

A

Common Half Yearly Exam -2022
Standard X
Science

Time : 3 Hours

Marks : 75

Part - I

I. Choose the correct answers :

1. d . Both a and c
2. a. positive
3. c. 746
- 4.c .28g
- 5.c. silica gel
- 6.c. -al
- 7.b.when Co₂ liberated
- 8.c. atrium – ventricle –arteries-vein
- 9.a.melatonin
- 10.d. androecium and gymnoecium
- 11.b.metacentric
- 12.a.malignant

Part - II

II. Answer any 7 :

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

14. Match the following

- a) BARC - MUMBAI
- b)FUEL - URANIUM
- c)CONTROLLED FUSION – NUCLEAR REACTOR
- d) I-131 – THYROID DISEASE

15.

When iron is exposed to moist air, it forms a layer of brown hydrated ferric oxide on its surface. This compound is known as **rust** and the phenomenon of formation of rust is known as rusting. 4 Fe + 3 O₂ + x H₂ O → 2 Fe₂ O₃ . xH₂ O

16. **Volume percentage**

Volume percentage is defined as the percentage by volume of solute (in ml) present in the given volume of the solution.

Volume Percentage = $\frac{\text{Volume of the solute} \times 100}{\text{Volume of the solution}}$

Volume Percentage = $\frac{\text{Volume of the solute} \times 100}{\text{Volume of the solute} + \text{volume of the solvent}}$

17. **photosynthesis .**

During this process oxygen is released as a byproduct.



Carbon dioxide + Water Glucose + + Water Oxygen

18. a) 2033/1033

b) Central nervous system

19. Treatment of rosette plants with gibberellin induces sudden shoot elongation followed by flowering is called bolting. It can be induced artificially before the crop is harvested.

20.

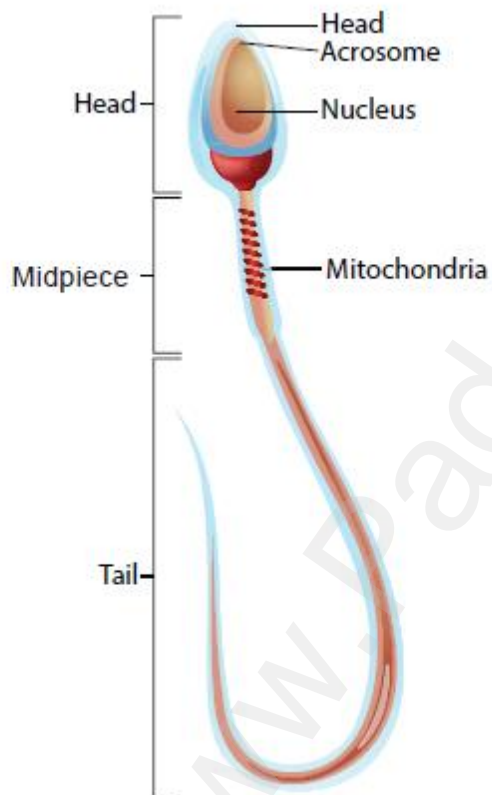


Figure 17.15 Structure of sperm

21. Agents of Soil erosion .

Agents of soil erosion are high velocity of wind, air currents, flowing water, landslide, human activities (deforestation, farming and mining) and overgrazing by cattle.

22. ohm's law

$$I = 2 \quad V = 30$$

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

Part – III

23. a. Boyle's law: When the temperature of a gas is kept constant, the volume of a fixed mass of gas is inversely proportional to its pressure.

$$P \propto 1/V$$

$$PV = \text{constant}$$

b. **Ideal Gases** If the atoms or molecules of a gas do not interact with each other, then the gas is said to be an ideal gas or a perfect gas.

Real Gases If the molecules or atoms of a gases interact with each other with a definite amount of intermolecular or inter atomic force of attraction, then the gases are said to be real gases.

24. a – I) True II) False – cannot travel in vacuum.

b. The radio isotope of phosphorous (P-32) helps to increase the productivity of crops. The radiations from the radio isotopes can be used to kill the insects.

25. a. **Amalgam**

An amalgam is an alloy of mercury with another metal. These alloys are formed through metallic bonding with the electrostatic force of attraction between the electrons and the positively charged metal ions. Silver tin amalgam is used for dental filling. **Reasons for alloying:** i. To modify appearance and colour ii. To modify chemical activity. iii. To lower the melting point

b. Soap and Detergent

Soap	Detergent
It is a sodium salt of long chain fatty acids.	It is sodium salts of sulphonic acids.
The ionic part of a soap is $-\text{COO}^- \text{Na}^+$.	The ionic part in a detergent is $-\text{SO}_3^- \text{Na}^+$.
It is prepared from animal fats or vegetable oils.	It is prepared from hydrocarbons obtained from crude oil.
Its effectiveness is reduced when used in hard water.	It is effective even in hard water.
It forms a scum in hard water.	Does not form a scum in hard water.
It has poor foaming capacity.	It has rich foaming capacity.
Soaps are biodegradable.	Most of the detergents are non-biodegradable.

26.

i) CH₃-CH₂-CH-CH₃

OH

ii) 2-Butanol

iii) saturated

27. Aerobic respiration :

Aerobic respiration is the type of cellular respiration in which organic food is completely oxidized with the help of oxygen into carbon dioxide, water and energy. It occurs in most plants and animals. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + ATP$

Anaerobic respiration :

Anaerobic respiration takes place without oxygen. Glucose is converted into ethanol (Ethanol fermentation by yeast) or lactic acid (lactic acid fermentation by bacteria).



28. Functions of blood

- i) Transport of respiratory gases (Oxygen and CO₂).
- ii) Transport of digested food materials to the different body cells.
- iii) Transport of hormones.
- iv) Transport of nitrogenous excretory products like ammonia, urea and uric acid.
- v) It is involved in protection of the body and defense against diseases.
- vi) It acts as buffer and also helps in regulation of pH and body temperature.
- vii) It maintains proper water balance in the body.

29.

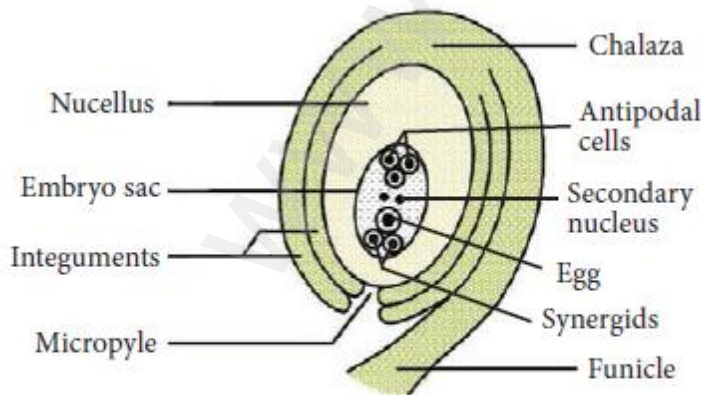


Figure 17.10 Structure of an Ovule

30.

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

b) Obesity is due to genetic factors, physical inactivity, eating habits (overeating) and endocrine factors. Obesity is a positive risk factor in development of hypertension, diabetes, gall bladder disease, coronary heart disease and arthritis.

31.

a) **Rainwater harvesting** is a technique of **collecting and storing rainwater** for future use. It is a traditional method of storing rain water in underground tanks, ponds, lakes, check dams and used in future.

The main purpose of rainwater harvesting is to make the rainwater percolate under the ground so as to recharge 'groundwater level'.

b. e-wastes are generated from spoiled, outdated, non-repairable electrical and electronic devices.

32.

Example 3: Calculate the pH of 1×10^{-4} molar solution of NaOH.

Solution: NaOH is a strong base and dissociates in its solution as:



One mole of NaOH would give one mole of OH^- ions. Therefore,

$$[\text{OH}^-] = 1 \times 10^{-4} \text{ mol litre}^{-1}$$

$$\begin{aligned} \text{pOH} &= -\log_{10}[\text{OH}^-] = -\log_{10} \times [10^{-4}] \\ &= -(-4 \times \log_{10} 10) = -(-4) = 4 \end{aligned}$$

$$\text{Since, } \text{pH} + \text{pOH} = 14$$

$$\begin{aligned} \text{pH} &= 14 - \text{pOH} = 14 - 4 \\ &= 10 \end{aligned}$$

Part - IV

33 . a) “the force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force”.

Initial momentum of the body $P_i = mu$

Final momentum of the body $P_f = mv$

Change in momentum $\Delta p = P_f - P_i = mv - mu$

By Newton’s second law of motion,

Force,

$F \propto$ rate of change of momentum

$F \propto$ change in momentum / time

$F \propto \frac{mv - mu}{t}$ $F = km(v - u) / t$

Here, k is the proportionality constant. $k = 1$ in all systems of units.

Hence, $F = m(v - u) / t$

Since, acceleration = change in velocity/ time,

$a = (v - u) / t$.

Hence, we have $F = m \times a$

Force = mass \times acceleration

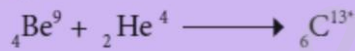
b) PROPERTIES OF LIGHT

1. Light is a form of energy.
2. Light always travels along a straight line.
3. Light does not need any medium for its propagation. It can even travel through vacuum.
4. The speed of light in vacuum or air is, $c = 3 \times 10^8 \text{ ms}^{-1}$
5. violet light has the lowest wavelength and red light has the highest wavelength.

Or

a)

Properties	α rays	β rays	γ rays
What are they?	Helium nucleus (${}_2\text{He}^4$) consisting of two protons and two neutrons.	They are electrons (${}_{-1}e^0$), basic elementary particle in all atoms.	They are electromagnetic waves consisting of photons.
Charge	Positively charged particles. Charge of each alpha particle = $+2e$	Negatively charged particles. Charge of each beta particle = $-e$	Neutral particles. Charge of each gamma particle = zero
Ionising power	100 time greater than β rays and 10,000 times greater than γ rays	Comparatively low	Very less ionization power
Penetrating power	Low penetrating power (even stopped by a thick paper)	Penetrating power is greater than that of α rays. They can penetrate through a thin metal foil.	They have a very high penetrating power greater than that of β rays. They can penetrate through thick metal blocks.
Effect of electric and magnetic field	Deflected by both the fields. (in accordance with Fleming's left hand rule)	Deflected by both the fields; but the direction of deflection is opposite to that for alpha rays. (in accordance with Fleming's left hand rule)	They are not deflected by both the fields.
Speed	Their speed ranges from 1/10 to 1/20 times the speed of light.	Their speed can go up to 9/10 times the speed of light.	They travel with the speed of light.



In the above nuclear reaction, ${}_6\text{C}^{13*}$ is unstable and is radioactive. This reaction can be represented as ${}_4\text{Be}^9 (\alpha, n) {}_6\text{C}^{12}$



b)

34. a)

‘The main postulates of modern atomic theory’ are as follows:

An atom is no longer indivisible (after the discovery of the electron, proton, and neutron).

Atoms of the same element may have different atomic mass. (discovery of isotopes $^{17}\text{Cl}^{35}$, $^{17}\text{Cl}^{37}$). Atoms of different elements may have same atomic masses (discovery of Isobars $^{18}\text{Ar}^{40}$, $^{20}\text{Ca}^{40}$). Atoms of one element can be transmuted into atoms of other elements. In other words, atom is no longer indestructible (discovery of artificial transmutation).

Atom is the smallest particle that takes part in a chemical reaction.

The mass of an atom can be converted into energy ($E = mc^2$).

b) HNO_3 , H_2SO_4 etc.,

or

a) **Are plants and animals pH sensitive?** Our body works within the pH range of 7.0 to 7.8. Living organisms can survive only in a narrow range of pH change.

pH in our digestive system It is very interesting to note that our stomach produces hydrochloric acid. It helps in the digestion of food without harming the stomach.

pH changes as the cause of tooth decay pH of the saliva normally ranges between 6.5 to 7.5. White enamel coating of our teeth is calcium phosphate, the hardest substance in our body.

pH of soil In agriculture, the pH of the soil is very important. Citrus fruits require slightly alkaline soil, while rice requires acidic soil and sugarcane requires neutral soil.

pH of rain water The pH of rain water is approximately 7, which means that it is neutral and also represents its high purity.

b)

REVERSIBLE REACTION	IRREVERSIBLE REACTION
It can be reversed under suitable conditions.	It cannot be reversed.
Both forward and backward reactions take place simultaneously.	It is unidirectional. It proceeds only in forward direction.
It attains equilibrium.	Equilibrium is not attained.
The reactants cannot be converted completely into products.	The reactants can be completely converted into products.
It is relatively slow.	It is fast.

35. a

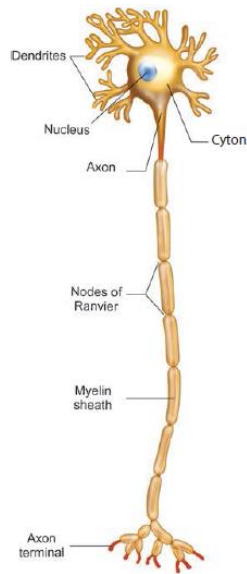


Fig. 15.1 Structure of Neuron

(i) **Cyton:** Cyton is also called cell body or perikaryon. It has a central nucleus with abundant cytoplasm called **neuroplasm**. The cytoplasm has large granular body called **Nissl's granules** and the other cell organelles like mitochondria, ribosomes, lysosomes, and endoplasmic reticulum. Neurons do not have the ability to divide. Several neurofibrils are present in the cytoplasm that help in transmission of nerve impulses to and from the cell body.

(ii) **Dendrites:** These are the numerous branched cytoplasmic processes that project from the surface of the cell body. They conduct nerve impulses towards the cyton. The branched projections increase the surface area for receiving the signals from other nerve cells.

(iii) **Axon:** The axon is a single, elongated, slender projection. The end of axon terminates as fine branches which terminate into knob like swellings called **synaptic knob**. The plasma membrane of axon is called **axolemma**, while the cytoplasm is called **axoplasm**. It carries impulses away from the cyton. The axons may be covered by a protective sheath called **myelin sheath** which is further covered by a layer of **Schwann cells** called **neurilemma**. Myelin sheath breaks at intervals by depressions called **Nodes of Ranvier**. The region between the nodes is called as **internode**. Myelin sheath acts as insulator and ensures rapid transmission of nerve impulses.

Synapse: A junction between synaptic knob of axon of one neuron and dendron of next neuron is called **synaptic junction**.

II

a) Physiological effects of ethylene

1. Ethylene promotes the **ripening of fruits**. e.g. Tomato, Apple, Mango, Banana, etc.
2. Ethylene **inhibits** the **elongation** of stem and root in dicots.
3. Ethylene hastens the **senescence** of leaves and flowers.
4. Ethylene stimulates **formation of abscission zone** in leaves, flowers and fruits. This leads to premature shedding.

5. Ethylene **breaks the dormancy** of buds, seeds and storage organs.

b) Advantages of cross pollination

1. The seeds produced as a result of crosspollination, develop and germinate properly and grow into better plants, i.e. cross pollination leads to the production of new varieties.
2. More viable seeds are produced.

-----BEST WISHES-----

Prepared by

D. HIFZUR RAHMAN MSc.,MPhil., B.Ed.,

DEPT OF SCIENCE

KH MATRIC.BOYS HR.SEC.SCHOOL

THEN NANDIYALAM

MELVISHARAM – RANIPET DISTRICT

WHATSAPP : 8807731560 - FOR CENTUM PRACTICE