★ Initially, the container receives the thermal energy and it expands.

★ As a result, the volume of the liquid appears to have reduced.

★ Mark this reduced level of liquid as L_2.

Real and apparent expansion of liquid

UNIT - 5. ACOUSTICS

TEXT BOOK EVALUATION

I. Choose the correct answer:

1. When a sound wave travels through air, the air particles
a) vibrate along the direction of the wave motion
b) vibrate but not in any fixed direction
c) vibrate perpendicular to the direction of the wave motion
d) do not vibrate   **Ans : a) vibrate along the direction of the wave motion**

2. Velocity of sound in a gaseous medium is 330 ms^{-1}. If the pressure is increased by 4 times without causing a change in the temperature, the velocity of sound in the gas is
a) 330 m s^{-1} b) 660 m s^{1} c) 156 m s^{-1} d) 990 m s^{-1} **Ans : a) 330 m s^{-1}**

3. The frequency, which is audible to the human ear is. (P.T.A-6)
a) 50 kHz   b) 20 kHz   c) 15000 kHz   d) 10000 kHz   **Ans : b) 20 kHz**

4. The velocity of sound in air at a particular temperature is 330 ms^{-1}. What will be its value when temperature is doubled and the pressure is halved?
a) 330 m s^{-1} b) 165 m s^{-1} c) 330 × $\sqrt{2}$ m s^{-1} d) 320 / $\sqrt{2}$ m s^{-1}

                           Ans :c) 330 × $\sqrt{2}$ m s^{-1}

5. If a sound wave travels with a frequency of 1.25 × 10^{4} Hz at 344 ms^{-1}, the wavelength will be
a) 27.52 m   b) 275.2 m   c) 0.02752 m   d) 2.752 m   **Ans : c) 0.02752 m**

6. The sound waves are reflected from an obstacle into the same medium from which they were incident. Which of the following changes?
a) speed   b) frequency   c) wavelength   d) none of these

                           Ans : d) none of these

7. Velocity of sound in the atmosphere of a planet is 500 ms^{-1}. The minimum distance between the sources of sound and the obstacle to hear the echo, should be
a) 17 m   b) 20 m   c) 25 m   d) 50 m   **Ans : c) 25 m**

II. Fill in the blanks.

1. Rapid back and forth motion of a particle about its mean position is called _____ .

                           Ans : vibration

2. If the energy in a longitudinal wave travels from south to north, the particles of the medium would be vibrating in _____ .   **Ans : north to south**

3. A whistle giving out a sound of frequency 450 Hz, approaches a stationary observer at a speed of 33 m s^{-1}. The frequency heard by the observer is (speed of sound = 330 m s^{-1}) _____ .   **Ans : 500 Hz**

$$\left[\text{Hint : } n' = \left(\frac{v}{v-v_s}\right) \quad n = \left(\frac{330}{330-33}\right) 450 = \left(\frac{330}{297}\right) \times 450 = 500\text{Hz} \right]$$

4. A source of sound is travelling with a velocity 40 km/h towards an observer and emits a sound of frequency 2000 Hz. If the velocity of sound is 1220 km/h, then the apparent frequency heard by the observer is _____ .   **Ans : 2068 Hz**

$$\left[\text{Hint : } n' = \left(\frac{v}{v-v_s}\right) n = \left(\frac{1220}{1220-40}\right) 2000 = \left(\frac{1220}{1180}\right) \times 2000 = 2068\text{Hz} \right]$$

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VIII. Problem Corner

1. A sound wave has a frequency of 200 Hz and a speed of 400 m s^{-1} in a medium. Find the wavelength of the sound wave.

Solution :   Frequency   (n)   =   200 Hz

           Velocity   (V)   =   400 ms^{-1}

           Wave length   (λ)   =   ?

$$ \boxed{v = n\lambda} $$

$$ \lambda = \frac{v}{n} = \frac{400}{200} = 2\,m $$

$$ \boxed{\lambda = 2\,m} $$

2. The thunder of cloud is heard 9.8 seconds later than the flash of lightning. If the speed of sound in air is 300 m s^{-1}, what will be the height of the cloud?

Solution :   Time (t)   =   9.8 seconds

                     Velocity (V)   =   300 ms^{-1}

                     Distance (d)   =   ?

$$ v = \frac{d}{t} $$

$$ d = v \times t $$

$$ = 300 \times 9.8 $$

$$ \boxed{d = 2940\,m} $$

3. A person who is sitting at a distance of 400 m from a source of sound is listening to a sound of 600 Hz. Find the time period between successive compressions from the source?

Solution :   Distance   (d)   =   400 m

               Frequency (n)   =   600 Hz

               Time   (T)   =   ?

$$ = \frac{1}{n} = \frac{1}{600} = 0.0017\,S $$

$$ \boxed{T = 0.0017\,S} $$

4. An ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the transmission and reception of the wave is 1.6 seconds. What is the depth of the sea, if the velocity of sound in the seawater is 1400 m s^{-1}?

Solution :   Velocity   (V)   =   1400 ms^{-1}

              Time   (t)   =   1.6 seconds

             Distance   (d)   =   ?

$$ v = \frac{2d}{t} $$

$$ d = \frac{v \times t}{2} = \frac{1400 \times 1.6}{2} = \frac{2240}{2} = 1120\,m $$

$$ \boxed{d = 1120\,m} $$

5. A man is standing between two vertical walls 680 m apart. He claps his hands and hears two distinct echoes after 0.9 seconds and 1.1 second respectively. What is the speed of sound in the air?

Solution :   distance (d)   =   680 m

                    time t_1 =   0.9 seconds

CHEMISTRY

UNIT - 7. ATOMS AND MOLECULES

Text Book Evaluation

I. Choose the best answer.

1. Which of the following has the smallest mass?
a. 6.023×10^{23} atoms of He   b. 1 atom of He
c. 2 g of He   d. 1 mole atoms of He   **Ans : b. 1 atom of He**

2. Which of the following is a triatomic molecule? (G.M.Q.) (P.T.A- 1)
a. Glucose   b. Helium   c.Carbon dioxide   d.Hydrogen
                                        Ans : c. Carbon dioxide

3.The volume occupied by 4.4 g of CO_2 at S.T.P
a. 22.4 litre   b. 2.24 litre   c. 0.24 litre   d. 0.1 litre   **Ans : b. 2.24 litre**

4. Mass of 1 mole of Nitrogen atom is
a. 28 amu   b. 14 amu   c. 28 g   d. 14 g   **Ans : d. 14g**

5. Which of the following represents 1 amu?
a. Mass of a C - 12 atom   b. Mass of a hydrogen atom
c. $1/12^{th}$ of the mass of a C- 12 atom   d. Mass of O - 16 atom
                                   Ans : c. $1/12^{th}$ of the mass of a C- 12 atom

6. Which of the following statement is incorrect?
a. 12 gram of C - 12 contains Avogadro's number of atoms.
b. One mole of oxygen gas contains Avogadro's number of molecules.
c. One mole of hydrogen gas contains Avogadro's number of atoms.
d. One mole of electrons stands for 6.023×10^{23} electrons.
          Ans : c. One mole of hydrogen gas contains Avogadro's number of atoms.

7. The volume occupied by 1 mole of a diatomic gas at S.T.P is
a.11.2 litre   b.5.6 litre   c.22.4 litre   d. 44.8 litre   **Ans : c.22.4 litre**

8. In the nucleus of $_{20}Ca^{40}$, there are
a. 20 protons and 40 neutrons   b. 20 protons and 20 neutrons
c. 20 protons and 40 electrons   d. 40 protons and 20 electrons
                                        Ans : b. 20 protons and 20 neutrons

9. The gram molecular mass of oxygen molecule is
a.16g   b.18g   c. 32g   d.17g   **Ans : c. 32g**

10. 1 mole of any substance contains _____ molecules.
a. 6.023×10^{23} b. 6.023×10^{-23} c. 3.0115×10^{23} d.12.046×10^{23}
                                        Ans : a. 6.023×10^{23}

II. Fill in the blanks

1. Atoms of different elements having _____ mass number, but _____ atomic
numbers are called isobars.   **Ans: same, different**

2. Atoms of one element can be transmuted into atoms of other element by_____.
                                        Ans. artificial transmutation

3. The sum of the numbers of protons and neutrons of an atom is called its_____.
                                        Ans: mass number

4. Relative atomic mass is otherwise known as _____ .
                                        Ans: Standard Atomic weight

5. The average atomic mass of hydrogen is _____ amu.   **Ans: 1.008**

6. If a molecule is made of similar kind of atoms, then it is called _____ atomic molecule. **(May - 22)**   **Ans: homo**

7. The number of atoms present in a molecule is called its _____ . **(P.T.A-4)**   **Ans: atomicity**

8. One mole of any gas occupies _____ ml at S.T.P.   **Ans : 22,400**

9. Atomicity of phosphorous is _____ .   **Ans: 4**

III. Match the following   **Answer :**

Match the following				Answer :		
1. 8g of O_2	-	4 moles		1. 8g of O_2	-	0.25 moles
2. 4g of H_2	-	0.25 moles		2. 4g of H_2	-	2 moles
3. 52g of He	-	2 moles		3. 52g of He	-	13 moles
4. 112g of N_2	-	0.5 moles		4. 112g of N_2	-	4 moles
5. 35.5g of Cl_2	-	13 moles		5. 35.5g of Cl_2	-	0.5 moles

IV. True or False: (If false give the correct statement)

1. Two elements sometimes can form more than one compound.   **Ans : True**

2. Noble gases are Diatomic.   **Ans : False.**

Correct Statement : Noble gases are **monoatomic.**

3. The gram atomic mass of an element has no unit.   **Ans :False.**

Correct Statement : The gram atomic mass of an element **has unit**.

4. 1 mole of Gold and Silver contain same number of atoms.   **Ans : True**

5. Molar mass of CO_2 is 42g.   **Ans : False :**

Correct Statement : Molar mass of CO_2 is **44g**

V. Assertion and Reason:

1. Assertion: The relative atomic mass of aluminium is 27

Reason: An atom of aluminium is 27 times heavier than $\dfrac{1}{12^{th}}$ of the mass of the C-12 atom

Answer the following questions using the data given below :

i) A and R are correct, R explains the A.

ii) A is correct, R is wrong.

iii) A is wrong, R is correct.

iv) A and R are correct, R doesn't explains A.

    Ans : iv) A and R are correct, R doesn't explains A.

---

2. Assertion: The Relative Molecular Mass of Chlorine is 35.5 a.m.u. (P.T.A-3)

Reason: The natural abundance of Chlorine isotopes are not equal.

Answer the following questions using the data given below :

i) A and R are correct, R explains the A.

ii) A is correct, R is wrong.

iii) A is wrong, R is correct.

iv) A and R are correct, R doesn't explains A.

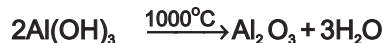   **Ans : iii) A is wrong, R is correct.**

UNIT - 8. PERIODIC CLASSIFICATION OF ELEMENTS

Text Book Evaluation

I. Choose the best answer.

1. The number of periods and groups in the periodic table are_____ .
    a) 6,16   b) 7,17 c) 8,18 d) 7,18   **Ans : d. 7,18**

2. The basis of modern periodic law is_____ .
    a) atomic number   b) atomic mass
    c) isotopic mass   d) number of neutrons   **Ans : a. atomic number**

3. _____ group contains the member of halogen family. (P.T.A - 1)
    a) 17th   b) 15th c) 18th d)16th   **Ans : a. 17th**

4. _____ is a relative periodic property.
    a) atomic radii   b) ionic radii   c) electron affinity d) electronegativity
                                                    Ans : d. electronegativity

5. Chemical formula of rust is _____ .
    a) FeO x H_2O b) FeO_4 x H_2O c)$Fe_2 O_3$ x H_2O d)FeO   **Ans : c. Fe_2O_3 .x H_2O**

6. In the alumino thermic process the role of Al is _____ .
    a) oxidizing agent   b) reducing agent
    c) hydrogenating agent   d) sulphurising agent   **Ans : b. reducing agent**

7.The process of coating the surface of metal with a thin layer of zinc is called _____ .
    a) painting   b) thinning
    c) galvanization   d) electroplating   **Ans : c. galvanization**

8. Which of the following have inert gases 2 electrons in the outermost shell.
    a) He   b) Ne   c) Ar   d) Kr   **Ans : a. He**

9. Neon shows zero electron affinity due to _____ .
    a) stable arrangement of neutrons   b) stable configuration of electrons
    c) reduced size   d) increased density
                                        Ans :b. stable configuration of electrons

10. _____ is an important metal to form amalgam.(G.M.Q)
    a)Ag   b) Hg   c) Mg   d) Al   **Ans : b. Hg**

II. Fill in the blanks

1. If the electronegativity difference between two bonded atoms in a molecule is greater than 1.7, the nature of bonding is _____ .   **Ans. ionic**

2. _____ is the longest period in the periodical table.   **Ans : Sixth period**

3. _____forms the basis of modern periodic table.   **Ans: Atomic number**

4. If the distance between two Cl atoms in Cl_2 molecule is 1.98A^0, then the radius of Cl atom is _____ .   **Ans : 0.99A^0**

5. Among the given species A$^-$, A$^+$, and A, the smallest one in size is _____ . **Ans : A$^+$**

6. The scientist who propounded the modern periodic law is _____ . **Ans : Henry Mosley**

7. Across the period, ionic radii _____ (increases.decreases).   **Ans : decreases**

8. _____ and_____ are called inner transition elements.
                                        Ans : Lanthanides, Actinides

9. The chief ore of Aluminium is _____ .   **Ans : Bauxite**

10. The chemical name of rust is _____ .   **Ans : hydrated ferric oxide [Fe_2O_3.x H_2O]**

★ The precipitate is filtered, washed, dried and ignited at 1000^oC to get alumina.

$$2Al(OH)_3 \xrightarrow{1000^oC} Al_2O_3 + 3H_2O$$

b) Along with cryolite and alumina, another substance is added to the electrolyte mixture. Name the substance and give one reason for the addition.
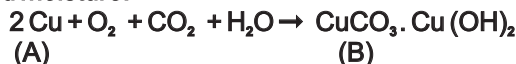**Ans :**
★ Fluorspar.
★ It lowers the fusion temperature of electrolyte.

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2. The electronic configuration of metal A is 2, 8,18, 1.
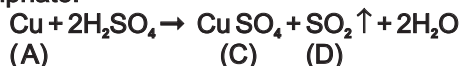**The metal A when exposed to air and moisture forms B a green layered compound. A with con. H_2So_4 forms C and D along with water. D is a gaseous compound. Find A, B, C and D. (P.T.A - 1)**
Ans :
★ Metal A is copper (Cu)
★ Copper gets covered with a green layer of basic copper carbonate in the presence of CO_2 and moisture.

$$2Cu + O_2 + CO_2 + H_2O \rightarrow CuCO_3 . Cu(OH)_2$$
$$(A) \qquad\qquad\qquad\qquad (B)$$

★ Copper reacts with con. H_2SO_4 with the liberation of sulphur di oxide gas and copper sulphate.

$$Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 \uparrow + 2H_2O$$
$$(A) \qquad\qquad (C) \quad (D)$$

A - Copper   B - Copper carbonate   C - Copper sulphate   D - Sulphur dioxide gas

---

3. Explain smelting process.
Ans :
Smelting (in a Blast Furnace) : The charge consisting of roasted ore, coke and limestone in the ratio 8:4:1 is smelted in a blast furnace by introducing it through the hopper arrangement at the top.
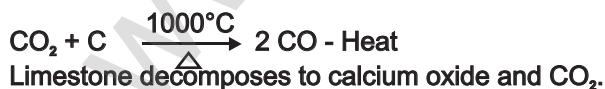
There are three important regions in the furnace.
(a) The Lower Region (Combustion Zone) - The temperature is at 1500°C. In this region, coke burns with oxygen to form CO_2 when the charge comes in contact with a hot blast of air.
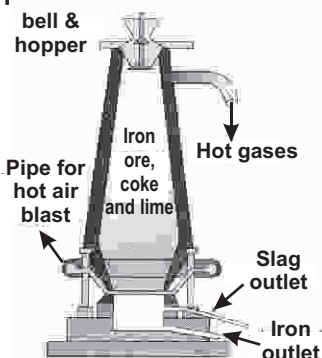
$$C + O_2 \xrightarrow[\triangle]{1500°C} CO_2 + Heat$$

It is an exothermic reaction since heat is liberated.

(b) The Middle Region (Fusion Zone) - The temperatur prevails at 1000°C. In this region, CO_2 is reduced to CO.

$$CO_2 + C \xrightarrow[\triangle]{1000°C} 2CO - Heat$$

Limestone decomposes to calcium oxide and CO_2.

$$CaCO_3 \xrightarrow[\triangle]{1000°C} CaO + CO_2 - Heat$$

These two reactions are endothermic due to absorption of heat. Calcium oxide combines with silica to form calcium silicate slag.

$$CaO + SiO_2 \rightarrow CaSiO_3$$

bell & hopper

Iron ore, coke and lime

Hot gases

Pipe for hot air blast

Slag outlet

Iron outlet

UNIT - 11. CARBON AND ITS COMPOUNDS

Text Book Evaluation

I. Choose the best answer.

1. The molecular formula of an open chain organic compound is C_3H_6. The class of the compound is
a. alkane   b. alkene   c. alkyne   d. alcohol   **Ans : b. alkene**

2. The IUPAC name of an organic compound is 3-Methyl butan-1-ol. What type compound it is?
a. Aldehyde   b.Carboxylic acid   c. Ketone   d.Alcohol   **Ans :d. Alcohol**

3. The secondary suffix used in IUPAC nomenclature of an aldehyde is___.
a. - ol   b. - oic acid   c.- al   d.- one   **Ans : c. - al**

4. Which of the following pairs can be the successive members of a homologous series?
a. C_3H_8 and C_4H_{10} b. C_2H_2 and C_2H_4
c. CH_4 and C_3H_6 d. C_2H_5OH and C_4H_8OH **Ans : a. C_3H_8 and C_4H_{10}**

5. $C_2H_5OH + 3O_2 \longrightarrow 2CO_2 + 3H_2O$ is a (Sep-20)
a. Reduction of ethanol   b.Combustion of ethanol
c. Oxidation of ethanoic acid   d.Oxidation of ethanal   **Ans : b.Combustion of ethanol**

6. Rectified spirit is an aqueous solution which contains about_____of ethanol (May - 22)
a.95.5%   b.75.5%   c.55.5%   d. 45.5%   **Ans : a. 95.5%**

7. Which of the following are used as anaesthetics?
a. Carboxylic acids   b.Ethers   c. Esters   d. Aldehydes   **Ans : b.Ethers**

8. TFM in soaps represents _____ content in soap.
a. mineral   b. vitamin   c. fatty acid   d. carbohydrate   **Ans : c. fatty acid**

9. Which of the following statements is wrong about detergents?
a. It is a sodium salt of long chain fatty acids   b. It is sodium salts of sulphonic acids
c. The ionic part in a detergent is - $SO_3^- Na^+$ d. It is effective even in hard water.
Ans : a. It is a sodium salt of long chain fatty acids

II. Fill in the blanks

1. An atom or a group of atoms which is responsible for chemical characteristics of an organic compound is called _____ .   **Ans :functional group**

2. The general molecular formula of alkynes is _____ .   **Ans :C_nH_{2n-2}**

3. In IUPAC name, the carbon skeleton of a compound is represented by _____. (root word / prefix / suffix)   **Ans : root word**

4. (Saturated / Unsaturated) _____ compounds decolourize bromine water.   **Ans : Unsaturated**

5. Dehydration of ethanol by conc. Sulphuric acid forms_____. (ethene / ethane)   **Ans : ethene**

6. 100 % pure ethanol is called_____ .   **Ans : absolute alcohol**

7. Ethanoic acid turns_____ litmus to _____ .   **Ans : blue, red**

8. The alkaline hydrolysis of fatty acids is termed as _____. **Ans : saponification**

9. Biodegradable detergents are made of_____ (branched / straight) chain hydrocarbons.   **Ans : straight**

III. Match the following : (P.T.A - 2)

1.	Functional group OH	-	Benzene
2.	Heterocy clic	-	Potassium stearate
3.	Unsaturated	-	Alcohol
4.	Soap	-	Furan
5.	Carbocyclic	-	Ethene

Answers:

1.	Functional group OH	-	Alcohol
2.	Heterocy clic	-	Furan
3.	Unsaturated	-	Ethene
4.	Soap	-	Potassium stearate
5.	Carbocyclic	-	Benzene

IV. Assertion and Reason :

1. Answer the following questions using the data given below

1. Assertion : **Detergents are more effective cleansing agents than soaps in hard water.**

Reason : Calcium and magnesium salts of detergents are water soluble. (P.T.A-4)

i) A and R are Correct, R explains the A.   ii) A is correct, R is wrong.

iii) A is wrong, R is correct.   iv) A and R are correct, R doesn't explains A

           Ans : i) A and R are Correct, R explains the A.

2. Assertion : Alkanes are saturated hydrocarbons.

Reason : Hydrocarbons consist of covalent bonds.

i) A and R are Correct, R explains the A.   ii) A is correct, R is wrong.

iii) A is wrong, R is correct.   iv) A and R are correct, R doesn't explains A.

           Ans : iv) A and R are correct, R doesn't explains A.
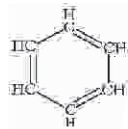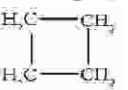
V. Short answer question :

1. Name the simplest ketone and give its structural formula. (P.T.A-2)

Ans : simplest ketone - Acetone

       structural formula - $CH_3 - CO - CH_3$

2. Classify the following compounds based on the pattern of carbon chain and give their structural formula : (May - 22)

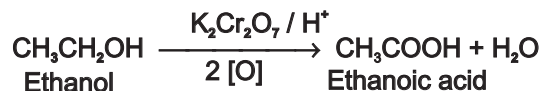**i) Propane (P.T.A-1)   ii) Benzene (P.T.A-1)   iii) Cyclobutane   iv) Furan**

Ans :

S.No. Compound	Type of compound		Structural formula
i) Propane	Acyclic Compounds		$CH_3 - CH_2 - CH_3$
ii) Benzene	Cyclic Compounds	Aromatic Compound	
iii) Cyclobutane		Alicyclic Compound	
iv) Furan		Heterocyclic compounds	

3. Write a reaction which is used for the identification of alcohol. (Sep - 20)

Ans : Oxidation :

✴ Ethanol is oxidized to ethanoic acid with alkaline $KMnO_4$ or acidified $K_2Cr_2O_7$

$$CH_3CH_2OH \xrightarrow[2\,[O]]{K_2Cr_2O_7\,/\,H^+} CH_3COOH + H_2O$$

　Ethanol　　　　　　　　Ethanoic acid

✴ During this reaction, the orange colour of $K_2Cr_2O_7$ changes to green.

✴ Therefore, this reaction can be used for the identification of alcohols.

---

4. a) The functional group for ketones is _____

　b) IUPAC Stands for _____

$$\overset{\displaystyle O}{\overset{\|}{Ans : a) - C -}}$$ 　b) **International Union of Pure and Applied Chemistry**

---

5. Write the functional group and the suffix used for the following class of compounds. 　　　　　　　　　　　　　　　　　　　(May - 22)

Ans :

Class of Compounds	Functional Group	Suffix used
Alcohol	-OH	- ol
Aldehyde	-CHO	- al
Ketone	$\overset{O}{\overset{\|}{-\,C\,-}}$	- one
Carboxylic Acid	-COOH	- oic acid

6. a) _____ is used as a food preservative.

　b) _____ is used in the manufacture of plastics.

　　　　　　　　　　　Ans : a) Acetic acid　b) Ethanoic Acid

7. a) _____ is used for coagulating rubber from latex.

　b) _____ is used as a stain remover.

　　　　　　　　　　　Ans : a) Ethanoic acid　b) ketones

III. Short Answers : (Four Marks)

1. Fill in the blanks in the table using IUPAC nomenclature of organic compounds. (P.T.A - 2)

Name of the compound	Structural formula	Functional group present
————	$CH_3 - CH - CH_3$ 　　　　$\|$ 　　　OH	- OH
Ethanal	$CH_3 - C - H$ 　　$\|\|$ 　　O	———
Butanone	————	> C = O
————	$CH_3 - CH_2 - CH_2 - COOH$	- COOH

BIOLOGY

UNIT - 12 PLANT ANATOMY AND PLANT PHYSIOLOGY

TEXT BOOK EVALUATION

I. Choose the correct answer

1. Casparian strips are present in the ....of the root. (G.M.Q)
a) cortex   b) pith   c) pericycle   d) endodermis   **Ans : d) endodermis**

2. The endarch condition is the characteristic feature of (May - 22)
a) root   b) stem   c) leaves   d) flower   **Ans : b) stem**

3. The xylem and phloem arranged side by side on same radius is called................... .
a) radial   b) amphivasal   c) conjoint   d) None of these   **Ans : c) conjoint**

4. Which is formed during anaerobic respiration. (G.M.Q) (Sep-20)
a) Carbohydrate   b) Ethyl alcohol   c) Acetyl CoA   d) Pyruvate   **Ans:b) Ethyl alcohol**

5. Kreb's cycle takes place in............................ . (P.T.A - 3)
a) chloroplast   b) mitochondrial matrix
c) stomata   d) inner mitochondrial membrane   **Ans : b) mitochondrial matrix**

6. Oxygen is produced at what point during photosynthesis ? (P.T.A - 4)
a) when ATP is converted to ADP   b) when CO_2 is fixed
c) when H_2O is splitted   d) All of these   **Ans : c) when H_2O is splitted**

II. Fill in the blanks.

1. The innermost layer of cortex in root is called .... **Ans : Endodermis**
2. Xylem and phloem are arranged in an alternate radii constitute a vascular bundle called ....   **Ans : Radial bundle**
3. Glycolysis takes place in............................ .   **Ans : Cytoplasm**
4. The source of O_2 liberated in Photosynthesis is................ .   **Ans : H_2O**
5. ....is ATP factory of the cells.   **Ans : Mitochondria**

III. State whether the statements are true or false. Correct the false statement.

1. Phloem tissue is involved in the transport of water in plant.   **Ans : False**
Correct Statement : <u>Xylem</u> tissue is involved in the transport of water in plant.
2. The waxy protective covering of a plant is called as cuticle.   **Ans : True**
3. In monocot stem cambium is present in between xylem and phloem. **Ans : False**
Correct Statement : In <u>dicot</u> stem cambium is present in between xylem and phloem.
4. Palisade parenchyma cells occur below upper epidermis in dicot root. **Ans : False**
Correct Statement : Palisade Parenchyma cells occur below upper epidermis in dicot <u>leaf.</u>
5. Mesophyll contains chlorophyll.   **Ans : True**
6. Anaerobic respiration produces more ATP than aerobic respiration. **Ans : False**
Correct Statement : Anaerobic respiration produces <u>less</u> ATP than aerobic respiration.

IV. Match the following

		Answers :-	
1. Amphicribal	- Dracaena	1. Amphicribal	- Fern
2. Cambium	- Translocation of food	2. Cambium	- Secondary growth
3. Amphivasal	- Fern	3. Amphivasal	- Dracaena
4. Xylem	- Secondary growth	4. Xylem	- Conduction of water
5. Phloem	- Conduction of water	5. Phloem	- Translocation of food

V. Answer in a sentence

1. What is collateral vascular bundle ? (P.T.A - 1)
Ans : ✶ A Vascular bundle in which xylem lies towards the centre and phloem lies towards the periphery is called collateral vascular bundle.

2. Where does the carbon that is used in Photosynthesis come from ?
Ans : ✶ Atmospheric Carbon - di - oxide (CO_2).

3. What is the common step in aerobic and anaerobic pathway ? (P.T.A - 5)
Ans : ✶ Glycolysis.

4. Name the phenomenon by which Carbohydrates are oxidized to release ethyl alcohol.
Ans : ✶ Anaerobic respiration (or) Fermentation.

VI. Short answer questions.

1. Give an account on vascular bundle of dicot stem.
Ans : ★ Vascular bundles are conjoint, collateral, endarch and open.
★ They are arranged in the form of a ring around the pith.

2. Write a short note on mesophyll.
Ans : ★ The tissue present between the upper and lower epidermis is called mesophyll.
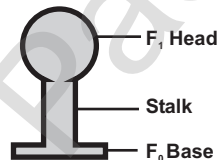★ It is differentiated into palisade parenchyma and spongy parenchyma.
★ Palisade parenchyma are elongated cells with more number of chloroplasts and take part in photosynthesis.
★ Spongy parenchyma are spherical cells with intercellular spaces and helps in gaseous exchange.

3. Draw and label the structure of oxysomes.
Ans :

F_1 Head
Stalk
F_0 Base
Structure of Oxysomes

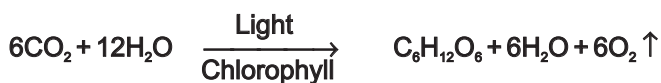**4. Name the three basic tissues system in flowering plants.**
Ans :
The three basic tissues system in flowering plants are,
1) Dermal or Epidermal tissue system.
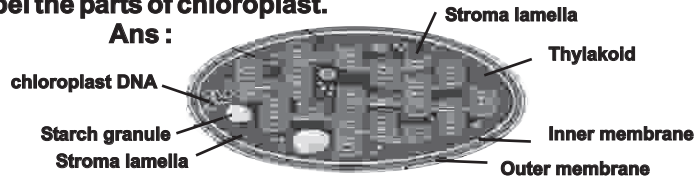2) Ground tissue system.
3) Vascular tissue system.

5. What is photosynthesis and where in a cell does it occur ? (P.T.A - 3)
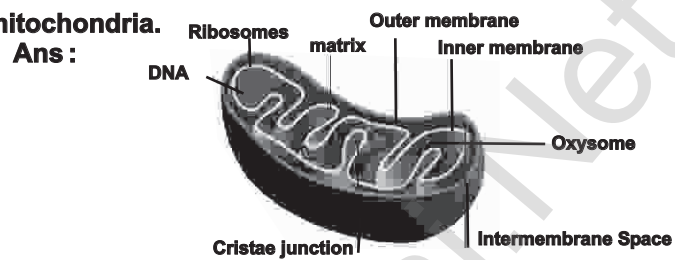**Ans : Photosynthesis :**
★ Photosynthesis is a process by which autotrophic organisms like green plants, algae and chlorophyll containing bacteria utilize the energy from sunlight to synthesize their own food.

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6H_2O + 6O_2 \uparrow$$

4. Draw and label the parts of chloroplast.

Ans :

Labels: Stroma lamella, Thylakoid, chloroplast DNA, Starch granule, Stroma lamella, Inner membrane, Outer membrane

5. Draw and label the parts of mitochondria.

Ans :

Labels: Ribosomes, Outer membrane, matrix, Inner membrane, DNA, Oxysome, Cristae junction, Intermembrane Space

III. Short Answer : (Four Marks)

1. Draw and label the different types of Conjoint vascular bundles. (P.T.A-4)

Ans :

Labels: Phloem, Cambium, Xylem, Outer Phloem, Outer Cambium, Xylem, Inner Cambium, Inner Phloem

Conjoint, collateral and open   Conjoint, collateral and closed   Conjoint, Bicollateral
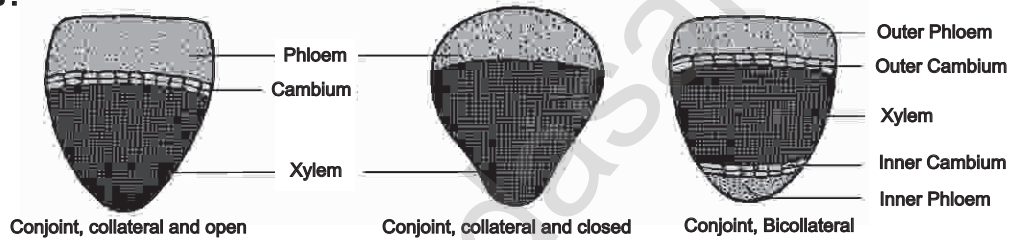
2. Draw the structure of a dicot root and label the parts.. (P.T.A-6)

Ans :

Labels: Root hair, Piliferous layer, Cortex, Phloem, Xylem, Ground plan, Root hair, Piliferous layer, Cortex, Passage cell, Endodermis, Phloem, Pericycle, Xylem, Conjunctive tissue, Casparian strip, A sector enlarged
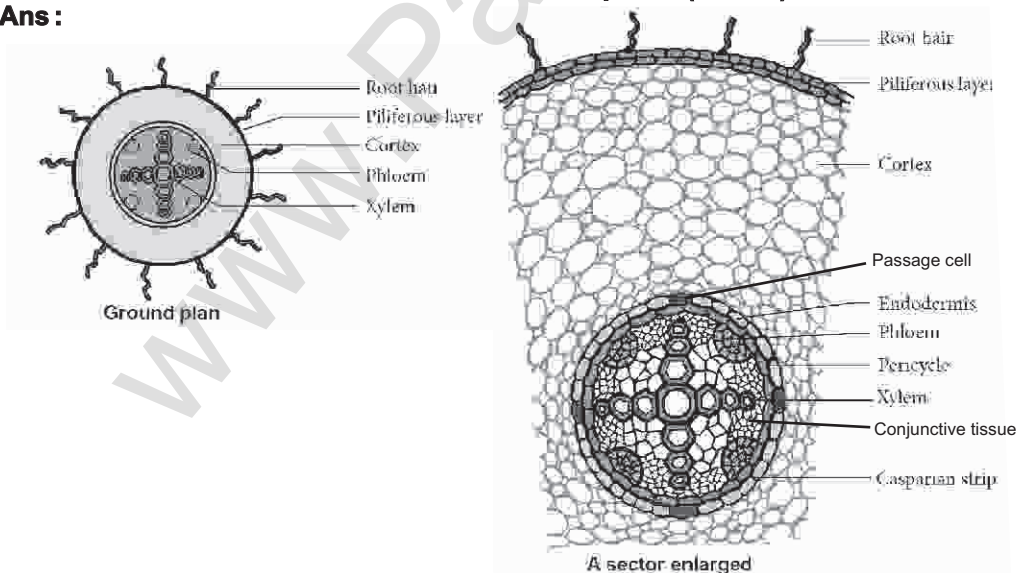
Transverse section of Dicot root

UNIT - 16

PLANT AND ANIMAL HORMONES

TEXT BOOK EVALUATION

I Choose the correct answer

1. Gibberellins cause:
a) Shortening of genetically tall plants
b) Elongation of dwarf plants
c) Promotion of rooting
d) Yellowing of young leaves   **Ans : b) Elongation of dwarf plants**

2. The hormone which has positive effect on apical dominance is:
a) Cytokinin   b) Auxin
c) Gibberellin   d) Ethylene   **Ans : b) Auxin**

3. Which one of the following hormones is naturally not found in plants:
a) 2, 4-D   b) GA3
c) Gibberellin   d) IAA
                                                    Ans : a) 2, 4-D

4. Avena coleoptile test was conducted by
a) Darwin   b) N. Smit
c) Paal   d) F.W. Went
                                                    Ans : d) F.W. Went

5. LH is secreted by
a) Adrenal gland   b) Thyroid gland
c) Anterior pituitary   d) Hypothalamus.
                                                    Ans : c) Anterior pituitary

6. Identify the exocrine gland
a) Pituitary gland   b) Adrenal gland
c) Salivary gland   d) Thyroid gland
                                                    Ans : c) Salivary gland

7. Which organ acts as both exocrine gland as well as endocrine gland (P.T.A-3)
a) Pancreas   b) Kidney
c) Liver   d) Lungs   **Ans : a) Pancreas**

8. Which one is referred as "Master Gland"? (P.T.A-2) (May - 22)
a) Pineal gland   b) Pituitary gland
c) Thyroid gland   d) Adrenal gland
                                                    Ans : b) Pituitary gland

9. Why are thyroid hormones refered as personality hormone?(G.M.Q)
Ans :
★ Thyroid hormone is essential for normal physical, mental and personality development.
★ Hence, it is referred to as personality hormone.

10. Which hormone requires iodine for its formation? What will happen if intake of iodine in our diet is low?
Ans :
★ Thyroid hormone requires iodine for its formation.
★ If intake of iodine in our diet is low, it leads to the enlargement of thyroid gland which protrudes as a marked swelling in the neck and is called as goitre.

VIII. Long answer questions
1. (a) Name the gaseous plant hormone. Describe its three different actions in plants.
Ans :
Ethylene is a gaseous plant hormone .
Action of ethylene :
1. Ethylene promotes the ripening of fruits.
e.g. Tomato, Apple, Mango, Banana, etc.
2. Ethylene inhibits the elongation of stem and root in dicots.
3. Ethylene hastens the senescence of leaves and flowers.
(b) Which hormone is known as stress hormone in plants ? Why?
Ans :
 Abscisic acid (ABA) is known as stress hormone in plants.
Reason :
★ It increases tolerance of plants to various kinds of stress.

2. Describe an experiment which demonstrates that growth stimulating hormone is produced at the tip of coleoptile.
Ans : Went's Experiment
★ Frits Warmolt Went, a Dutch biologist demonstrated the existence and effect of auxin in plants.
★ He did a series of experiments in Avena coleoptiles.
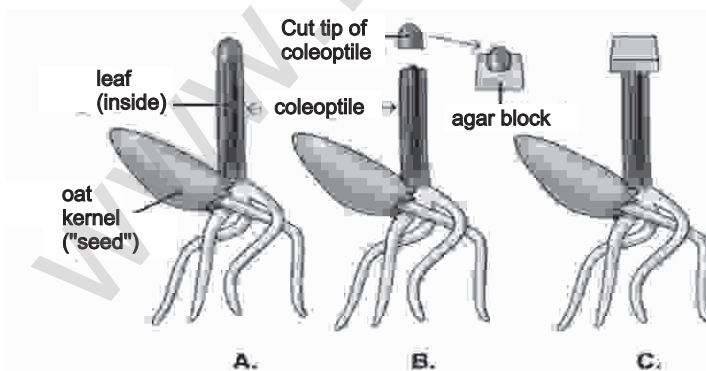
A. Germination of an oat seed.
B. Decapitate tip of coleoptile and place on agar block.
C. Agar block is placed on top of the decapitated tip of the seedling.

4. Sanjay is sitting in the exam hall. Before the start of the exam , he sweats a lot, with increased rate of heart beat. Why does this condition occur?

Ans :

★ Sanjay is in stress and fright condition in the exam hall.

★ Due to this condition emergency hormones epinephrine and nor epinephrine are secreted .

★ So, he sweats a lot, with increased rate of heart beat.

5. Susan's father feels very tired and frequently urinates. After clinical diagnosis he was advised to take an injection daily to maintain his blood glucose level. What would be the possible cause for this? Suggest preventive measures.

Ans :

Cause - diabetes mellitus.

Preventive measures :

1. Maintenance of normal body weight through adoption of healthy nutritional habits and physical exercise.

2. Intake of low carbohydrate and fibre rich diets are more appropriate.

Additional Questions

Part - I. Choose the correct answers :

1. _____ is found abundantly in liquid endosperm of coconut. (Sep -20)

a) Auxin	b) Cytokinin
c) Gibberellins	d) Ethylene **Ans : b) Cytokinin**

2. The first plant hormone discovered is _____ .

a) Auxin	b) Cytokinins
c) Gibberellin	d) Abscisic acid **Ans : a) Auxin**

3. The influence was identified as Auxin by _____ .

a) Haagen Smith	b) Charles Darwin
c) Went	d) E.H. Starling **Ans : c) Went**

4. The chemical messengers are _____ .

a) Insulin	b) glucose
c) Glucagon	d) hormones **Ans : d) hormones**

5. _____ promotes ripening of fruits.

a) Abscisic acid	b) Gibberellin
c) Ethylene	d) Auxin **Ans : c) Ethylene**

Part - II. (Two Mark Questions)

Very Short Answers :

1. Identify the parts A, B, C, D in the given figure. (May - 22)

Ans :
A - Capsule
B - Cortex
C - Medulla
D - Blood vessels

2. Identify the disorder with which the person in the figure is suffering. (P.T.A-1)

Ans : Goitre :

★ It is caused due to the inadequate supply of iodine in our diet.

★ It leads to the enlargement of thyroid gland which protrudes as a marked swelling in the neck and is called as **goitre.**

UNIT - 18

GENETICS

TEXT BOOK EVALUATION

I. Choose the correct answer

1. According to Mendel alleles have the following character
a) Pair of genes   b) Responsible for character
c) Production of gametes   d) Recessive factors

Ans : b) Responsible for character

2. 9 : 3 : 3 : 1 ratio is due to
a) Segregation   b) Crossing over
c) Independent assortment   d) Recessiveness

Ans : c) Independent assortment

3. The region of the chromosome where the spindle fibres get attached during cell division
a) Chromomere   b) Centrosome
c) Centromere   d) Chromonema

Ans : c) Centromere

4. The centromere is found at the centre of the _____ chromosome.
a) Telocentric   b) Metacentric
c) Sub-metacentric   d) Acrocentric   **Ans : b) Metacentric**

5. The _____ units form the backbone of the DNA.
a) 5 carbon sugar   b) Phosphate
c) Nitrogenous bases   d) Sugar phosphate

Ans : d) Sugar phosphate

6. Okasaki fragments are joined together by _____.
a) Helicase   b) DNA polymerase
c) RNA primer   d) DNA ligase   **Ans : d) DNA ligase**

7. The number of chromosomes found in human beings are _____.
a) 22 pairs of autosomes and 1 pair of allosomes.
b) 22 autosomes and 1 allosome
c) 46 autosomes
d) 46 pairs autosomes and 1 pair of allosomes.

Ans : a) 22 pairs of autosomes and 1 pair of allosomes.

8. The loss of one or more chromosome in a ploidy is called _____.
a) Tetraploidy   b) Aneuploidy
c) Euploidy   d) polyploidy   **Ans : b) Aneuploidy**

II. Fill in the blanks

1. The pairs of contrasting character (traits) of Mendel are called _____.

Ans : alleles

2. Physical expression of a gene is called _____ .   **Ans : phenotype**

3. The thin thread like structures found in the nucleus of each cell are called _____.

Ans : chromosomes

4. DNA consists of two _____ chains.   **Ans : polynucleotide**

5. An inheritable change in the amount or the structure of a gene or a chromosome is called _____.   **Ans : mutation**

6. A pure tall plant (TT) is crossed with pure dwarf plant (tt), what would be the F_1 and F_2 generations? Explain. (P.T.A-5)

Ans :

F_1 Generation :

★ Plants raised from the seeds of pure breeding parental corss in F_1 generation were tall and monohybrids.

F_2 Generation :

★ Selfing of the F_1 monohybrids resulted in tall and dwarf plants respectively in the ratio of 3 :1.

★ In the F_2 generation 3 different types were obtained :

Tall Homozygous   -   TT (pure) - 1
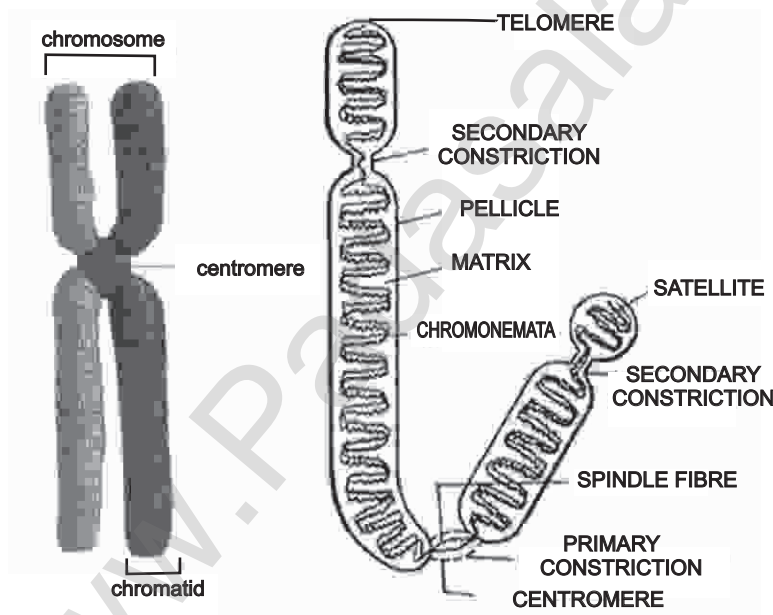
Tall Heterozygous   -   Tt - 2

Dwarf Homozygous   -   tt - 1

Phenotypic ratio = 3 :1.

Genotypic ratio = 1:2:1.

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7. Explain the structure of a chromosome. (P.T.A-6)

Ans :

Structure of chromosome

Structure of a Chromosome :

★ The chromosomes are thin, long and thread like structures consisting of two identical strands called sister chromatids.

★ They are held together by the centromere.

★ Each chromatid is made up of spirally coiled thin structure called chromonema.

★ The chromonema has number of bead-like structures along its length which are called chromomeres.

★ The chromosomes are made up of DNA, RNA, chromosomal proteins (histones and non-histones) and certain metallic ions.

★ These proteins provide structural support to the chromosome .

A chromosome consists of the following regions

Primary constriction:

★ The two arms of a chromosome meet at a point called **primary constriction** or **centromere**.

★ The centromere is the region where spindle fibres attach to the chromosomes during cell division.

Secondary constriction:

★ Some chromosomes possess secondary constriction **at any point** of the chromosome.

★ They are known as the nuclear zone or **nucleolar organizer** (formation of nucleolus in the nucleus).

Telomere:

★ The **end of the chromosome** is called telomere.

★ Each extremity of the chromosome has a polarity and prevents it from joining the adjacent chromosome.

★ It maintains and provides **stability to the chromosomes.**

Satellite:

★ Some of the chromosomes have an elongated **knob-like appendage** at one end of the chromosome known as satellite.

★ The chromosomes with satellites are called as the **sat-chromosomes**.

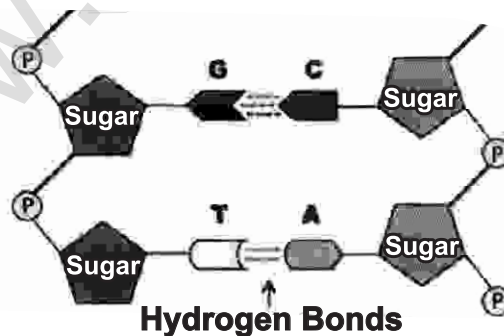**8. Label the parts of the DNA in the diagram given below. Explain the structure briefly.**
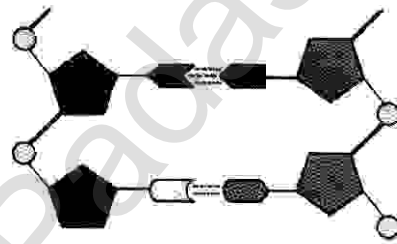
Ans :

P - Phosphate

G - Guanine

C - Cytosine

T - Thymine

A - Adenine

Hydrogen Bonds

UNIT - 22

ENVIRONMENTAL MANAGEMENT

TEXT BOOK EVALUATION

I. Fill in the blanks

1. Deforestation leads to _____ in rainfall.   **Ans : decrease**
2. Removal of soil particles from the land is called _____. **Ans : soil erosion**
3. Chipko movement is initiated against _____ .   **Ans : deforestation**
4. _____ is a biosphere reserve in Tamilnadu.   **Ans : Nilgiris**
5. Tidal energy is _____ type of energy.   **Ans : renewable**
6. Coal, petroleum and natural gas are called _____ fuels.

                                        Ans : fossil
7. _____ is the most commonly used fuel for the production of electricity.

                                        Ans : Coal

II. State whether True or False. Correct the statements which are false

1. **Biogas is a fossil fuel.**   **Ans : False**
Correct Statement : **Natural gas** is a fossil fuel.
2. **Planting trees increases the groundwater level.**   **Ans : True**
3. **Habitat destruction cause loss of wild life.**   **Ans : True**
4. **Nuclear energy is a renewable energy.**   **Ans : False**
Correct Statement : Nuclear energy is a **non-renewable** energy.
5. **Overgrazing prevents soil erosion.**   **Ans : False**
Correct Statement : Overgrazing **causes in** soil erosion.
6. **Poaching of wild animals is a legal act.**   **Ans : False**
Correct Statement : Poaching of wild animals is **an illegal** act.
7. **National park is a protected park.**   **Ans : True**
8. **Wild life protection act was established in 1972.**   **Ans : True**

III. Match the following

1.	Soil erosion	-	energy saving
2.	Bio gas	-	acid rain
3.	Natural gas	-	removal of vegetation
4.	Green house gas	-	renewable energy
5.	CFL bulbs	-	CO_2
6.	Wind	-	non - renewable energy
7.	Solid waste	-	lead and heavy metals

Additional Questions & Answers :
Part - I. Choose the Correct Answers.
1. The soft finely stratified sadimentary rocks refers to (G.M.Q)
a) shale   b) petroleum
c) methane   d) coal   **Ans : a) shale**
2. The energy obtained from the movement of water due to ocean tides is ....
(P.T.A-6)
a) Tidal energy   b) Wind energy
c) Solar energy   d) Water energy   **Ans : a) Tidal energy**
3. Match the following: (May - 22)
(1) Solar Energy   (i) Flowing water
(2) Petroleum   (ii) Mobile phone
(3) Hydropower   (iii) Inexhaustible energy
(4) Electronic device   (iv) Exhaustible energy resource
a) (1) - (iv), (2) - (iii), (3) - (ii), (4) - (i)
b) (1) - (iii), (2) - (iv), (3) - (i), (4) - (ii)
c) (1) - (iii), (2) - (i), (3) - (iv), (4) - (ii)
d) (1) - (i), (2) - (iv), (3) - (ii), (4) - (iii)
                                        Ans : b) (1) - (iii), (2) - (iv), (3) - (i), (4) - (ii)
4. A capacity of 100 litres solar heater can save up to .... of electricity.
a) 1000 units   b) 2000 units
c) 1500 units   d) 500 units   **Ans : c) 1500 units**
5. One wind turbine can produce electricity for .... homes.
a) 200   b) 300
c) 150   d) 400   **Ans : b) 300**
6. Only ....of e-wastes produced are recycled.
a) 2 %   b) 3 %
c) 5 %   d) 4 %   **Ans : c) 5 %**

Part II. (Two Marks Questions)
Very Short Answers :
1. What is 4R approach? (P.T.A-1)
Ans :
    4R approach :
★ The 4R approach such as Reduce, Reuse, Recovery and Recycle may be followed for effective waste management.

2. Define - Conservation
Ans :
★ Proper utilization and Management of nature and its resources is termed as conservation.

3. What is Van Mahotsav ?
Ans :
★   Van Mahotsav is an activity for afforestation programme which includes planting
and protecting trees with Multiple Uses.
★ It helps in restoration of green cover.

4.   a) The.............Movement was aimed at protection and Conservation of trees.
     b) First established National Park is..................   .
                     Ans : a) Chipko b) Jim Corbett National Park

PRACTICALS   PHYSICS

1. DETERMINATION OF WEIGHT OF AN OBJECT USING THE PRINCIPLE OF MOMENTS

Aim:
To determine the weight of an object using the principle of moments.

Apparatus required:
A metre scale, a knife edge, slotted weights, thread.

Procedure:
i. A metre scale is supported at its centre of gravity by a knife edge or suspended by using a thread tied to its centre so that the scale is in the horizontal position. Ensure that the scale is in equilibrium position.
ii. A known weight W_2 and an unknown weight W_1 are suspended from to either side of the the scale using the weight hangers.
iii. Fix the position of one weight hanger and adjust the position of the second weight hanger such that the scale is in equilibrium.
iv. Measure the distance d_1 and d_2 of the two weight hangers from the centre of the scale accurately.
v. The experiment is repeated for different positions of the unknown weight. Measure the distances. The reading are tabulated as follows:

Observation:

S.No	Weight in the weight hanger(W_2) kg	Distance of known weight d_2(m)	Distance of unknown weight d_1 (m)	$W_2 \times d_2$ (kg m)	unknown weight $W_1 = \dfrac{W_2 x d_2}{d_1}$ (kg)
1	50×10^{-3}	20×10^{-2}	13.7×10^{-2}	$(50 \times 10^{-3})(20 \times 10^{-2})$	72.99×10^{-3}
2	100×10^{-3}	20×10^{-2}	27.5×10^{-2}	$(100 \times 10^{-3})(20 \times 10^{-2})$	72.72×10^{-3}
3	150×10^{-3}	20×10^{-2}	41.2×10^{-2}	$(150 \times 10^{-3})(20 \times 10^{-2})$	72.81×10^{-3}

Mean : 72.84×10^{-3}

Calculations:
Moment of a force can be calculated using the formula
Moment of the force = Force x distance
Anti clock wise moment by unknown weight = $W_1 \times d_1$
Clockwise moment by known weight = $W_2 \times d_2$
$W_1 \times d_1 = W_2 \times d_2$
Unknown weight = $W_1 = \dfrac{W_2 \times d_2}{d_1}$

Result:
Using the principle of moments, the weight of the unknown body W1 = $\overset{72.84 \times 10^{-3}}{\ldots\ldots\ldots\ldots\ldots}$ Kg Wt.

(ii) To find the diameter of the wire using screw gauge:

S.No.	Pitch Scale reading-PSR (mm)	Head Scale coincidence HSC	Head Scale reading HSR=HSCxLC (mm)	Total reading= PSR + HSR (mm)
1	1	26	0.26	1.26
2	1	27	0.27	1.27
3	1	28	0.28	1.28
			Mean Diameter	1.27

Calculations:

Radius of the wire, r = diameter/2 =   **1.27 / 2   =   0.63 x 10^{-3}** m

Area of cross section of the wire, A = πr^2 = **1.2462 x 10^{-6}** m^2

Length of the wire L = **1** m.

Resistivity of the material of the wire = $= \frac{\square}{\square} |\frac{R}{}$ =   **2.4925 x 10^{-6}** Ω m

Result:

The resistivity of the material of the wire = **2.4925 x 10^{-6}** Ω m

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CHEMISTRY

4. IDENTIFY THE DISSOLUTION OF THE GIVEN SALT WHETHER IT IS EXOTHERMIC OR ENDOTHERMIC.

Aim:

To test the dissolution of given salt is exothermic or endothermic.

Principle:

If the reaction or process liberates the heat, then it is called exothermic.

If the reaction or process absorbs the heat, then it is called endothermic.

Apparatus required:

Two beakers, Thermometer, stirrer ,weighed amount of two samples.

Procedure:

Take 50ml of water in two beakers and label them as A and B. Note the temperature of the water from beaker A and B. Then, add 5g of sample A into the beaker A and stir well until it dissolve completely. Record final temperature of the solution. Now, repeat the same for the sample B. Record the observation.

BIO-BOTANY

8. PHOTOSYNTHESIS-TEST TUBE AND FUNNEL EXPERIMENT(DEMONSTRATION)

Aim:

To prove that oxygen is evolved during photosynthesis.

Materials required:

Test tube, funnel, beaker, pond water and Hydrilla plant.

Procedure:

1. Take a few twigs of Hydrilla plant in a beaker containing pond water.
2. Place an inverted funnel over the plant.
3. Invert a test tube filled with water over the stem of the funnel.
4. Keep the apparatus in the sunlight for few hours.

Observation:

After one hour, it is noted that water gets displaced down from the test tube.
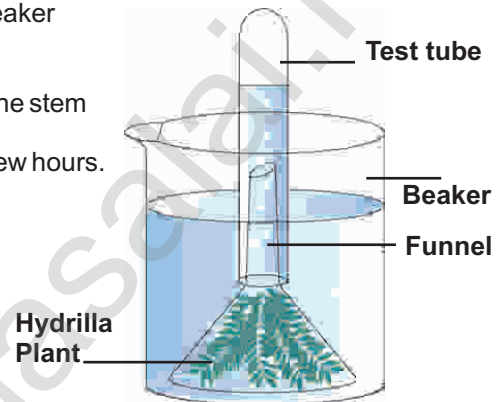
Inference

During photosynthesis, oxygen is evolved as a by-product. Gas bubbles liberated from the Hydrilla plant reach the top of the test tube and it displaces the water downwards. Take the test tube and keep the burning stick near the mouth of the test tube. Increased flame will appear. Hence, it is proved that oxygen is evolved during photosynthesis.

BIO-ZOOLOGY

12. OBSERVATION OF MODELS-HUMAN HEART AND HUMAN BRAIN

Identification of longitudinal section (L.S) of the human heart.

Aim:
To observe and draw a labelled sketch of L.S of human heart and write the structure.

Materials Required:
Model showing the L.S of human heart.

Observation:
The given model is identified as L.S. of human heart

1. The human heart has four chambers. It is made up of two auricles and two ventricles.

2. The auricle are separated by interauricular septum and ventricles are separated by interventricular septum.
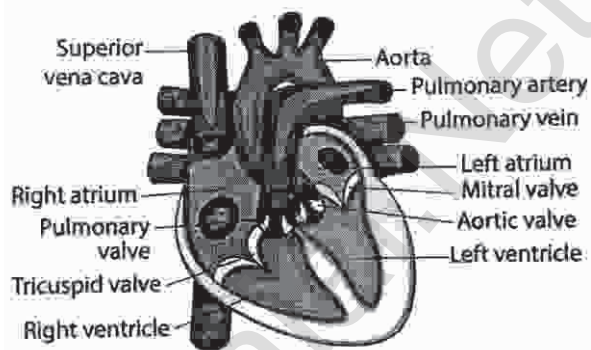
It prevents the mixing of oxygenated and deoxygenated blood.

3. Tricuspid valve - It is located between the right auricle and the right ventricle.

4. Bicuspid valve - It is located between the left auricle and the left ventricle.

5. The heart is covered by a protective double walled membrane called pericardium.

6. The heart pumps blood to all parts of the body.

Identification of L.S of the human brain.

Aim:
To observe and draw a labelled sketch of L.S of human brain and comment on it.

Materials Required
Model showing the L.S of human brain
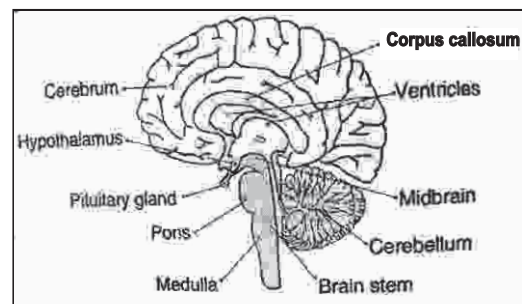

Identification:
The given model is identified as L.S. of human brain

1. The brain is enclosed in the cranial cavity.

2. It is the controlling centre of all the body activities.

3. It is covered by three connective tissue membrane or meninges: Duramater Arachnoid membrane and Piamater.

4. The human brain is divided into three parts namely forebrain, midbrain and hindbrain.

14. IDENTIFICATION OF ENDOCRINE GLANDS

Aim:
To identify the endocrine gland, its location, hormone secreted and functions - Thyroid gland and Pancreas.

Materials Required:
1. Endocrine glands – (a) Thyroid gland (b) Pancreas – Islets of Langerhans
2. Any one endocrine gland should be flag labelled.
For the purpose of flag labelling a model / a chart / photograph showing all endocrine glands should be used. (Mark the endocrine glands mentioned for the practical)

Identification:
Identify the flagged endocrine gland, write its location, the hormones secreted and its functions.

(a) Thyroid gland
Identification: The flag labelled endocrine gland is identified as
Thyroid gland
Location: Thyroid gland is a bilobed gland located in the neck region
on either side of the trachea.
Hormones secreted: Triiodothyronine (T3) and Thyroxine (T4)
Functions of Hormones:
1. Thyroid hormones increases the basal metabolic rate (BMR).
2. It increases the body temperature.
3. It regulates metabolism.
4. It is required for normal growth and development.
5. It is also known as personality hormone.
6. Deficiency of thyroxine results in simple goiter, myxoedema (in adults) and cretinism (in children).
7. Excess secretion causes Grave's diseases.

(b) Pancreas – Islets of Langerhans
Identification:
The flag labelled endocrine gland is identified as Islets of Langerhans in the Pancreas.
**Location:**
Islets of Langerhans are seen embedded in the pancreas which is located in the abdominal region.
Hormones secreted:
1. α cells secrete glucagon
2. β cells secrete insulin
Functions of Hormones:
1. Insulin converts glucose into glycogen and stores it in liver and muscles.
2. Glucagon converts glycogen into glucose.
3. Insulin and glucagon maintain the blood sugar level (80 – 120 mg/dl) by their antagonistic function.
4. Decrease in insulin secretion causes diabetes mellitus.
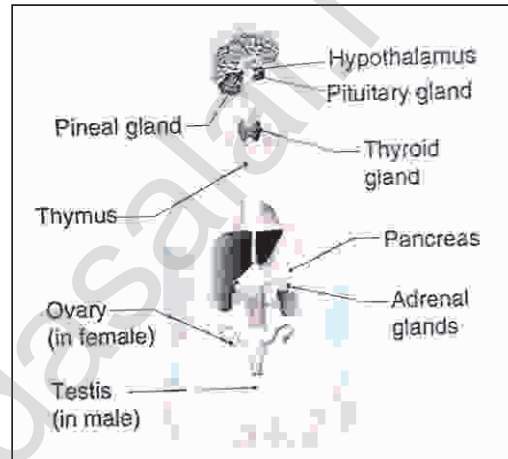
SELECTION

OUR BOOKS

3ʳᵈ TO 10ᵗʰ STD

TAMIL
ENGLISH
MATHS
SCIENCE
SOCIAL SCIENCE
3ʳᵈ TO 6ᵗʰ STD 5 in 1

TAMIL MEDIUM & ENGLISH MEDIUM

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