ಕರ್ನಾಟಕ ಶಾಲಾ ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯನಿರ್ಣಯ ಮಂಡಲಿ

ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು - 560 003

KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD
Malleshwaram, Bengaluru - 560 003

2026-27ರ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ -2
S.S.L.C. MODEL QUESTION PAPER-2: 2026-27

ವಿಜ್ಞಾನ – ಮಾದರಿ ಉತ್ತರಗಳು
SCIENCE - KEY AMSWERS

(ಭೌತ ವಿಜ್ಞಾನ, ರಸಾಯನ ವಿಜ್ಞಾನ ಮತ್ತು ಜೀವ ವಿಜ್ಞಾನ / Physics, Chemistry and Biology)

(ಆಂಗ್ಲ ಮಾಧ್ಯಮ / English Medium)

ವಿಷಯ ಸಂಕೇತ: 83-E **Subject Code : 83-E**

ಸಮಯ : 3 ಗಂಟೆ 15 ನಿಮಿಷಗಳು] [Time: 3 Hours 15 Minutes

ಗರಿಷ್ಠ ಅಂಕಗಳು : 80] [Max. Marks: 80

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General Instructions to the Candidate :

1. There are three parts in the question paper:

   Part A: Physics, Part B: Chemistry, Part C Biology.

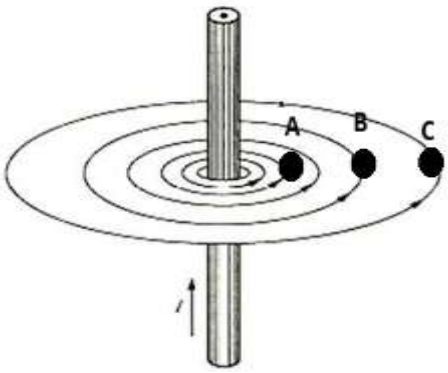
2. This question paper consists of 38 questions.

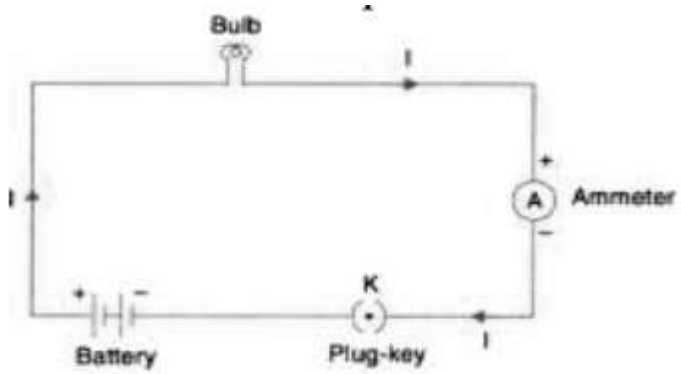
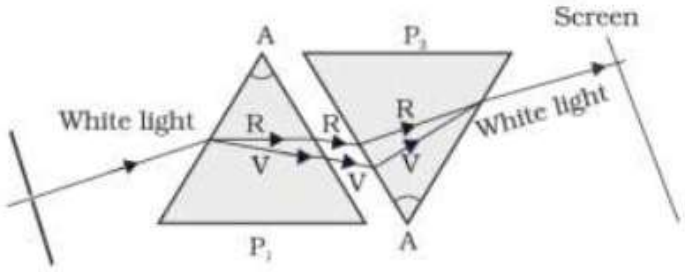
3. Follow the instructions given against the questions.

4. Figures in the right hand margin indicate maximum marks for the questions.

5. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.

PART – A

I.Four alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.		**2×1=2**
1	**The SI unit of Power** (A) Ampere (A) (B) Ohm(Ω) (C) Volt (V) (D) Watt (W) • **Correct Option: (D) Watt (W)**	1
2	**The given below diagram shows the pattern of the magnetic field lines produced when the electric current flows through a straight conductor. The magnitude of the magnetic field at the points A, B, and C is:**  (A) Equal at all points. (B) Maximum at C and minimum at A. (C) Maximum at A and minimum at C. (D) Greater at B than at A and C. **Correct Option: © Maximum at A and minimum at C**	1
II.Answer the following questions :		**2 x 1 = 2**
3	**Why convex mirrors are used as rear-view mirrors in vehicles:** • They always produce an erect, diminished virtual image of objects behind the vehicle. • They have a wider field of view because they curve outwards,	1

	enabling drivers to view a much larger area than a plane mirror allows.	
4	**How a fuse is connected in an electric circuit:** • An electric fuse is always connected in series with the live wire.	1
III.Answer the following questions :		**3 x 2 = 6**
5	**Write the schematic diagram of an electric circuit comprising cell, electric bulb, ammeter and plug key.** 	2
6	**Two electric iron boxes A and B with metal casings are connected to a two-pin plug and a three-pin plug respectively. Which of these iron box is safer to use? Justify your answer.** Iron Box B (connected to a 3-pin plug) is safer to use. **Justification:** a. The third pin connects the metallic casing of Iron Box B directly to the earth wire. b. If insulation fails and live current touches the metal body, the current flows safely into the ground through the low-resistance earth wire, preventing severe electrical shocks. c. Iron Box A lacks earthing, leaving users vulnerable to electric shocks if an internal short circuit occurs.	1 1
7	**Draw the diagram that shows the recombination of the colours of white light spectrum.** 	2

IV.Answer the following questions :		**3 x 3 = 9**
8	**Explain the activity to determine the focal length of a concave mirror** **Materials Required**: Concave mirror, mirror stand, small screen/paper, meter scale, distant object (e.g., a tree or building). • **Procedure:** 1. Mount the concave mirror on a stand and face it toward a distant outdoor object. 2. Place a small screen in front of the reflecting surface of the mirror. 3. Move the screen back and forth until a sharp, inverted image of the distant object appears on it. 4. Measure the distance between the pole (P) of the mirror and the screen using a meter scale. • **Conclusion:** The measured distance equals the focal length (f) of the concave mirror, because parallel rays **from infinity converge at the principal focus (F).** **OR**	1 1 1
	The refractive indices of the media A and B are $\eta_A = 1.36$ and $\eta_B = 1.65$ respectively **(i) Which medium is more dense?** **(ii) In which medium the speed of light is more? Justify your answer.** (i) Medium B is optically denser because it has a higher refractive index ($\eta_B = 1.65 > \eta_A = 1.36$). (ii) Speed of light is higher in Medium A. **Justification:** The speed of light in a medium (v) is inversely proportional to its refractive index ($\eta = \frac{c}{v}$). ○ Since Medium A has a lower refractive index ($\eta_A = 1.36$), light travels faster through it than through Medium B.	 1 1 1
9	**What is presbyopia? Write the causes and remedy for this defect?** • Presbyopia is the age-related condition where the eye progressively loses its ability to accommodate and focus comfortably on near objects. • **Causes:** 1. Gradual weakening of the ciliary muscles. 2. Diminishing flexibility of the eye lens. • **Remedy**: Corrected using bifocal lenses, where the upper	 1 1

	portion consists of a concave lens (for distant vision) and the lower portion consists of a convex lens (for near vision).	1
	OR	
	What is Tyndall effect? Give any two illustrations for this effect. • The phenomenon of scattering of light rays by small colloidal or suspended particles in a medium, making the path of the light beam visible. • **Illustrations:** 1. A fine beam of sunlight entering a dark, dusty room through a small hole. 2. Sunlight passing through the dense canopy of a foggy forest, where tiny water droplets scatter the light rays.	1 2
10	**(a) State Right-Hand Thumb Rule.** **(b) Write any two properties of magnetic field lines.** **(c) Which factor helps to determine the relative strength of a magnetic field** • **(a) Right-Hand Thumb Rule:** o Imagine holding a current-carrying straight conductor in your right hand such that the thumb points in the direction of the electric current. The curled fingers around the conductor indicate the direction of the magnetic field lines. • **(b) Two Properties of Magnetic Field Lines:** 1. They form continuous, closed loops (emerging from the North pole and entering the South pole outside the magnet). 2. Two magnetic field lines never intersect each other at any point. • (**c) Factor Determining Relative Strength:** o The degree of closeness (density) of the magnetic field lines determines the strength; closer lines represent a stronger magnetic field.	1 1 1
V.	**Answer the following questions :**	**2 x 4 = 8**
11	**The resistivities (ρ) of three different materials (X, Y, Z) at 20°C are given below:** **Material X** | $1.6 \times 10^{-8}\ \Omega m$	

Material Y	$\mathbf{100 \times 10^{-6}\ \Omega m}$
Material Z	$\mathbf{10^{10}\ \Omega m\ to\ 10^{14}\ \Omega m}$

Read and analyse. Which of these materials can be used as:

(i) an electrical wire,

(ii) in electrical heating coil, and

(iii) as an electrical insulator? Give reasons for your choices.

- Material X: Conductor / Metal (Very low resistivity, $\sim 10^{-8}\ \Omega \cdot \mathrm{m}$)
- Material Y: Alloy (Intermediate resistivity, $\sim 10^{-6}\ \Omega \cdot \mathrm{m}$)
- Material Z: Insulator (Extremely high resistivity, $\sim 10^{10}$ to $10^{14}\ \Omega \cdot \mathrm{m}$)

3+1

OR

a) Write any two differences between the series connection and parallel connection of resistors.

b) On what factors does the resistance of a conductor depend?

- (a) Differences Between Series and Parallel Connections:

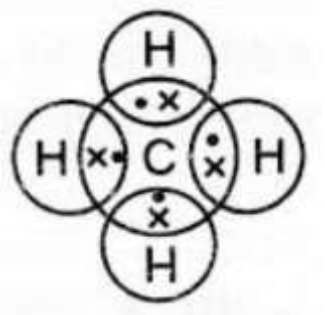
Feature	Series Connection	Parallel Connection
Current Flow	Current remains constant throughout all resistors ($I_1 = I_2 = I_3$).	Current divides across branches ($I = I_1 + I_2 + I_3$).
Potential Difference	Voltage divides across individual resistors ($V = V_1 + V_2 + V_3$).	Voltage across every branch remains equal ($V_1 = V_2 = V_3$).
Equivalent Resistance	Increases total resistance ($R_s = R_1 + R_2 + R_3$).	Decreases total resistance ($\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$).

2

- (b) Factors Affecting Resistance of a Conductor:
  1. Length of the conductor (l): Resistance is directly proportional ($R \propto l$).
  2. Cross-sectional area (A): Resistance is inversely

2

	proportional ($R \propto \frac{1}{A}$). 3. Nature of the material: Dependent on intrinsic resistivity (ρ). 4. Temperature: Resistance generally increases with an increase in temperature for metallic conductors.	
12	**An object of height 6 cm is placed at a distance of 30 cm vertically on the principal axis of a convex lens. An image is formed at a distance of 20 cm from the lens. Then,** **(i) Find the focal length of the lens.** **(ii) Find the size of the image formed and write the nature of the image.** Given Data: • Height of object (h_o) = +6 cm • Object distance (u) = −30 cm *(by sign convention)* • Image distance (v) = +20 cm *(real image formed on opposite side)* • (i) Find the focal length (f) of the lens: Using the Lens Formula: $$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$ $$\frac{1}{f} = \frac{1}{20} - \left(-\frac{1}{30}\right)$$ $$\frac{1}{f} = \frac{1}{20} + \frac{1}{30}$$ $$\frac{1}{f} = \frac{3+2}{60} = \frac{5}{60} = \frac{1}{12}$$ $$f = +12 \text{ cm}$$ The focal length of the convex lens is +12 cm. • (ii) Size and Nature of the Image: Using the Magnification Formula: $$m = \frac{h_i}{h_o} = \frac{v}{u}$$ $$h_i = h_o \times \left(\frac{v}{u}\right)$$ $$h_i = 6 \times \left(\frac{20}{-30}\right) = 6 \times \left(-\frac{2}{3}\right) = -4 \text{ cm}$$ • Size of Image: The height of the image is 4 cm (diminished compared to the 6 cm object). • Nature of Image: o The negative sign ($h_i = -4$ cm) indicates that the image is real and inverted. o Formed on the opposite side of the lens at a distance of 20 cm.	1 1 1 1 1

Q.N		MARKS
	PART –B **(CHEMISTRY)**	
VI. Four alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.		**2 x 1 = 2**
13	The functional group present in propanoic acid is (A) -CO (B) -OH (C) -CHO (D) -COOH **Correct Option: (D) -C O O H**	**1**
14	A situation where chemical change occurs is, when (A) sugar is dissolved in water (B) paper is being torn (C) grape undergoes fermentation (D) water is boiled **Correct Option:** (C) grape undergoes fermentation	**1**
15	The surface of silver materials exposed to the air for a long time turns black. The component of the air responsible for this change is (A) Oxygen (B) Carbon di oxide (C) Sulphur (D) Nitrogen **Correct Option:** (C) Sulphur	**1**
VII. Answer the following questions :		**3 x 1 = 3**
16	Which precipitate is produced when air is blown into lime water? **Ans : Calcium carbonate**	**1**
17	By which methods moderately reactive metals are extracted? **Ans :** *Calcination *Roasting *Reduction using carbon	**1**
18	Write the electron dot structure of methane. **Ans :**  	**1**

VIII. Answer the following questions : **3 x 2 = 6**

19

When an aqueous solution of 'P' is subjected to electrolysis in the chlor-alkali process the gases 'Q' and 'R' will be released at cathode and anode respectively then,

i) Name P, Q and R.

ii) Write any one use of the gas Q.

Calcium hydroxide

Ans : i)P: sodium chloride solution

Q: hydrogen

R: chlorine

ii)*as fuel

*In artificial butter preparation (margarine)

*Ammonia for fertilizers

2

20

The hydrogen gas that is released when calcium metal reacts with water does not burn. What is the reason for this? Write a chemical equation for this reaction.

Ans : Calcium reacts less vigorously with water. The heat released is not enough to ignite hydrogen gas

OR

Write any two differences between the physical properties of metals and non-metals.

Ans :

Metals	**Non metals**
*.Metals are generally hard solid(except mercury liquid at room temperature) * Lustrous * Malleable * Ductile * Good conductors of heat and electricity * Have high melting and boiling points	*Non metals exist as solids or gases (bromine in liquid) *Non - lustrous (except iodine) *Not malleable *Not ductile *Have low melting and boiling points

(Any two)

2

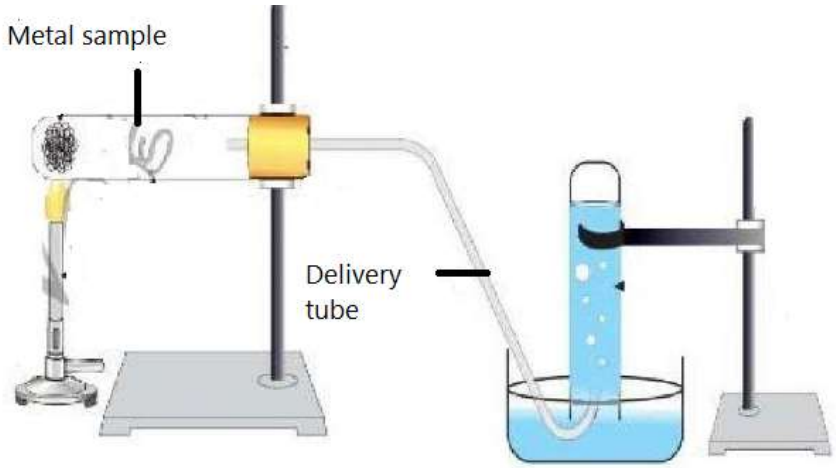
21

Give reason:

a) Covalent compounds are generally poor conductors of electricity.

Ans : I) The bonding in covalent compounds does not give rise to any ions to conduct electricity.

	b) Ethanoic acid known as glacial acetic acid. **Ans :** The melting point of pure ethanoic acid is 290 K and hence it often freezes during winter in cold climates therefore Ethanoic acid is known glacial acetic acid. **OR** $CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$; Analyse this chemical equation. Is this process an addition reaction or substitution reaction? Decide. Justify your decision. **Ans :** Substitution reaction Because one type of atom or a group of atoms takes the place of another.	**2**
IX.	**Answer the following questions :**	**3 x 3 = 9**
22	Write the chemical equations for the following chemical reactions by using appropriate atomic symbols and molecular formulas. Identify and name the type of each chemical reaction. i) Calcium oxide when reacts with water, produces calcium hydroxide. **Ans :** $CaO + H_2O \rightarrow Ca(OH)_2$ 1 **Combination reaction** ii) By reacting lead and copper chloride each other, lead chloride and copper will be formed. **Ans :** $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$ 1 **Displacement reaction** **OR** a) Formation of zinc and carbon monoxide due to the reaction between zinc oxide and Coke is considered a redox reaction. Support this statement with reasons and write a chemical equation for this reaction. **Ans :** $ZnO + C \longrightarrow Zn + CO$ Yes. This is an example of a redox reaction During this reaction the zinc dioxide is losing Oxygen and is being reduced , the coke is gaining Oxygen and is being oxidized. so here one reactant gets oxidised while the other reactants reduced during a reaction. b) Any chemical equation is to be balanced. Why? **Ans :** A chemical equation must be balanced to obey the law of conservation of mass which state that matter can neither be created nor destroyed in a chemical reaction	**3**

23	How does tooth decay cause? Explain. How can this be prevented? **Ans :** Bacteria present in the mouth are produced acids by degradation of sugar and food particles remaining in the mouth after eating. This causes tooth decay. *The best way to prevent this is to clean the mouth after eating food. *Using toothpastes, which are generally basic, for cleaning the teeth can neutralize the excess acid and prevent tooth decay.	**3**
24	Draw the diagram of arrangement of apparatus to show the action of steam on metal. Label the following: i) Metal sample ii) Delivery tube **Ans :**  Action of steam on a metal Diagram-2, labeling -1/2+1/2	**3**
X.	**Answer the following questions :**	**1 x 4 = 4**
25	How is the dirt cleaned by using soaps? Explain. **Ans :** *The molecules of soap are sodium or potassium salts of long chain carboxylic acid *The ionic end of soap interacts with water while the carbon chain interacts with oil, the soap molecules thus form structures called micelles. *Where one end of the molecules is towards the oil droplet while the ionic end faces outside. This forms an emulsion in water. *The soap micelles thus helps in pulling out the dirt in water. How can the hardness of water be detected using detergents?	**4**

Ans : You cannot detect the hardness of water used it is synthetic detergent because detergent lather easily in both hard and soft water and do not form insoluble precipitates with the calcium and magnesium ions in hard water

OR

Write any two differences between saturated and unsaturated carbon compounds.

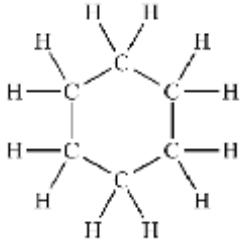
Saturated compound	Unsaturated compounds
Contents only single bonds between carbon atoms less reactive Undergo substitution reactions Burn with blue flame	Contain double bond or triple bond between carbon atoms More reactive Undergo addition and substitution reaction Burn with a red or yellow flame

Write the molecular formula and structural formula for the following carbon compounds

i) Cyclohexane

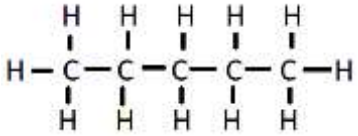
ii) Pentane

Molecular formula: C_6H_{12} structural formula:



½ + ½

Molecular formula : C_5H_{12} structural formula:



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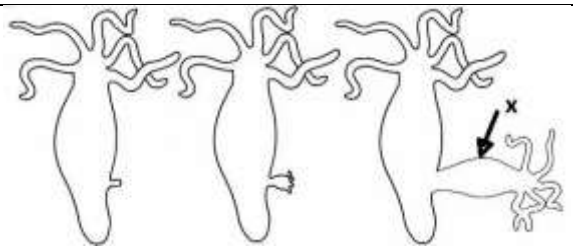
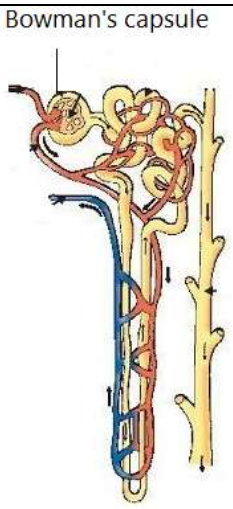
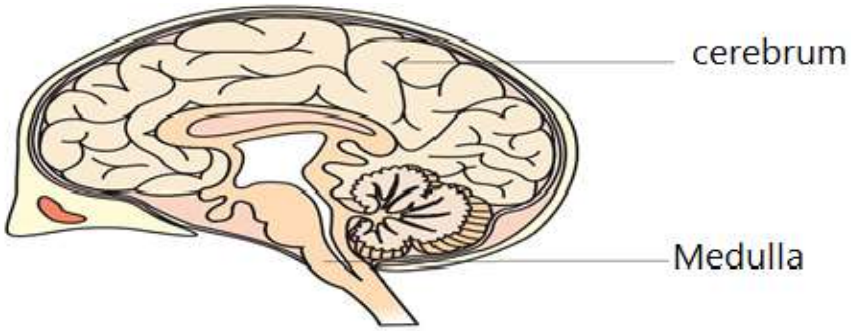
PART – C
(BIOLOGY)

XI. Four alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet. **3 × 1 = 3**

26 Observe the figure below. A correct pair that has the name of the process that produces the structure labelled as X and the name of the organism in which this process is found is **1**

	 (A) Budding, Sea anemone (B) Fragmentation, Coral (C) Budding, Hydra (D) Fragmentation, Yeast **Correct Option:** (C) Budding, Hydra	
27	The byproducts that are produced by the breakdown of pyruvate by using oxygen in the mitochondria are (A) Carbon dioxide, water & energy (B) Lactic acid & energy (C) Ethanol, Carbon dioxide & energy (D) Lactic acid, Carbon dioxide & energy **Correct Option:** (A) Carbon dioxide, water & energy	**1**
28	In humans, the factor that determine the sex of a child is (A) Sex chromosome of mother (B) Environmental temperature (C) Sex chromosomes of father and mother (D) Sex chromosome of father **Correct Option:** (D) Sex chromosome of father	**1**
XII.	**Answer the following questions :**	**3 x 1 = 3**
29	Define Menstruation. **Ans :** Egg is not fertilized inner lining of uterus brakes and comes out through vagina as blood and mucus is called menstruation	**1**
30	The pulmonary veins are blocked in a person who has been prone to heart attack. Which specific part of the heart fails to receive the oxygenated blood instantly? **Ans : Left atrium**	**1**
31	Which tropic movements are necessary to bring the growth in the roots and shoots of the plants? **Ans :** In the roots : Geotropism Shoots of plants: phototropism	**1**
XIII.	**Answer the following questions :**	**2 x 2 = 4**
32	Draw the diagram to show the structure of nephron and label the bowman's capsule.	**2**

	 structure of nephron Diagram-1.1/2, labeling -1/2	
33	Name the glands that secrete the following hormones and mention the function of these hormones. i) Oestrogen ii) Adrenaline **Ans :** Oestrogen: development of female sex organ, regulate menstrual cycle. Adrenaline: prepare the body to face the emergency situation.	**2**
XIV.	**Answer the following questions :**	**3 x 3 = 9**
34	Draw a diagram of the structure of the human brain. Label the following parts. i) Cerebrum ii) Medulla **Ans :**  Diagram-2, labeling -1/2+1/2	**3**
35	Yellow flowering tall pea plant (YYTT) is hybridised with white flowering dwarf pea plant (yytt). Show the result of F_2 generation with the help of a checker board. Write the ratio of the plants obtained here. **Ans :**	**3**

gametes	YT	Yt	yT	yt
YT	YYTT	YYTt	YyTT	YyTt
Yt	YYTt	YYtt	YyTt	Yytt
yT	YyTT	YyTt	yyTT	yyTt
yt	YyTt	Yytt	yyTt	yytt

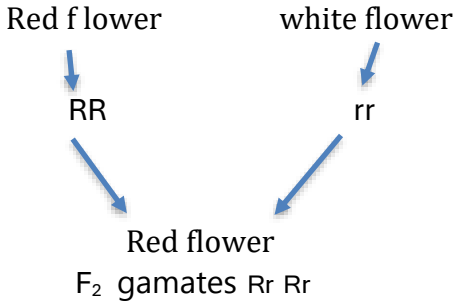
2

Yellow seeded tall plants	Green seeded tall plants	Yellow seeded dwarf plants	Green seeded dwarf plants
9	3	3	1

1

OR

Red flowering pea plant (RR) is hybridised with white flowering pea plant (rr). Show the result of F_2 generation with the help of a checker board. Write the phenotypic and genotypic ratios of the plants obtained in F_2 generation.



F_2 generation	R	r
R	RR	Rr
r	Rr	rr

2

Phenotypic ratio 3:1 1

Genotypic ratio 1:2:1 1

36

a) Mention any two measures that can be followed to reduce the problems caused while disposing the wastes.

Ans : By adapting the following methods

*Segregation of dry wastes and wet wastes

*Reusing wet wastes by converting them into manures

*Recycling dry wastes

*Limiting the use of disposable materials

*Following eco friendly packaging

(any two)

b) Give an example for the food chain of the grassland ecosystem. If there is an increase in the number of organisms in the second tropic level, how does this affect that food chain?

Ans : Grass → Grasshopper → Frog → Snake → Eagle.

(Any suitable food chain)

*If the number of organisms in the second tropic level increases then the number of organisms in the first tropic level decreases.

*Eventually population of the rest of the organisms in the tropic level decreases and leads to ecological imbalance.

3

XV. Answer the following questions : **1 x 4 = 4**

37

a) Write the main functions of the enzymes given below.

i) Trypsin

ii) Lipase

Ans : i)Trypsin: Digests protein in food

ii)Lipase: Breaks down emulsified unsaturated fats.

b) Mention the difference between alveoli and villi

Ans :

Alveoli	Villi
Found in the lungs	Found on the inner walls of the small intestine
Structures resembling small air sacs.	Finger-like structures.
Exchange of oxygen and carbon dioxide takes place	Absorption of nutrients from digested food takes place
Increase surface area for gas exchange.	Increase surface area for nutrient absorption.

OR

a) How are inorganic substances transported from the xylem tissue in plants? Explain.

Ans : In xylem tissue, vessels and tracheids form a continuous

4

	water conducting channels reaching all parts of the plant. *At the roots, the cells in contact with the soil actively take up ions. *This creates a difference in the concentration of these ions between the roots and the soil . Water therefore moves into the roots from the soil. *Evaporation of the water molecules from the cells of a leaf creates a suction which pulls water from the xylem cells of roots. b) Write any four methods used by plants to eliminate waste materials. **Ans :** *Accumulation of waste in the form of glue and resins in old xylem. *By shedding leaves *By releasing waste into the soil around them *Increased water loss through evaporation *Oxygen through photosynthesis *Carbon dioxide through respiration	
XVI.	**Answer the following questions :**	**1 x 5 = 5**
38	a) What are the functions of testis and seminal vesicles in the human male reproductive system? **Ans** : **Testis :** Produce sperm and testosterone hormone **Seminal vesicle:** its secretion makes the transport of the sperm easier and provides nutrition to the sperms b) How does a fertilized egg in a female develop into an embryo in the uterus? How does this embryo get nourishment in the mother's womb? Explain. **Ans** : *does zygote divide and become an embryo *The embryo is implanted in the lining of the uterus the embryo continues to grow and developed organs to become foetus * the foetus receives nourishment from the mother blood through the placenta **OR** a) What is pollination? Write any two differences between two types of pollination. **Ans :** Pollination is the process by which the Pollen grains of stamens in a flower are transferred to the stigma of pistil	**5**

Self pollination	Cross pollination
*The Pollen grains in the stamen of a flower are transferred to the pistil of the same flower *No external media required *Occurs in bisexual flower	*The Pollen grains in the stamen of one flower are transferred to the pistil of another flower *External media is required

		*Occurs in Monosexual and bisexual flower.	

b) Mention any two advantages of vegetative propagation.

Ans : Vegetative propagation :

*They produce flowers and fruit quickly

*This method is useful in plants that do not produce seeds

*They are genetically similar to the parent plant

*They produce high- yielding ,disease- free plants

*A large number of plants can be grow in less time and at lower cost