



பள்ளிக் கல்வித்துறை  
செங்கல்பட்டு மாவட்டம்

10ஆம் வகுப்பு

அறிவியல்

(ஆங்கில வழி)

மெல்ல ழ்ளரும் மாணவர்களுக்கான  
சிறப்புக் கையேடு

2024 - 2025

வெளியீடு : முதன்மைக்கல்வி அலுவலகம், செங்கல்பட்டு

இதனை இதனால் இவன்முடிக்கும் என்றாய்ந்து  
அதனை அவன்கண் விடல்.

- குறள்.

அன்பார்ந்த மாணவர்களே!

1. உங்களின் இயல்பினை அறிந்து, அனைவரும் வெற்றி பெறும் நோக்கத்துடன் எனது வழிகாட்டுதலின் பேரில் உருவாக்கப்பட்ட சிறப்பு வழிகாட்டி இது. இந்த வழிகாட்டி முழுமையும் படித்தால் நீங்கள் வெற்றி பெறுவது உறுதி.
2. படித்ததை எழுதிப் பழகுங்கள், மேலும் படித்த வினா விடைகளை, சக மாணவர்களோடு கலந்து பேசி தெளிவாகுங்கள் வெற்றி எளிது..
3. முயன்றால் முடியாதது எதுவுமே இல்லை. உங்களால் முடியாதது வேறு எவராலும் முடியாது என்பதை உணருங்கள்.
4. நாளை நூட்கள் உங்களுக்காகவே காத்திருக்கின்றன. இச்சிறப்பு வழிகாட்டி உங்களை வெற்றிக்கு அழைத்துச் செல்ல இருக்கிறது. கல்வியிலும், வாழ்க்கையிலும் வசந்தம் பெற வாழ்த்துக்கள்.....!

முதன்மைக்கல்வி அலுவலர்,  
செங்கல்பட்டு.

## 1.LAWS OF MOTION

### 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)
2. Impulse is equals to \_\_\_\_\_.  
 (a) rate of change of momentum      (b) rate of force and time  
**(c) change of momentum**      (d) rate of change of mass.
3. One kilogram force equals to \_\_\_\_\_.  
 (a) 9.8 dyne    (b)  $9.8 \times 10^4$  N      **(c)  $98 \times 10^4$  dyne** (d) 980 dyne.
4. To project the rockets which of the following principle(s) is / (are) required?  
 (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.**
5. Match the following:

Newtons first law	Stable equilibrium of a body
Newtons second law	Law of force
Newtons third law	Flying nature of bird
Conservation of linear momentum	Propulsion of rocket

### Answer briefly:

#### 6. Define inertia. Give its classification.

The inherent property of a body to resist any change in its state of rest or of uniform motion, unless it is influenced upon by an external unbalanced force.

#### **Types of Inertia**

- Inertia of rest
- Inertia of motion
- Inertia of direction

#### 7. Classify the types of force based on their application.

- Like parallel forces
- Unlike parallel forces

#### 8. Differentiate mass and weight.

Mass	Weight
Amount of matter contained in a body	Gravitational force exerted on a body
Scalar quantity	Vector quantity
Remains the same everywhere	Varies from place to place
Unit is kilogram	Newton

#### 9. State the principle of moments.

At equilibrium, the algebraic sum of the moments of all the individual forces about any point is equal to zero.

**10.State Newton's second law.**

"The force acting on a body is directly proportional to the rate of change of linear momentum of the body".

$$F = ma$$

**11.Why a spanner with a long handle is preferred to tighten screws in heavy vehicles?**

A spanner with long handle give high torque with less force.

$$M = F \times d .$$

**12.While catching a cricket ball the fielder lowers his hands backwards. Why?**

By lowering hands he takes longer interval of time to catch the ball resulting in lesser impulse on his hands.

**13.How does an astronaut float in a space shuttle?**

Space station and astronauts have equal acceleration. They are under free fall condition.

**Answer in Detail.****14.What are the types of inertia? Give an example for each type.**

**Inertia of rest:** The resistance of a body to change its state of rest.

Eg: leaves fall down while shaking branches

**Inertia of motion:** The resistance of a body to change its state of motion .

Eg: Running some distance before a long jump

**Inertia of direction:** The resistance of a body to change its direction of motion.Eg: passengers lean sideways in sharp turns

**15.State Newton's laws of motion.****Newton's First Law:**

Everybody continues to be in its state of rest or the state of uniform motion along a straight line unless it is acted upon by some external force.

**Newtons Second law:**

The force acting on a body is directly proportional to the rate of change of linear momentum of the body.  $F = ma$

**Newtons Third Law:**

For every action, there is an equal and opposite reaction.

**2.Optics****Choose the correct answer.**

- Where should an object be placed so that a real and inverted image of same size is obtained by a convex lens:  
(a) f                      **(b) 2f**                      (c) infinity                      (d) between f and 2f
- A convex lens forms a real, diminished point sized image at focus. Then the position of the object is at:  
(a) focus                      **(b) infinity**                      (c) at 2f                      (d) between f and 2f
- In a myopic eye, the image of the object is formed \_\_\_\_\_.  
(a) behind the retina                      (b) on the retina  
**(c) in front of the retina**                      (d) on the blind spot.
- The eye defect 'presbyopia' can be corrected by:  
(a) convex lens (b) concave lens                      (c) convex mirror                      **(d) Bi focal lenses**

**Answer Briefly.****5.What is refractive index?**

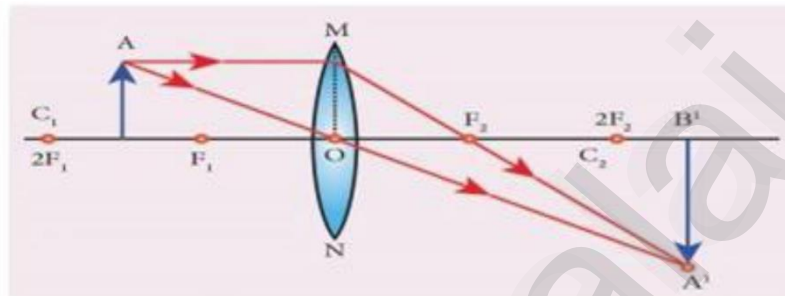
The ratio of speed of light in vacuum to speed of light in medium.

$$\mu = \frac{c}{v}$$

**6.State Snell's law.**

The ratio of the sine of the angle of incidence and sine of the angle of refraction is equal to the ratio of refractive indices of the two media.

$$\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$$

**7.Draw a ray diagram to show the image formed by a convex lens when the object is placed between F and 2F.****8.Define dispersion of light.**

When a beam of white light is refracted through any transparent media it is split into its component colours.

**9.State Rayleigh's law of scattering.**

Amount of scattering of light is inversely proportional to the fourth power of its wavelength”

**10.Differentiate convex lens and concave lens.**

Convex lens	Concave lens
Thicker in middle	Thinner in middle
Converging lens	Diverging lens
Produce mostly real images	Produce virtual images
Used to treat hypermetropia	Used to treat myopia

**11.What is the power of accommodation of the eye?**

- The ability of the eye lens to focus objects by changing the focal length of the eye lens is called the power of accommodation of the eye.

**12.What are the causes of 'Myopia'?**

- Lengthening of eye ball.
- Focal length of eye lens is reduced.

**13.Why does the sky appear blue in colour?**

When sunlight passes through the atmosphere, the blue colour with shorter wavelength is scattered to a greater extent than the red colour.

**14.Why are traffic signals red in colour?**

Red light with higher wavelength is scattered the least by atmospheric particles can travel the longest distance through a fog, rain etc.

**Give the answer in detail.****15. List any five properties of light?**

- Light is a form of energy.
- Travels along a straight line.
- It does not need any medium for its propagation.
- Different coloured light has a different wavelength and frequency.

**16. Differentiate the eye defects: Myopia and Hypermetropia.**

Myopia	Hypermetropia
Short sightedness	Long sightedness
Due to lengthening of eye ball	Due to shortening of eye ball
Near objects can be seen	Distant objects can be seen
Corrected using concave lens	Corrected using convex lens

**3. Thermal Physics****Choose the correct answer.**

1. The value of universal gas constant:
 

(a) 3.81 mol <sup>-1</sup> K <sup>-1</sup>	(b) 8.03 mol <sup>-1</sup> K <sup>-1</sup>
(c) 1.38 mol <sup>-1</sup> K <sup>-1</sup>	<b>(d) 8.31 mol<sup>-1</sup> K<sup>-1</sup></b>
  
2. If a substance is heated or cooled, the change in mass of that substance is:
 

(a) positive	<b>(b) negative</b>	(c) zero	(d) none of the above
--------------	---------------------	----------	-----------------------
  
3. The value of Avogadro number **6.023 × 10<sup>23</sup>**

**Answer in briefly.****4. Define one calorie.**

Amount of heat energy required to rise the temperature of 1 gram of water through 1°C.

**5. State Boyle's law**

When the temperature of a gas is kept constant, the volume of a fixed mass is inversely proportional to its pressure.

$$PV = \text{constant}$$

**6. State the law of volume.**

When the pressure of a gas is kept constant, the volume is directly proportional to the temperature.

$$V \propto T.$$

**7. What is co-efficient of real expansion?**

The ratio of the true rise in the volume of the liquid per degree rise in temperature to its unit volume.

SI unit is K<sup>-1</sup>.

**Answer in detail.****8. Derive the ideal gas equation.**

\*Boyle's law,  $PV = \text{constant}$

\*Charles's law,  $\frac{V}{T} = \text{constant}$

\*Avogadro's law,  $\frac{V}{n} = \text{constant}$

\*combining above equations,  $\frac{PV}{nT} = \text{constant}$

$$n = \mu N_A$$

$$\frac{PV}{\mu N_A T} = \text{constant}$$

$$\frac{PV}{\mu N_A T} = K_B$$

$$PV = \mu N_A K_B T$$

$$\mu N_A K_B = R$$

R is universal gas constant

$$PV = RT$$

**4. Electricity****Choose the best answer.**

1. SI unit of resistance is:

- (a) mho                      (b) joule                      **(c) ohm**                      (d) ohm meter

2. Kilowatt hour is the unit of:

- (a) resistivity                      (b) conductivity  
**(c) electrical energy**                      (d) electrical power

3. The ratio of the potential difference to the current is known as

- (a) conductance                      **(b) Resistance**  
(c) Voltage                      (d) Resistivity

4. The wiring in a house consists of **parallel** circuits.

5. LED stands for **Light Emitting Diode**.

6. Match the following:

Electric current	Ampere
Potential difference	Volt
Specific resistance	Ohm meter
Electrical power	Watt
Electrical energy	Joule

**Very short answer questions.****7. Define the unit of current.**

- SI unit of current is ampere.
- when a charge of one coulomb flows across any cross-section of a conductor, in one second is called one ampere.

**8. What happens to the resistance, as the conductor is made thicker?**

Resistance decreases, as resistance is inversely proportional to area of cross section.

**9. Why is tungsten metal used in bulbs, but not in fuse wires?**

Tungsten with high melting point will not melt even if large current passes through it and the appliances will get damaged.

**10. Name any two devices, which are working on the heating effect of the electric current.**

Electric iron, electric heater and electric toaster.

**Short Answer Questions.****11. Define electric potential and potential difference.**

**Electric Potential** is the amount of work done in moving unit positive charge from infinity to that point against the electric force.

**Potential difference** is the amount of work done in moving a unit positive charge from one point to another against the electric force.

**12. What is the role of the earth wire in domestic circuits?**

- Provides a low resistance path to the electric current.
- It sends the excess current from the appliance to the Earth.
- saves us from electric shocks.

**13. State Ohm's law.**

At a constant temperature, the steady current 'I' flowing through a conductor is directly proportional to the potential difference 'V' between the two ends of the conductor.

$$V = IR$$

**14. What connection is used in domestic appliances and why?**

- Parallel connection is used to provide equal supply voltage to all.

**Long answer Questions.****15.(a) What is meant by electric current?**

The rate of flow of charges in a conductor is called electric current.

**(b) Name and define its unit.**

The SI unit of electric current is ampere (A). when a charge of one coulomb flows across any cross-section of a conductor, in one second is one ampere.

**(c) Which instrument is used to measure the electric current? How should it be connected in a circuit?**

Ammeter should be connected in series.



**16.(a) State Joule's law of heating.**

The heat produced in any resistor is, directly proportional to the square of the current, resistance of the resistor and the time for which the current is passing through the resistor.

**(b) An alloy of nickel and chromium is used as the heating element. Why?**

It has high resistivity, high melting point and it is not easily oxidized.

**(c) How does a fuse wire protect electrical appliances?**

Fuse wire has low melting point. When large current flows through circuit, the fuse wire melts and the circuit gets disconnected and saved from damage.

**17. (a) What are the advantages of LED TV over the normal TV?**

- ❖ bright picture quality.
- ❖ thin size.
- ❖ Consumes less power and less energy.
- ❖ More life span.
- ❖ More reliable.

**(b) List the merits of LED bulb.**

- ❖ no loss of energy in the form of heat.
- ❖ low power requirement.
- ❖ not harmful to the environment.
- ❖ cost-efficient and energy efficient.
- ❖ No use of toxic materials.

**5. Acoustics****Choose the correct answer:**

1. The frequency, which is audible to the human ear is:

- (a) 50 kHz      (b) **20 kHz**      (c) 15000 kHz      (d) 10000 kHz

2. Match the following:

Infrasonic	10 kHz
Echo	Ultrasonography
Ultrasonic	22 kHz
High pressure region	Compressions

**Answer Briefly:****3.What is a longitudinal wave?**

The wave in which the particles of the medium vibrate along the direction of the wave.

**4.What is the audible range of frequency?**

20 Hz and 20,000 Hz

**5.What is the minimum distance needed for an echo?**

17.2 metre.

**6.Name three animals, which can hear ultrasonic vibrations.**

Dogs, bats and dolphins.

**Answer briefly:****7. Why does sound travel faster on a rainy day than on a dry day?**

When humidity increases, the speed of sound increases.

**8. Explain why the ceilings of concert halls are curved.**

When sound waves are reflected from curved surfaces, the intensity of reflected waves are changed and the audience can hear the sound clearly.

**9. Mention two cases in which there is no Doppler effect in sound?**

When source (S) and listener (L) both are at rest and both moving in perpendicular directions.

**Answer in Detail.****10. What are the factors that affect the speed of sound in gases?**

**i) Effect of density:** The velocity of sound is inversely proportional to the square root of the density of the gas.

$$v \propto \sqrt{\frac{1}{d}}$$

**ii) Effect of temperature:** The velocity of sound in a gas is directly proportional to the square root of its temperature.

$$v \propto \sqrt{T}$$

**iii) Effect of relative humidity:** When humidity increases, the speed of sound increases.

**11. (a) What do you understand by the term 'ultrasonic vibration'?**

The vibrations whose frequencies are greater than 20000 Hz

**(b) State three uses of ultrasonic vibrations.**

- To kill micro organisms.
- To find direction and range of submarines.
- To clean dental plates, jewellery and coins.
- used in welding.

**(c) Name three animals which can hear ultrasonic vibrations.**

Mosquito, Dogs and Bats

**12. What is an echo?**

(a) An echo is the sound reproduced due to the reflection of the original sound wave.

- State two conditions necessary for hearing an echo. The minimum time gap between the original sound and an echo must be 0.1 s.
- The minimum distance required to hear an echo is 17.2 m.

**(b) What are the medical applications of echo?**

used to create real-time visual images of the developing embryo.

**(c) How can you calculate the speed of sound using echo?**

$$\begin{aligned} \text{Speed of sound} &= \frac{\text{distance travelled}}{\text{time taken}} \\ &= \frac{2d}{t} \end{aligned}$$

## 6. Nuclear Physics

### Choose the correct answer.

- Unit of radioactivity is \_\_\_\_\_.  
(a) roentgen (b) curie (c) Becquerel (d) **all the above.**
- Artificial radioactivity was discovered by:  
(a) Becquerel (b) **Irene Curie** (c) Roentgen (d) Neils Bohr
- ..... isotope is used for the treatment of cancer.  
(a) Radio Iodine (b) **Radio Cobalt** (c) Radio Carbon (d) Radio Nickel
- ..... aprons are used to protect us from gamma radiations.  
(a) Lead oxide (b) Iron (c) **Lead** (d) Aluminium
- Kamini reactor is located at:  
(a) **Kalpakkam** (b) Koodankulam (c) Mumbai (d) Rajasthan
- Anemia can be cured by **Radio Iron** isotope.
- Dosimeter** is used to measure exposure rate of radiation in humans.

### 8. Use the analogy to fill in the blank.

- Spontaneous process : Natural Radioactivity, Induced process : artificial radioactivity
  - Nuclear Fusion : Extreme temperature, Nuclear Fission : higher temperature
  - Increasing crops : Radio phosphorous, Effective functioning of heart : radio sodium
  - Deflected by electric field :  $\alpha$  ray, No Deflection : gamma ray
- Answer in one or two words (VSA).

### 9. Who discovered natural radioactivity?

Henri Becquerel

### 10. Which radioactive material is present in the ore of pitchblende?

Uranium.

### 11. Write any two elements which are used for inducing radioactivity?

Boron and aluminium

### 12. Write the name of the electromagnetic radiation which is emitted during natural radioactivity.

Gamma rays

### 13. If A is a radioactive element which emits an $\alpha$ - particle and produces ${}_{104}\text{Rf}^{259}$ . Write the atomic number and mass number of the element A.

A=263

Z=106

**14.What is the average energy released from a single fission process?**

200 MeV

**15.Which hazardous radiation is the cause for the genetic disease?**

Gamma-ray

**16.What is the amount of radiation that may cause death of a person when exposed to it?**

600 R.

**17.Give the SI unit of radioactivity.**

Becquerel.

**18.Which material protects us from radiation?**

Lead

**Answer the following questions in a few sentences.**

**19.Write any three features of natural and artificial radioactivity.**

S. No	Natural Radioactivity	Artificial Radioactivity
1	Alpha, Beta and Gamma radiations are emitted.	Elementary particles are emitted.
2	Spontaneous process	Induced process
3	Cannot be controlled	Can be controlled

**20.Define one roentgen.**

One roentgen is defined as the quantity of radioactive substance which produces a charge of  $2.58 \times 10^{-4}$  coulomb in 1 kg of air under standard conditions of pressure, temperature and humidity.

**21.State Soddy and Fajan's displacement law.**

When a radioactive element emits an alpha particle, a daughter nucleus is formed whose mass number is less by 4 units and the atomic number is less by 2 units.

When a radioactive element emits a beta particle, a daughter nucleus is formed whose mass number is the same and the atomic number is more by 1 unit.

**22.Give the function of control rods in a nuclear reactor.**

To control chain reaction by controlling the number of neutrons.

**23.In Japan, some of the newborn children are having congenital diseases. Why?**

Due to high exposure of radiation caused by atom bomb during second world war. It affects new born children with congenital diseases.

**24.Mr. Ramu is working as an X – ray technician in a hospital. But, he does not wear the lead aprons. What suggestion will you give to Mr. Ramu?**

He can use lead aprons and a pocket dosimeter.

**25.Give any two uses of radio isotopes in the field of agriculture?**

- P-32 helps to increase the productivity of crops.
- To kill the insects and parasites

## 7. Atoms and Molecules

### Choose the best answer:

- Which of the following has the smallest mass?  
 (a)  $6.023 \times 10^{23}$  atoms of He      **(b) 1 atom of He**  
 (c) 2 g of He      (d) 1-mole atoms of He
- Which of the following is a triatomic molecule?  
 (a) Glucose      (b) Helium      **(c) Carbon dioxide**      (d) Hydrogen.
- The volume occupied by 4.4 g of  $\text{CO}_2$  at S.T.P:  
 (a) 22.4 litre      **(b) 2.24 litre**      (c) 0.24 litre      (d) 0.1 litre
- Mass of 1 mole of Nitrogen atom is \_\_\_\_\_.  
 (a) 28 amu      **(b) 14 amu**      (c) 28 g      (d) 14 g.
- 1 mole of any substance contains molecules.  
**(a)  $6.023 \times 10^{23}$**       (b)  $6.023 \times 10^{-23}$   
 (c)  $3.0115 \times 10^{23}$       (d)  $12.046 \times 10^{23}$
- Atoms of one element can be transmuted into atoms of other element by **Artificial transmutation**
- The sum of the numbers of protons and neutrons of an atom is called its **mass number**
- The number of atoms present in a molecule is called its **atomicity**.

### Short answer questions:

#### 9. Define: Relative atomic mass

Relative atomic mass of an element is the ratio between the average mass of its isotopes to  $\frac{1}{12}$  th part of the mass of a carbon-12 atom.

#### 10. Define Atomicity.

The number of atoms present in the molecule is called its 'Atomicity'.  
 Eg: Atomicity of hydrogen is 2.

#### 11. Give any two examples for heteroatomic molecules.

HI, HCl, CO, HBr, HF.

#### 12. What is Molar volume of a gas?

The volume occupied by one mole of any gas at S.T.P.

### Long answer questions:

#### 13. Give the salient features of "Modern atomic theory".

- An atom is no longer indivisible.
- Atoms of the same element may have different atomic mass.
- Atoms of different elements may have the same atomic masses.
- Atoms may not always combine in a simple whole-number ratio.
- Atom is the smallest particle that takes part in a chemical reaction.
- The mass of an atom can be converted into energy [ $E = mc^2$ ].

**14. Derive the relationship between Relative molecular mass and Vapour density.**

$$\text{Relative molecular mass} = \frac{\text{mass of 1 molecule of gas or vapour}}{\text{mass of 1 atom of hydrogen}}$$

$$\text{Vapour density (V.D)} = \frac{\text{Mass of a given volume of gas or vapour at STP}}{\text{mass of the same volume of hydrogen}}$$

$$\text{V.D} = \frac{\text{mass of } n \text{ molecules of gas or vapour at STP}}{\text{Mass of } n \text{ molecules of hydrogen}}$$

$$\text{V.D} = \frac{\text{mass of 1 molecule of gas or vapour at STP}}{\text{Mass of 1 molecules of hydrogen}}$$

$$\text{V.D} = \frac{\text{mass of 1 molecule of gas or vapour at STP}}{\text{Mass of 2 atoms of hydrogen}}$$

$$\text{V.D} = \frac{\text{mass of 1 molecule of gas or vapour at STP}}{2 \times \text{Mass of 1 atom of hydrogen}}$$

$$\text{V.D} = \frac{\text{Relative molecular mass}}{2}$$

$2 \times \text{Vapour density} = \text{Relative Molecular mass of a gas}$

$\text{Relative Molecular Mass} = 2 \times \text{Vapour density}$

### 8. Periodic classification of elements

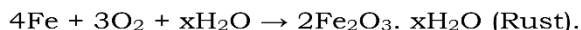
**Choose the best answer:**

- The number of periods and groups in the periodic table are:  
(a) 6, 16      (b) 7, 17      (c) 8, 18      **(d) 7, 18**
- The basis of modern periodic law is \_\_\_\_\_.  
**(a) atomic number**      (b) atomic mass  
(c) isotopic mass      (d) number of neutrons.
- ..... group contains the member of the halogen family.  
**(a) 17<sup>th</sup>**      (b) 15<sup>th</sup>      (c) 18<sup>th</sup>      (d) 16<sup>th</sup>
- The process of coating the surface of the metal with a thin layer of zinc is called \_\_\_\_\_.  
(a) painting      (b) thinning **(c) galvanization**      (d) electroplating.
- Atomic number** forms the basis of modern periodic table.
- The scientist who propounded the modern periodic law is **Henry Mosley**
- Across the period, ionic radii ..... (increases, **decreases**).
- The chief ore of Aluminium is **bauxite**
- Match the following:

Galvanisation	Coating with zinc
Calcination	Heating in the presence of air
Redox reaction	Alumina thermic process
Dental filling	Silver-tin amalgam
Group 18 elements	Noble gas elements

**Short answer questions:****10. What is rust? Give the equation for the formation of rust.**

When iron is exposed to moist air, it forms a layer of brown hydrated ferric oxide on its surface called rust.

**11. State two conditions necessary for rusting of iron.**

Presence of water and oxygen.

**Long answer questions:****12. (a) State the reason for addition of caustic alkali to bauxite ore during purification of bauxite.**

Bauxite is soluble in solvents only in the presence of caustic alkali.

(b) Along with cryolite and alumina, another substance is added to the electrolyte mixture. Name the substance and give one reason for the addition. Fluorspar is added to lower the fusion temperature.

**13. What are the methods used to prevent corrosion?**

- coating with paints
- coating with oil and grease
- alloying with other metals
- the process of galvanization
- electroplating
- sacrificial protection

**9. Solutions****Choose the best answer:**

1. A solution is a mixture.
 

<b>(a) homogeneous</b>	(b) heterogeneous
(c) homogeneous and heterogeneous	(d) non-homogeneous
2. The number of components in a binary solution is \_\_\_\_\_.
 

<b>(a) 2</b>	(b) 3	(c) 4	(d) 5.
--------------	-------	-------	--------
3. Which of the following is the universal solvent?
 

(a) Acetone	(b) Benzene	<b>(c) Water</b>	(d) Alcohol
-------------	-------------	------------------	-------------
4. Identify the non-aqueous solution.
 

(a) sodium chloride in water	(b) glucose in water
(c) copper sulphate in water	<b>(d) sulphur in carbon-di-sulphide</b>
5. The component present in lesser amount, in a solution is called **solute**.

**Short Answer Questions:****6. Define the term: Solution**

A solution is a homogeneous mixture of two or more substances.

**7. What is meant by the binary solution?**

Solutions which are made of one solute and one solvent are called binary solutions.

E.g. salt solution.

**8. Give an example each**

- Gas in liquid – CO<sub>2</sub> in water
- Solid in liquid – NaCl in water
- Solid in solid – Alloys
- Gas in gas – He – O<sub>2</sub> gas

**9. What is the aqueous and non-aqueous solution? Give an example.**

- The solution in which water act as a solvent is called aqueous solution.
- E.g. Common salt in water.
- The solution in which any liquid, other than water act as a solvent is called non-aqueous solution.
- E.g. Sulphur dissolved in carbon disulphide.

**10. The aquatic animals live more in a cold region. Why?**

solubility of gases increase with decrease in temperature .Hence more amount of dissolved oxygen is present in cold water.

**Long answer questions:**

11. Write notes on:
- i) saturated solution
  - ii) unsaturated solution

**Saturated solution:** A solution in which no more solute can be dissolved in a definite amount of the solvent at a given temperature \*e.g. 36 g of sodium chloride in 100 g of water at 25°C

**Unsaturated solution:** contains less solute than that of the saturated solution at a given temperature, \* e.g. 10 g or 20 g or 30 g of Sodium chloride in 100 g of water at 25°C .

**12. Write notes on various factors affecting solubility.****1. Nature of the solute and solvent :**

Ionic compounds are soluble in polar solvent and covalent compounds are soluble in non-polar solvents.

**2. Effect of Temperature :**

solubility of a solid solute in a liquid increases with increase in temperature.

Solubility of gases in liquid decreases with increase in temperature.

**3. Effect of Pressure :**

When the pressure is increased, the solubility of a gas in liquid increases.

**13. In what way hygroscopic substances differ from deliquescent substances.**

<b>Hygroscopic substances</b>	<b>Deliquescent substances</b>
absorb moisture and do not dissolve	absorb moisture and dissolve
no change in physical state	Change its physical state
May be amorphous solids or liquids	Crystalline solids.



## 10. Types of Chemical Reactions

### Fill in the blanks:

1. A reaction between an acid and a base is called **neutralization reaction**
2. The pH of a fruit juice is 5.6. If you add slaked lime to this juice, its pH **increases**.
3. The normal pH of human blood is **7.4**
4. Electrolysis is type of **decomposition reaction**.
5. Chemical volcano is an example for **decomposition** type of reaction.

### Short answer questions:

#### 6. Why does the reaction rate of a reaction increase in raising the temperature?

Increase in temperature provides energy to break more bonds and thus speed up the chemical reaction.

#### 7. Differentiate reversible and irreversible reactions.

Reversible reaction	Irreversible reaction
Equilibrium is attained	Equilibrium is not attained
Can be reversed	Cannot be reversed
Slow reaction	Fast reaction
bidirectional	Unidirectional

### Answer in detail:

#### 8. What are called thermolysis reactions?

A single compound splits into two or more simpler substances with the help of heat. Temperature provides energy to break more bonds.

Types:

- (i) Compound to element / element decomposition:
- (ii) Compound to compound / compound decomposition:

#### 9. Explain the types of double displacement reactions with examples.

- (i) Precipitation Reactions: Aqueous solutions of two compounds react to form an insoluble compound and a soluble compound.
- (ii) Neutralisation Reactions: Acid reacts with the base to form a salt and water.

#### 10. Explain the factors influencing the rate of a reaction.

1. Nature of the reactants : Stronger acids are more reactive than weaker acids.
2. Concentration of the reactants : More the concentration of reactants, faster the reaction.
3. Temperature : Increase in heat increases the reaction rate.
4. Pressure : Increase in pressure increases the reaction rate.
5. Catalyst : Catalysts increases the reaction rate without being consumed in the reaction.
6. Surface area of the reactants : Increases in surface area increases the reaction rate.

**11. How does pH play an important role in everyday life?**

- pH of stomach fluid is 2.0 – for digestion
- pH of blood is almost 7.4 - Any increase or decrease in this value leads to diseases
- If the pH of rainwater becomes less than 7, it becomes acid rain
- pH of saliva is 6.5 to 7.5. pH changes cause tooth decay.

**12. What is chemical equilibrium? What are its characteristics?**

- In Chemical equilibrium, Rate of forward reaction = Rate of backward reaction.
- No change in the amount of the reactants and products takes place.
- pressure, concentration, colour, density, viscosity etc., of the system remain unchanged with time.

**11. Carbon and its compounds****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
2. The IUPAC name of an organic compound is 3-Methyl butan-1-ol. What type of compound it is?  
(a) Aldehyde    (b) Carboxylic acid                      (c) Ketone    **(d) Alcohol**
3.  $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$  is a:  
(a) Reduction of ethanol                      **(b) Combustion of ethanol**  
(c) Oxidation of ethanoic acid                      (d) Oxidation of ethanal
4. Rectified spirit is an aqueous solution which contains about \_\_\_\_\_ of ethanol.  
**(a) 95.5 %**                      (b) 75.5 %                      (c) 55.5 %                      (d) 45.5 %
5. Which of the following are used as anaesthetics?  
(a) Carboxylic acids    **(b) Ethers**                      (c) Esters    (d) Aldehydes
6. TFM in soaps represents \_\_\_\_\_ content in soap.  
(a) mineral    (b) vitamin                      **(c) fatty acid**                      (d) carbohydrate.
7. The general molecular formula of alkynes is  **$C_nH_{2n-2}$**
8. (Saturated / **Unsaturated**) ..... compounds decolourize bromine water.
9. 100 % pure ethanol is called **absolute alcohol**.

**Short answer questions:****10. Name the simplest ketone and give its structural formula.**

Propanone :  $CH_3COCH_3$

**11. How is ethanoic acid prepared from ethanol? Give the chemical equation.**

Ethanol is oxidized to ethanoic acid in the presence of alkaline  $KMnO_4$  or acidified  $K_2Cr_2O_7$ .

**12. Differentiate soaps and detergents.**

Soap	Detergent
Not effective in hard water	Effective even in hard water
Forms scum in hard water	Does not form scum in hard water
Poor foaming capacity	Rich foaming capacity
Biodegradable	Non-biodegradable

**Long answer questions.**

**13. What is called a homologous series? Give any three of its characteristics?**

Group or a class of organic compounds having same general formula and similar chemical properties.

**Characteristics of homologous series:**

\*All members of a homologous series contain the same elements and functional group.

\*They are represented by a general molecular formula.

\*can be prepared by a common method.

\*Chemical properties are similar.

**12. PLANT ANATOMY AND PLANT PHYSIOLOGY****Choose the correct answer**

1. Casparian strips are present in of the root  
(a) cortex (b) pith (c) pericycle **(d) endodermis**
2. Which is formed during anaerobic respiration  
(a) Carbohydrate **(b) Ethyl alcohol**  
(c) Acetyl CoA (d) Pyruvate

**Fill in the blanks**

3. Xylem and phloem occurring on the same radius constitute a vascular bundle called conjoint
3. The source of oxygen liberated in photosynthesis is from photolysis of water.
4. Phloem tissue is involved in the transport of food in plants .
5. Xylem tissue is involved in the transport of water in plants.

**short answers**

**6. What is Collateral vascular bundle?**

Phloem and xylem lie in the same radius then this type of vascular bundle is called Collateral vascular bundle .

**7. Where does the carbon that is used in photosynthesis come from?**

From atmosphere

**8. Write short notes on mesophyll tissue?**

Tissues present between upper and lower epidermis of a leaf is called mesophyll tissues .

\*palisade parenchyma cells - below upper epidermis or elongated without intercellular spaces in the more number of chloroplast and perform photosynthesis.

\*spongy parenchyma - seen below palisade parenchyma tissues made up of spherical oval irregularly arranged cells helps in gaseous exchange.

**9. Name the three basic tissue system in flowering plants ?**

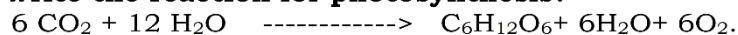
- \*Dermal tissue system
- \*Ground tissue system
- \*vascular tissue system

**10. What is respiratory quotient?**

$$RQ = \frac{\text{volume of carbon dioxide liberated}}{\text{volume of oxygen consumed}}$$

Respiratory quotient is the ratio of volume of carbon dioxide liberated and the volume of oxygen consumed during respiration.

**11. Write the reaction for photosynthesis?**



**12. Difference between Aerobic and Anaerobic respiration?**

<b>Aerobic respiration</b>	<b>Anaerobic respiration</b>
food is completely oxidized with the help of oxygen	food is broken down in the absence of oxygen
glucose is broken down into carbon dioxide water	glucose is converted into ethanol
lot of energy is produced	very small quantity of energy is produced
Complex process	Simpler process

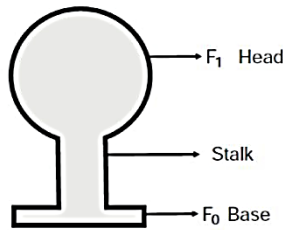
**13. Where does photosynthesis occur ?**

Occurs in all green parts of a plant.

**14. where do the light dependent reaction and the Calvin cycle occur in the chloroplast?**

\*Light reaction occur in grana of a chloroplast

\*Dark reaction is carried out in the stroma of the chloroplast.

**15. Draw the structure of chloroplast and mark all parts****16. Draw the structure of oxysome****13. STRUCTURAL ORGANISATION OF ANIMALS****Choose the correct answer**

1. The segments of leech are known as \_\_\_\_.

- (a) **Metameres (somites)** (b) Proglottids (c) Strobila  
(d) All the above.

2. In leech locomotion is performed by:

- (a) **Anterior sucker** (b) Posterior sucker (c) Setae  
(d) None of the above

**Fill in the blanks**

3. The body of leech has 33 segments

4. Mammals are warm blooded animals.

5. The blood sucking habit of leeches known as Sanguivorous

6. How does leech respire?

Through the skin

7. Write the dental formula of rabbit.

$$I \frac{2}{1}, C \frac{0}{0}, PM \frac{3}{2}, M \frac{3}{3} = \frac{2033}{1023}$$

**8. How is diastema formed in rabbit?**

The gap in between the incisors and premolar is called diastema.

**9. Which organ acts as suction pump in leech?**

Muscular pharynx

**10. Why is the teeth of rabbit called heterodont?**

In rabbit the teeth are of different types called heterodont.

**11. How does leech suck blood from the host?**

The blood is sucked by muscular pharynx.

**12. List out the parasitic adaptations in leech.**

- \*Blood is sucked by pharynx
- \*Blood is stored in the crop
- \*Hirudin which does not allow the blood to coagulate.

**13. How does locomotion take place in leech?**

- \*Looping or crawling movement
- \*Swimming movement

## 14. TRANSPORTATION IN PLANTS AND CIRCULATION IN ANIMALS

**Choose the correct answer**

1. Heart of heart is called:  
(a) SA node (b) AV node (c) Purkinje fibres (d) Bundle of His
2. A patient with blood group O was injured in an accident and has blood loss. Which blood group the doctor should effectively use for transfusion in this condition?  
(a) O group (b) AB group (c) A or B group  
(d) all blood group

**Fill in the blanks**

3. Water which is absorbed by root is transported to the aerial parts of the plant through xylem
4. Transpiration involves evaporative loss of water from aerial parts.
5. The normal human Heartbeat rate is about 72 to 75 times per minute .
4. Normal blood pressure is 120/80mm Hg.

**7. Name two layered protective covering of human heart ?**

Pericardium

**8. what is the shape of RBC in human blood ?**

Bi concave

**9. Why is the colour of the blood red?**

presence of haemoglobin

**10. Which kind of cells are found in the lymph ?**

white blood cells(WBC)

**11. Mention the artery which supplies blood to the heart Muscle?**

Coronary artery

**Short answers****12. what causes the opening and closing of guard cells of stomata during transpiration ?**

The change in the turgidity of the guard cells causes opening and closing of stomata.

**13. List out the functions of blood**

- \*transport of respiratory gases
- \*transport of digested food materials
- \*Maintain proper water balance in body
- \* involved in defence mechanism of body

**14. What is transpiration? give the importance of transpiration ?**

Evaporation of water in plants through stomata in the leaves is called transpiration.

**Importance of transpiration**

- \* Supplies water for photosynthesis
- \* Transports mineral from soil to all parts of the plant
- \* Cools the surface of leaves by evaporation.

**15. Describe the structure and working of human heart?**

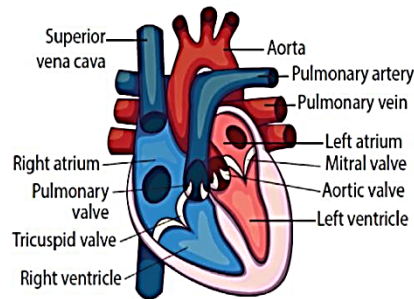
\*Heart is a conical shaped structure made up of cardiac muscle and it contains four Chambers.

\*The right Atrium receives deoxygenated blood through superior Vena cava inferior Vena cava and coronary sinus.

\*Pulmonary veins bring oxygenated blood to left Atrium.

\*The left ventricles gives rise to aorta which carries oxygenated blood to the parts of the body.

\*Tricuspid valve is present in between right auricle and right ventricle bicuspid valve is present between left auricle and left ventricle.

**16. Who discovered Rh factor ? why was it named so?**

Landsteiner discovered Rh factor .It was discovered from rhesus monkey and it is named as Rh factor.

**17. why is the Sino atrial node called pacemaker of heart ?**

Sino atrial node is called as pacemaker of heart because it is capable of initiating impulse which can stimulate the heart muscle to contract.

**15. NERVOUS SYSTEM****Choose the best answer:**

1. There are ..... pairs of cranial nerves and ..... pairs of spinal nerves.  
(a) 12, 31                      (b) 31, 12                      (c) 12, 13                      (d) 12, 21
2. Node of Ranvier is found in:  
(a) muscles                      (b) axons                      (c) dendrites                      (d) cyton
3. Which nervous band connects the two cerebral hemispheres of brain?  
(a) thalamus                      (b) hypothalamus                      (c) corpus callosum                      (d) pons

**Fill in the blanks**

4. Bipolar neurons are found in retina of eye
5. The outermost of the three cranial meninges is duramater
6. Vomiting centre is located in medulla oblongata
7. The part of brain which acts as relay center is thalamus.

**Short answers****8. Define stimulus.**

Stimulus refers to the changes in the environmental condition that are detected by receptors present in the body.

**9. Name the parts of the hind brain.**

Cerebellum, Pons, Medulla oblongata

**11. Which acts as a link between the nervous system and endocrine system?**

Hypothalamus

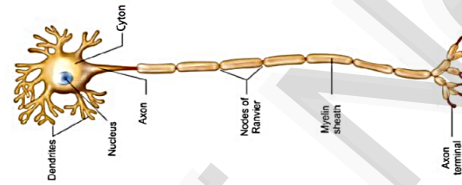
**12. Define reflex arc.**

The pathway taken by the nerve impulse to accomplish reflex action is called reflex arc.

**13. With a neat labelled diagram explain the structure of a neuron.**

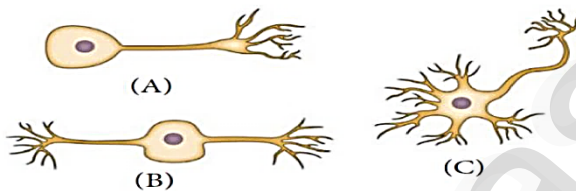
A neuron is the structural and functional unit of the nervous system. A neuron consists of three basic parts,

- \*Cyton or Cell body - Central nucleus with abundant cytoplasm. Cell organelles like mitochondria, ribosomes, lysosomes are present.
- \*Dendrites - numerous branched cytoplasmic process. Conduct nerve impulse towards cyton.
- \*Axon - It carries signals away from cyton.



**14. Classify neurons based on its structure.**

- Unipolar neurons - one nerve process arises from the cyton
- Bipolar neurons - two nerve processes arise from the cyton
- Multipolar neurons - many nerve processes arise from the cyton



**15. Illustrate the structure and functions of brain.**

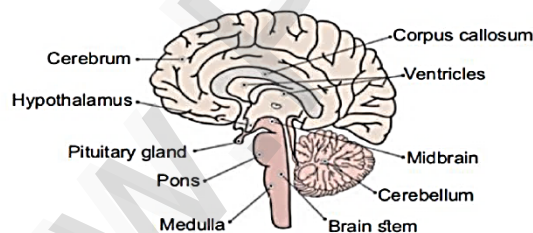
\*Brain is covered by three connective tissue membrane or meninges.

\*It is formed of three major parts.

Forebrain - Cerebrum, Thalamus and Hypothalamus (Thinking, sensory and hunger)

Mid brain - Corpora quadrigemina (Auditory reflexes)

Hindbrain - Cerebellum, Pons and Medulla oblongata (Body balance, Respiration and Cardiovascular centers)



**16. PLANT AND ANIMAL HORMONES**

**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

2. The hormone which has a positive effect on apical dominance is \_\_\_\_.

- (a) Cytokinin      **(b) Auxin**      (c) Gibberellin      (d) Ethylene.

3. Which one is referred to as "Master Gland"?

- (a) Pineal gland      **(b) Pituitary gland**      (c) Thyroid gland  
 (d) Adrenal gland

3. Which organ acts as both exocrine gland as well as endocrine gland?

- (a) Pancreas**      (b) Kidney      (c) Liver      (d) Lungs.

**Fill in the blanks**

4. Calcium metabolism of the body is controlled by parathormone  
 5. Name an artificial hormone 2,4- D  
 6. Which is the emergency hormone Adrenal

**Short answers**

7. Write the difference between exocrine and endocrine gland ?

Exocrine glands	Exocrine glands
glands have ducts	ductless glands
secretion is carried through ducts	secretion is carried through blood
example .salivary gland	example pituitary gland

**8. Why thyroid hormones referred as personality hormone?**

Thyroid hormone is essential for normal physical mental and personality development so it is called personality hormone.

**9. What is the hormone responsible for the secretion of milk in female after childbirth ?**

Prolactin hormone

**10. Which hormone requires iodine for its formation ? What will happen if intake of iodine in our diet is low?**

Thyroxine hormone requires iodine for its formation. Goitre will occur due to the inadequate supply of iodine in our diet.

**11. What are synthetic auxins give examples ?**

Artificially synthesized auxins that have the properties of natural auxins are known as synthetic auxins. Example NAA, 2,4-D

**12. What are chemical messengers?**

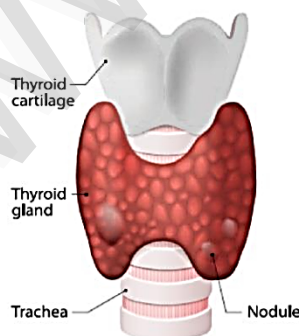
The endocrine system act through chemical messengers known as hormones produced by endocrine glands.

**13. Sanjay is sitting in the exam hall before the start of the exam he sweats a lot with increased rate of Heartbeat. Why does this condition occur?**

Adrenaline is responsible for this condition because adrenaline is a hormone produced during the conditions of stress and emotion.

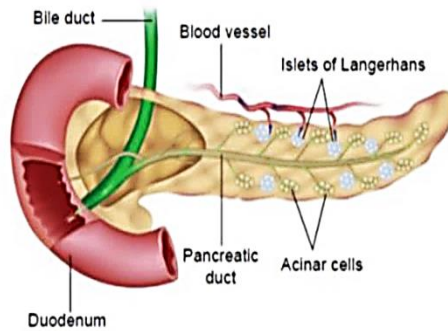
**14. Where are estrogen produced ? what is the role of estrogens in human body ?**

Estrogen is produced by Graafian follicles of ovary. It brings about the changes that occur during puberty .It promotes the development of secondary sexual characters.

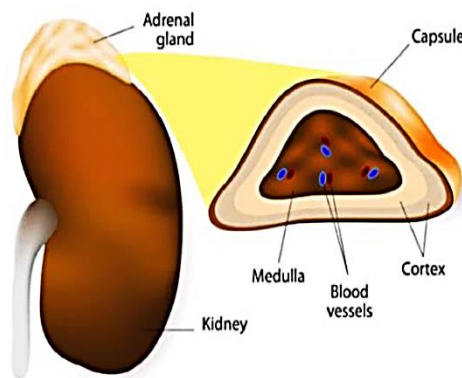
**15. Draw and labelled the structure of thyroid gland**



16. Draw and label the structure of pancreas



17. Draw the structure of adrenal gland



## 17. REPRODUCTION IN PLANTS AND ANIMALS

### Choose the correct answer

- The plant which propagates with the help of its leaves is:  
(a) Onion (b) Neem (c) Ginger **(d) Bryophyllum**
- Syngamy results in the formation of:  
(a) Zoospores (b) Conidia **(c) Zygote** (d) Chlamydozoospores
- Male gametes in angiosperms are formed by the division of \_\_\_\_\_.  
**(a) Generative cell** (b) Vegetative cell (c) Microspore mother cell  
(d) Microspore.

### Fill in the blanks

- After fertilization the ovary develops into fruit.
- Estrogen is secreted by Graafian follicle.
- The embryo sac in a typical dicot at the time of fertilization is 7 celled and 8 nucleated.
- Fertilization is internal in humans.
- When is world menstrual hygiene day observed may 28.

### Short questions

#### 9. Define triple fusion?

one sperm fuses with egg and forms a diploid zygote. The other sperm fuses with secondary nucleus of the embryo sac and forms a triploid primary endosperm nucleus. This is known as triple fusion.

**10. Write the events involved in the sexual reproduction in flowering plants? Discuss the first event and write the types mention the advantages and disadvantages of the event ?**

(i) pollination and (ii) fertilization

Types : self pollination and cross pollination

Advantages of self pollination :

- \* certain in bi sexual plants
- \* need not depend on agents
- \* there is no wastage

Disadvantages of self pollination

- \* Seeds are less in number
- \* New varieties cannot be produced

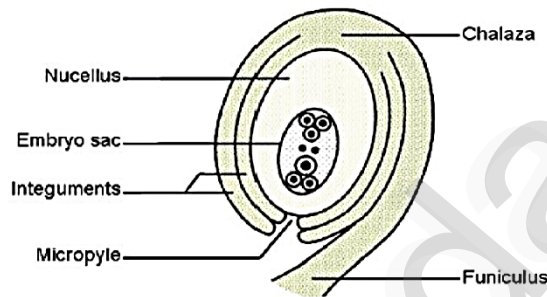
Advantages of cross pollination

- \* new varieties are formed
- \* more variable seeds are produced

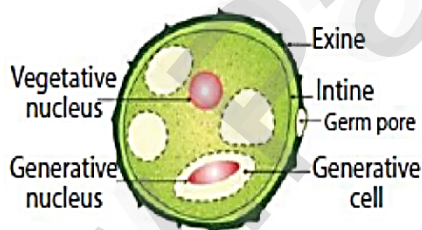
Disadvantages of cross pollination

- \* failure due to distance barrier
- \* more wastage of pollen grains

**11. Draw the structure of ovule?**



**12. Draw the structure of pollen grain?**



**13. What is colostrum? How is milk production hormonally regulated?**

The milk produced from the breast during the first 2 to 3 days after child birth is called colostrum. It is stimulated by prolactin secreted from the anterior pituitary.

**14. Name the secondary sex organs in male.**

Vas deferens, Epididymis, seminal vesicle, prostate gland and penis.

**15. Write the characteristics of insect-pollinated flowers.**

The flowers are brightly coloured , pollen grains are larger in size, the exine is pitted, spiny.

## 18.HEREDITY

### Choose the correct answer

1. 9 : 3 : 3 : 1 ratio is due to \_\_\_\_\_.  
 (a) Segregation (b) Crossing over (c) **Independent assortment**  
 (d) Recessiveness.
2. The centromere is found at the centre of the \_\_\_\_\_ chromosome.  
 (a) Telocentric (b) **Metacentric** (c) Sub – metacentric (d) Acrocentric.
3. Okazaki fragments are joined together by \_\_\_\_\_.  
 (a) Helicase (b) DNA polymerase (c) RNA primer (d) **DNA ligase.**
4. 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.

### Fill in the blanks

5. The sugar phosphate units forms the backbone of the DNA
6. The pair of contrasting characters of Mendel are called alleles
7. Physical expression of a gene is called phenotype
8. DNA consists of two polynucleotide chains.

### Short answers

#### 9.Why did Mendel selected pea plant for his experiments ?

- \*naturally self pollinating
- \*annual plant
- \* easy to cross pollinate
- \*well-defined contrasting characters
- \* bi sexual flowers

#### 10.What are Okazaki fragments?

The short segment of DNA synthesized in the lagging strand is known as which are joined together by DNA ligase.

#### 11.What do you understand by the term phenotype and genotype ?

\*External expression of a particular character is called phenotype  
 (e.g)Tall

\*Genetic expression of a particular character of an organisms is called genotype(e.g)tt or TT

### LONG ANSWER

#### 12.How is the structure of DNA organized?

\* DNA molecule consists of two nucleated chains double helix and parallel to one another

\*Nitrogenous base is there Centre linked to sugar phosphate backbone.

\*Hydrogen bonds make the DNA molecule stable

\* Adenine links with Thymine with two hydrogen bonds \*Cytosine linked with Guanine with three hydrogen bonds.

#### 13.What are mendel's law of heredity?

- i law of dominance
- ii law of segregation
- iii law of independent assortment

#### 14.What is dihybrid cross?

The inheritance of two pair of contrasting characters is called dihybrid cross .

phenotypic ratio 9:3:3:1

9-yellow round

3- yellow wrinkled

3-green round

1-green wrinkled

**15.What is monohybrid cross ?**

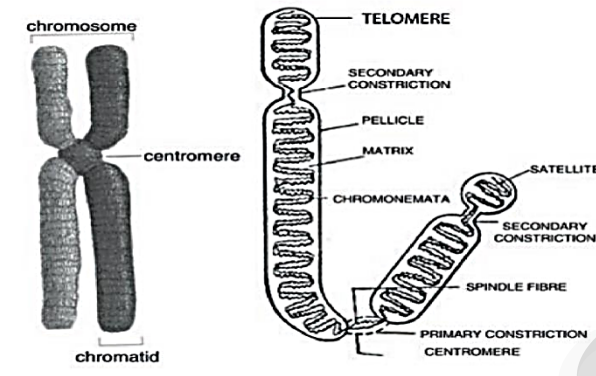
The inheritance of one pair of contrasting character is called monohybrid cross .

Phenotypic ratio 3:1

Genotypic ratio 1:2:1

**16.Explain the structure of chromosome?**

- \*Chromosomes are thread like structure
- \*Sister chromatids are held together with centromere
- \*The point at which 2 chromosomal arms meet is called primary construction
- \*Tip of the chromosome is called telomere
- \*It provides stability to the chromosome.

**19.ORIGIN AND EVOLUTION OF LIFE****Choose the correct answer**

- The 'use and disuse theory' was proposed by:
  - Charles Darwin
  - Ernst Haeckel
  - Jean Baptiste Lamarck**
  - Gregor Mendel
- Paleontologists deal with:
  - Embryological evidences**
  - Fossil evidences
  - Vestigial organ evidences
  - All the above
- The best way of direct dating fossils of recent origin is by:
  - Radio-carbon method**
  - Uranium lead method
  - Potassium-argon method
  - Both (a) and (c)

**Fill in the blanks**

- Who proposed natural selection Charles Darwin
- The term ethnobotany was coined by J.W .Harshberger
- The degenerated and non functional organs found in an organism is called this vestigial organs

**Short answers****7.The degenerated wings of kiwi is an aquatic character why is it an acquired character?**

The kiwi did not use its wings for a long time according to use and disuse theory the wing of kiwi degenerated so it is known as acquired character.

**8. Natural selection is a driving force for evolution how ?**

\*Overproduction: Living beings have capacity to multiply in geometrical manner it leads to overproduction

\*struggle for existence

\*Over production creates competition among individuals for food and space

\*Variation

\* Origin of Species - New species were originated due to accumulation of favourable variation.

**9. Define Ethnobotany and write its importance**

It is the study of region's plants and their practical uses through the traditional knowledge of local people.

**IMPORTANCE OF ETHANO BOTANY**

\*Provides traditional uses of plants

\*Gives information about plants

\*Tribal communities utilizes plant parts to treat diseases.

**10. Why is Archaeopteryx considered to be a connecting link?**

Archaeopteryx is the oldest known fossil bird. It is considered to be a connecting link between reptiles and birds. It had wings with feathers, like a bird. It had a long tail, clawed digits and conical teeth, like a reptile.

**11. Which organism is considered to be the fossil bird?**

Archaeopteryx is the fossil bird.

**12. How can you determine the age of the fossils?**

The age of fossils is determined by radioactive elements present in it. The elements may be carbon, uranium, lead or potassium. Carbon consumption of animals and plants stops after death, and the decaying process of C14 occurs continuously. The time passed since the death of a plant or animal can be calculated by measuring the amount of C14 present in their body.

**20. BREEDING AND BIOTECHNOLOGY****Choose the correct answer**

- Pusa Komal is a disease resistant variety of \_\_\_\_\_.  
(a) sugarcane (b) rice (c) cow pea (d) maize.
- Himgiri developed by hybridisation and selection for disease resistance against rust pathogens is a variety of:  
(a) chilli (b) maize (c) sugarcane (d) wheat
- We can cut the DNA with the help of \_\_\_\_\_.  
(a) scissors (b) restriction endonucleases  
(c) knife (d) RNAase.
- DNA fingerprinting is based on the principle of identifying \_\_\_\_\_ sequences of DNA.  
(a) single-stranded (b) mutated  
(c) polymorphic (d) repetitive.

**Fill in the blanks**

- Economically important crop plants with superior quality are raised by plant breeding
- Protein rich wheat variety is Atlas 66
- Colchicine is a chemical used for doubling the chromosome
- Golden rice is a genetically modified rice

**Short answer****9. What are the effects of hybrid vigour in animals?**

- \*increased production of milk of cattle
- \*increased production of egg by poultry
- \*high quality of meat is produced

**10. A breeder wishes to incorporate desirable characters into the crop plants prepare a list of characters in to the crop plants****OR****Organic farming is better than green revolution give reason ?**

- \*High yield
- \*adaptability to the environment
- \*tolerant against pest attack
- \*ability to grow with minimum availability of water.

**11. What are transgenic organisms?**

Plants or animals expressing a modified endogenous gene or a foreign gene is known as transgenic organism.

**12. State the applications of DNA fingerprinting technique.**

DNA fingerprinting technique is widely used in forensic applications such as identifying the – culprit.

\*It is also used for paternity testing in case of disputes.

\*It also helps in the study of genetic diversity of population, evolution and speciation.

**13. Biofortification may help in removing hidden hunger. How?**

Biofortification is the scientific process of helping crop plants, enriched with high levels of nutrients like vitamins, proteins and minerals. Micronutrient malnutrition is called hidden hunger, the lack of micronutrients such as vitamin A, zinc and iron in the diet.

Biofortification is effective in removing hidden hunger and improving the nutritional value of food.

**14. Define genetic engineering.**

Genetic engineering is the manipulation and transfer of genes from one, organism to another organism to create a new DNA called as recombinant DNA(rDNA).

**15. Differentiate between outbreeding and inbreeding.**

<b>Outbreeding</b>	<b>Inbreeding</b>
Breeding of unrelated animals	Breeding of related animals
Cross between two different species	Cross between superior male and female of same breed
Example: mule	Example :The sheep Hissardale

**21. HEALTH AND DISEASES****Choose the correct answer**

1. Which type of cancer affects lymph nodes and spleen?  
(a) Carcinoma (b) Sarcoma **(c) Leukaemia** (d) Lymphoma.
2. Coronary heart disease is due to \_\_\_\_\_.  
(a) Streptococci bacteria  
(b) Inflammation of pericardium  
(c) The weakening of heart valves  
**(d) Insufficient blood supply to heart muscles.**
3. Polyphagia is a condition seen in:  
(a) Obesity **(b) Diabetes mellitus**  
(c) Diabetes insipidus (d) AIDS

**Fill in the blanks**

4. Excessive consumption of alcohol leads to cirrhosis of liver
5. .Where does alcohol effect immediately after drinking central nervous system

**short answers****6.What are psychotropic drugs ?**

Psychotropic drugs act on the brain and alter the behaviour , consciousness, power of thinking and perception .

**7.Mention the disease caused by tobacco smoke?**

Cancer in the lungs ,mouth cancer, high blood pressure

**8.what is metastasis ?**

The cancerous cells migrate to distant part of the body and affect new cells.

**9.How is a cancer cell differ from a normal cell?**

<b>cancer cell</b>	<b>normal cell</b>
nucleus is larger	nucleus is proportionate size
growth is out of control	growth is in control
invisible to immune cells	visible to immune cells
destroy surrounding cells	Do not destroy surrounding cells

**10. What are the various routes by which transmission of human immune deficiency virus takes place?**

It spreads through contact with body fluids or blood. HIV is generally transmitted by

\*Sexual contact with an infected person.

\*Use of contaminated needles or syringes.

\*transfusion of contaminated blood or blood products.

\*From infected mother to her child through the placenta.

**11. What precautions can be taken for preventing heart diseases?**

Diet management- intake of fibre diet, fruits and vegetables

Physical activity- exercise, walking and yoga

**12. Men addicted to tobacco lead to oxygen deficiency in their body. What could be the possible reason?**

Smoking increases carbon monoxide content in blood and reduces the concentration of heamo bound oxygen. This causes O<sub>2</sub> deficiency in the blood.

**22.ENVIRONMENTAL MANAGEMENT****Choose the correct answer**

1. The gas released from vehicles exhaust are:

**(i) carbon monoxide** (ii) Sulphur dioxide **(iii) Oxides of nitrogen:**

**(a)** (i) and (ii) **(b) (i) and (iii)** **(c)** (ii) and (iii) **(d)** (i), (ii) and (iii)

2. Soil erosion can be prevented by \_\_\_\_\_

(a) deforestation

**(b) afforestation**

(c) over growing

(d) removal of vegetation

3. An inexhaustible resources is:

a) wind power (b) soil fertility (c) wild life **(d) all of the above**

4. Common energy source in village is \_\_\_\_\_

(a) electricity

(b) coal

(c) biogas

**(d) wood and animal dung**

**Fill In The Blanks**

5. The Nilgiris is a biosphere reserve in Tamil Nadu .
6. Tidal energy is renewable type of energy
7. Coal is the most commonly used fuel for the production of electricity
8. Coal Petroleum and natural gas are called fossil fuel
9. Greenhouse effect refers to warming of Earth.

**Short answers****11. Why fossil fuels are to be conserved?**

The coal and petroleum reserves can be exhausted if we continue using them at a rapid rate the formation of this fossil fuel is very slow process and takes very long period of time for renewal.

**12. Write notes on renewable and nonrenewable energy resources?**

**Renewable energy resources:** Energy resources are available in unlimited amount in nature and they can be renewed over short period of time is called renewable energy resources. example solar energy, wave energy, and wind energy .

**Non renewable energy resources :** Energy obtained from sources that cannot renew themselves over a short period of time is known as non renewable energy resources. example Coal ,Petroleum and natural gas.

**13. write notes on rainwater harvesting ?**

Rainwater harvesting is a technique of collecting and storing rainwater for future use.

Method of rainwater harvesting

- \*Rooftop rainwater harvesting
- \*Recharge pit
- \*digging of tanks or lakes
- \*Ooranis

Advantages of rainwater harvesting

- \*-overcome the Rapid depletion of groundwater level
- \*reduces flood and soil erosion
- \*meet the increased demand of water.

**14. What are the advantages of using biogas?**

- \*It burns without smoke
- \*causing less pollution.
- \*The leftover slurry is good manure rich in nitrogen and phosphorus.
- \*It is safe and convenient to use.
- \*less greenhouse gases emission

**15. What are the agents of soil erosion?**

High velocity of wind, air currents, flowing water, land slide, human activities like deforestation, farming and mining overgrazing by cattle.

**16. What will happen if trees are cut down?**

If trees are cut down it give rise to ecological problems like floods, drought, soil erosion, loss of wild life, extinction of species, imbalance of biogeochemical cycles, alternation of climatic conditions and desertification.

**17. What would happen if the habitat of wild animals is disturbed?**

If the habitual wild animals disturbed, the biological diversity cannot be maintained and cannot promote economic activities, which generates revenue to the government.



## 23.VISUAL COMMUNICATION

### Choose the best answer

1. Which software is used to create animation?  
 (a) Paint (b) PDF (c) MS Word **(d) Scratch**
2. All files are stored in the \_\_\_\_\_.  
**(a) folder** (b) box (c) pai (d) scanner.
3. Which is used to build scripts?  
**a) Script area** (b) Block palette (c) Stage (d) Sprite
4. Which is used to edit programs?  
 (a) Inkscape **(b) Script editor** (c) Stage (d) Sprite.
5. Where you will create category of blocks?  
 (a) Block palette **(b) Block menu** (c) Script area (d) sprite

### Short answers

#### 6. What is Scratch?

Scratch is a software used to create animations, cartoons and games easily. Scratch, on the other hand, is a visual programming language.

#### 7. What is stage?

Stage is the background appearing when we open the scratch window. The background will most often be white. You can change the background colour as you like.

#### 8. What is Sprite?

The characters on the background of a Scratch window are known as Sprite. Usually, a cat appears as a sprite when the Scratch window is opened. The software provides facilities to make alternations in the sprite.

#### 9. Write a short note on the editor and its types.

\*Editors or text Editors are software programs that enable the user to create and edit text files .

\*Editors are generally classified into 5 types as,  
 Line Editor , Stream Editor , Screen Editor , Word processors,  
 Structure Editor

### Problems:

**1.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.**

$$R = P - Q = 5 + (-15) = -10N$$

The resultant force acting along the direction of "Q".

**2.What will be the frequency sound having 0.20 m as its wavelength when it travels with a speed of 331 ms<sup>-1</sup>?**

$$n = \frac{v}{\lambda} = \frac{331}{0.2} \\ = 1655 \text{ Hz.}$$

**3.A charge of 12 C flows through a bulb in 5 seconds. What is the current through the bulb?**

$$I = \frac{Q}{t} = \frac{12}{5} = 2.4 \text{ A}$$

**3.Calculate the resistance of a conductor through which a current of 2 A passes, when the potential difference between the ends is 30 V.**

$$R = \frac{V}{I} = \frac{30}{2} = 15 \text{ ohm}$$

**5. An electric heater of resistance 5 ohm is connected to an electric source. If a current of 6 A flows through the heater, then find the amount of heat produced in 5 minutes.**

$$H = I^2 R t = 36 \times 5 \times 300 = 54000 \text{ J}$$

**6. Calculate the current and the resistance of a 100 W, 200 V electric bulb in an electric circuit.**

$$P = VI$$

$$I = \frac{P}{V} = \frac{100}{200} = 0.5 \text{ A}$$

$$R = \frac{V}{I} = \frac{200}{0.5} = 400 \text{ ohm}$$

**7. Calculate the amount of energy released when a radioactive substance undergoes fusion and results in a mass defect of 2 kg.**

$$E = mc^2 = 2 \times (3 \times 10^8)^2 = 1.8 \times 10^{17} \text{ J}$$

**8. Calculate the molecular mass of  $H_2O$ .**

$$\begin{aligned} \text{Molecular mass} &= 2 \times 1 + 1 \times 16 \\ &= 18 \text{ g} \end{aligned}$$

**9. Calculate the molecular mass of  $CO_2$**

$$\begin{aligned} \text{Molecular mass} &= 1 \times 12 + 2 \times 16 \\ &= 44 \text{ g} \end{aligned}$$

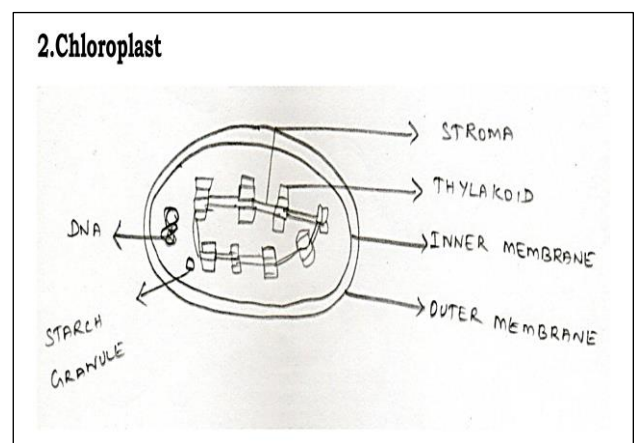
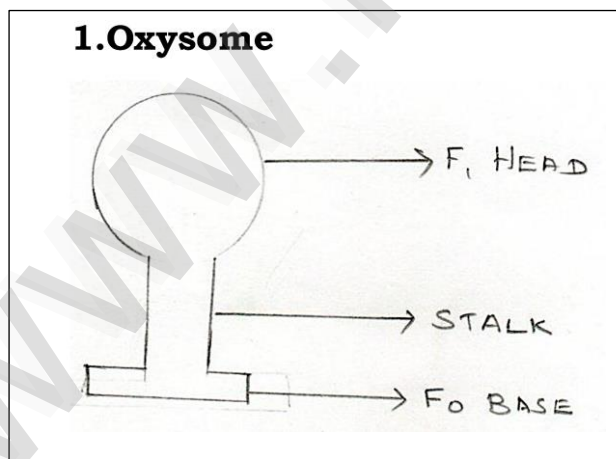
**10. A solution is prepared by dissolving 25 g of sugar in 100 g of water. Calculate the mass percentage of solute.**

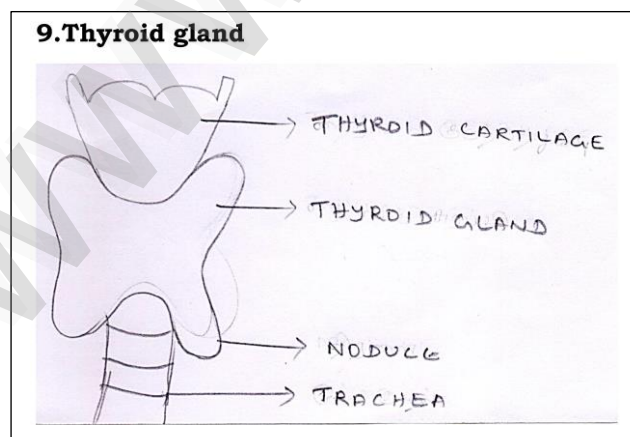
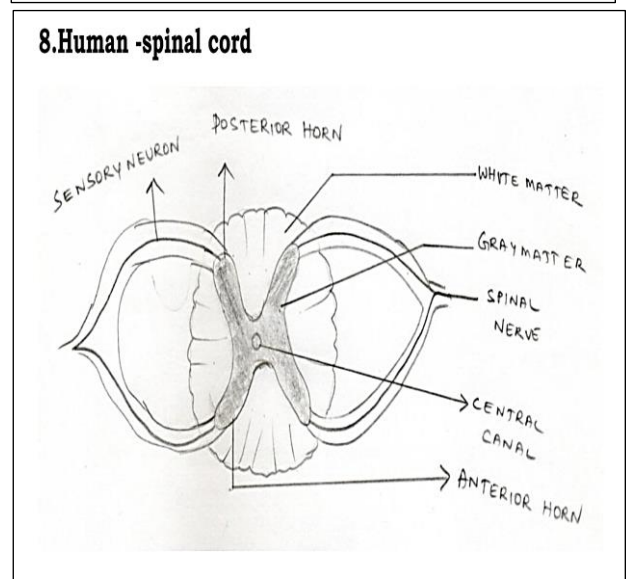
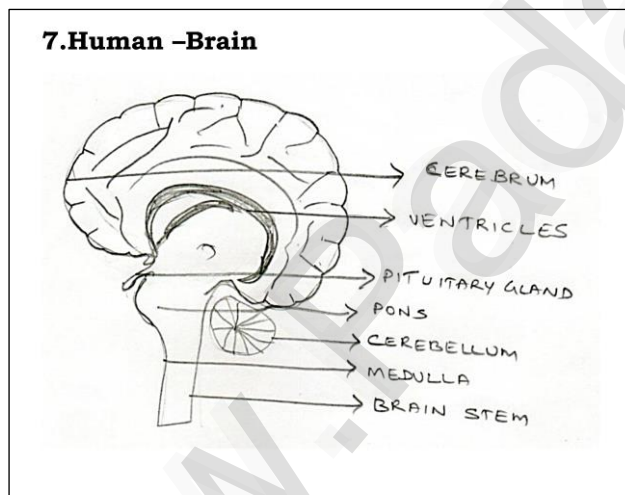
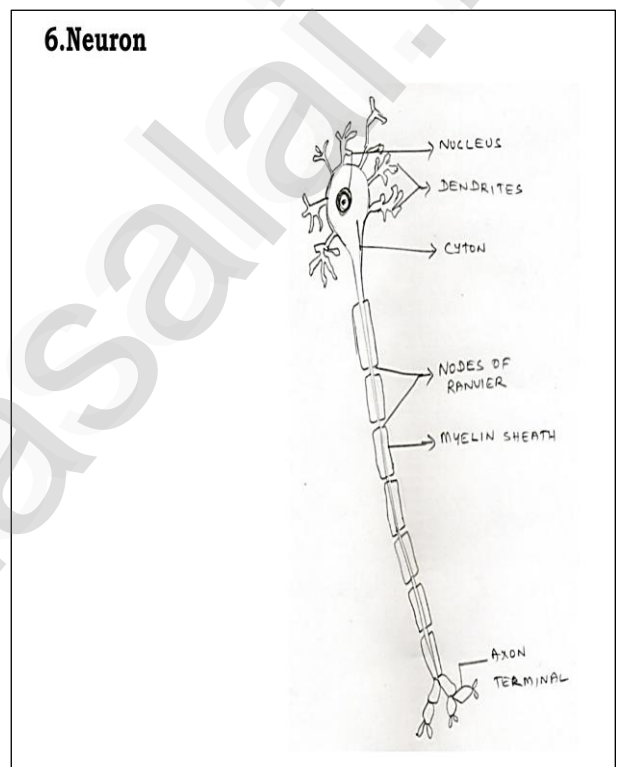
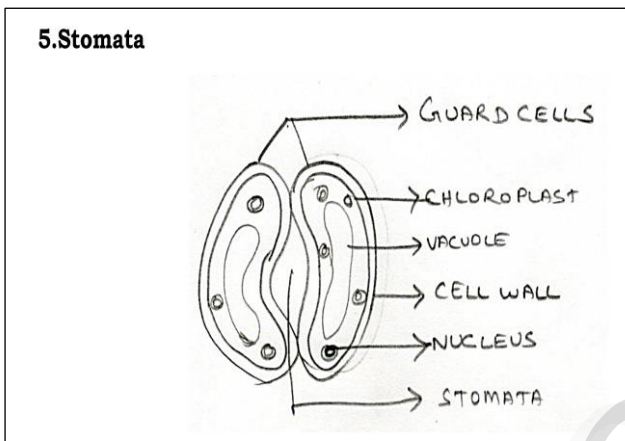
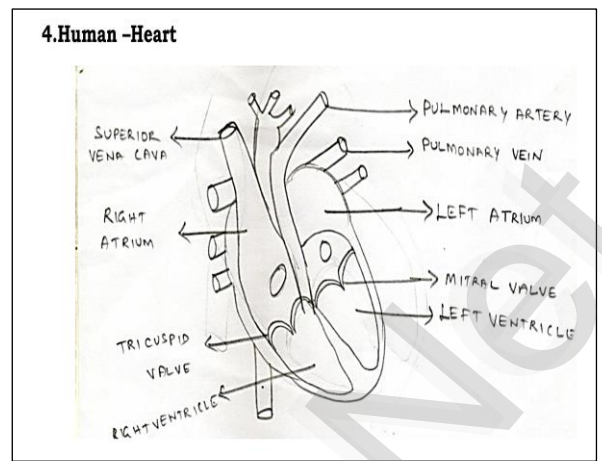
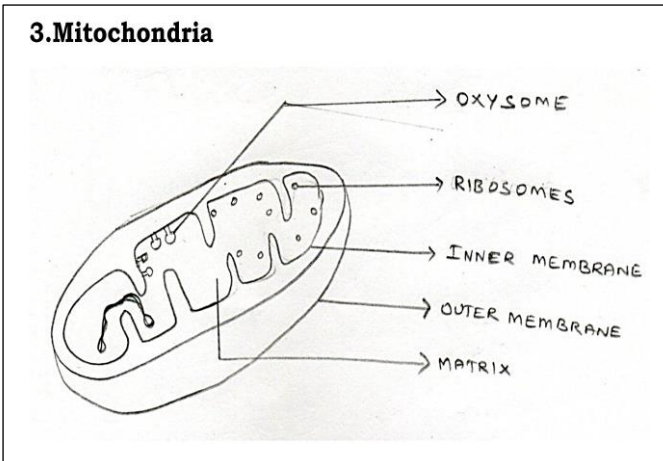
$$\begin{aligned} \text{Mass percentage} &= \frac{\text{mass of solute}}{\text{mass of solution}} \times 100 \\ &= \frac{25}{125} \times 100 \\ &= 20\% \end{aligned}$$

**11. Calculate the pH of 0.01 M  $HNO_3$  ?**

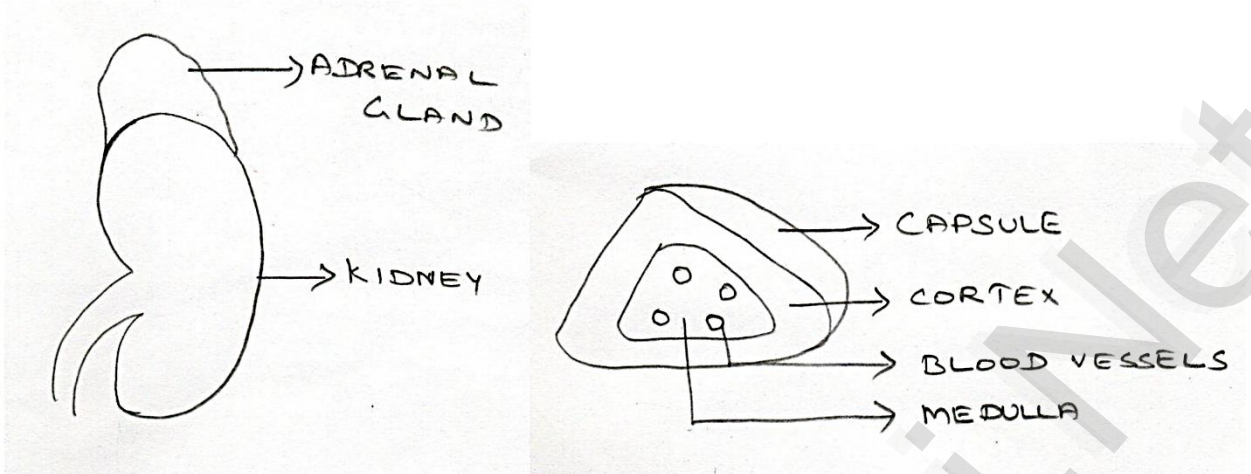
$$\begin{aligned} \text{pH} &= -\log_{10} [H^+] \\ &= -\log_{10} [0.01] = 2 \end{aligned}$$

## DIAGRAMS WITH LABELL

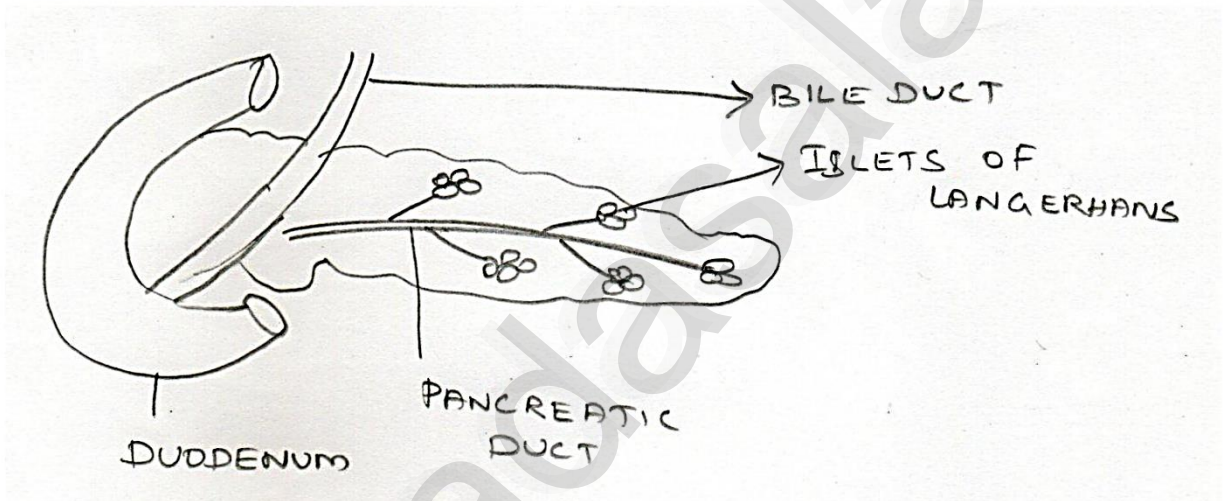




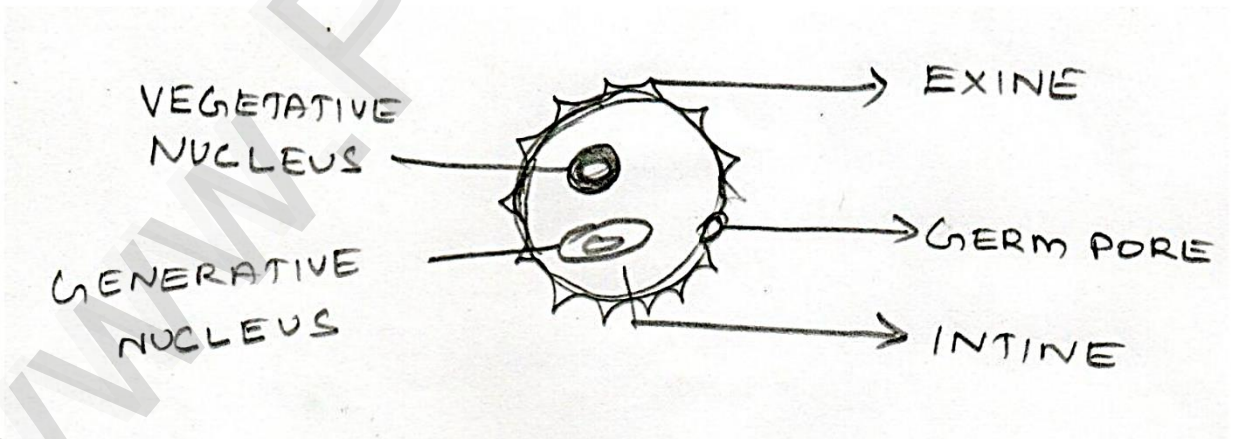
### 10. Adrenal gland



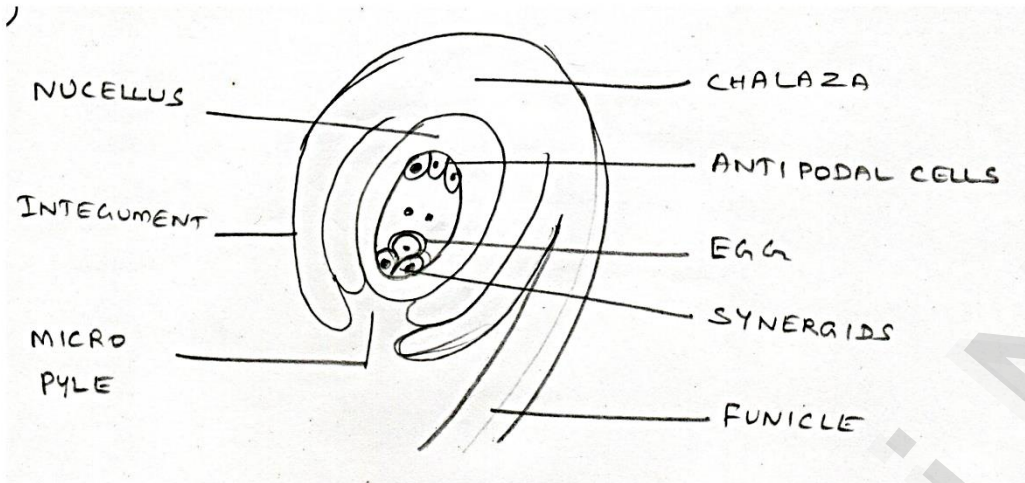
### 11. Pancrease



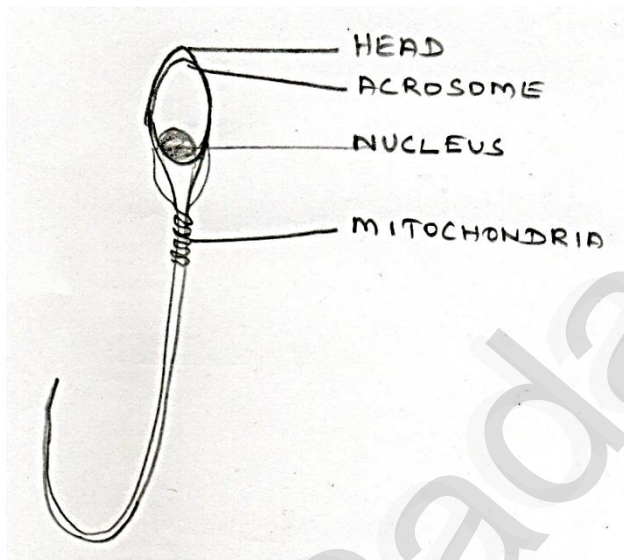
### 12. Structure of Pollen grain



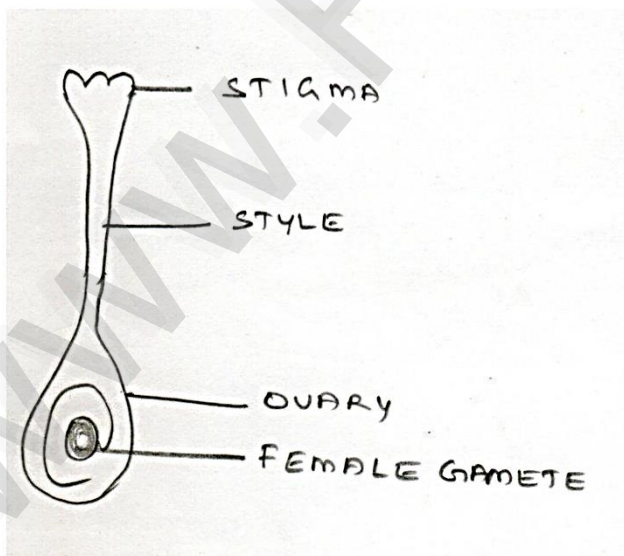
### 13. Structure of an ovule



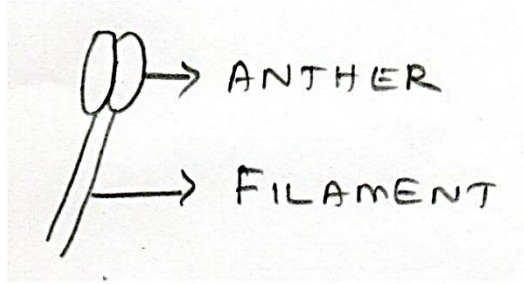
### 14. Structure of sperm



### 15. Structure of ovary



### 16. Anther



### 17. Chromosome

