



QUESTION BANK

Full Answers

SCIENCE

10

11 Question Papers with Full Answers

Govt. Model Question Paper with Full Answers	- 1
PTA Question Papers with Full Answers	- 6
Govt. Public Question Papers with Full Answers	- 4



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GOVT. MODEL QUESTION PAPER - 2019**CLASS: X****SCIENCE****Question
Paper****1****Time allowed: 15 mins + 3 hrs****Marks: 75**

Instructions :

1. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
2. Use Blue (or) Black ink to write and underline and pencil to draw diagrams.

Note: This question paper contains four parts.

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

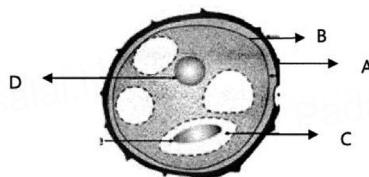
(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

1. To project the rockets which of the following principles 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
2. Kilowatt hour is the unit of _____.
a) resistivity b) conductivity c) electrical energy d) electrical power
3. _____ element emits its radiation spontaneously.
a) Ni b) Pd c) Pt d) U
4. Which of the following is a triatomic molecule?
a) Glucose b) Helium c) Carbon dioxide d) Hydrogen
5. _____ is an important metal to form amalgam.
a) Ag b) Hg c) Mg d) Al
6. The component present in lesser amount, in a solution is called _____.
a) Solute b) Solvent c) Solution d) Colloid
7. A patient with blood group 'O' was injured in an accident and has blood loss. In this condition the doctor should effectively use _____ blood group for transfusion.
a) 'O' group b) 'AB' group c) 'A' or 'B' group d) All blood group
8. Excessive consumption of alcohol leads to _____.
a) Loss of memory b) Cirrhosis of liver
c) state of hallucination d) Suppression of brain function
9. _____ is formed during anaerobic respiration
a) Carbohydrate b) Ethyl alcohol c) Acetyl CoA d) Pyruvate
10. Casparian strips are present in the _____ of the root.
a) Cortex b) Pith c) Pericycle d) Endodermis
11. The soft finely stratified sedimentary rock refers to _____.
a) shale b) petroleum c) methane d) coal
12. All files are stored in the _____.

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PART - II**Note: Answer any 7 questions. Question No. 22 is compulsory.****7×2=14**

13. State Newton's second law.
14. What are the causes of 'Myopia'?
15. What is the minimum distance needed for an echo?
16. Why does the rate of a reaction increase while raising the temperature?
17. Differentiate soaps and detergents.
18. Write the dental formula of rabbit.
19. What is Bolting? How can it be induced artificially?
20. Identify the parts A, B, C & D.



21. How can you determine the age of fossils?
22. A charge of 10 coulomb flows through a bulb in 5 second. What is the current through the bulb?

PART - III**Note: Answer any 7 questions. Question No. 32 is compulsory.****7×4=28**

23. State and prove the law of conservation of linear momentum
24. i) Draw a ray diagram to show the image formed by a convex lens when the object is placed between F and 2F.
ii) Define one calorie.
25. i) How many electrons are passing per second in a circuit in which there is a current of 5A?
ii) Mention two cases in which there is no Doppler effect in sound
26. Derive the relationship between relative molecular mass and vapour density.
27. How is metal corrosion prevented?
28. With neat labelled diagram explain the structure of a neuron.
29. a) Read the following content and answer the questions below.
Pure - bred tall Pea plants are first crossed with pure - bred dwarf pea plants. The pea plants obtained in F₁ generation are then cross - bred to produce F₂ generation of pea plant.
i) What do the plants of F₁ generation look like?
ii) What is the ratio of tall plants to dwarf plants in F₂ generation?
iii) Which type of plants were missing in F₁ generation but reappeared in F₂ generation?
b) Why is the sino-atrial node called the pacemaker of heart?
30. Differentiate the following:
i) Monocot root and Dicot root.
ii) Aerobic and Anaerobic respiration.
31. i) What precautions can be taken for preventing heart disease?
ii) Name two maize hybrids rich in amino acid lysine.
32. i) Write the features of Nuclear fission and Nuclear fusion.

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PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. a) i) State Boyle's law.
ii) Explain the experiment of measuring the real and apparent expansion of a liquid with a neat diagram. **(OR)**
- b) i) A source of sound is moving with a velocity of 50ms^{-1} towards a stationary listener. The listener measures the frequency of the source as 1000Hz . What will be the apparent frequency of the source when it is moving away from the listener after crossing him? (Velocity of sound in the medium is 330ms^{-1})
ii) Calculate the velocity of a moving body of mass 5kg whose linear momentum is 2 kg ms^{-1} .
34. a) i) Calculate the mass of 1.51×10^{23} molecule of H_2O .
ii) Calculate the moles of 46 g sodium.
iii) Calculate the number of molecules present in the 36 g water. **(OR)**
- b) Write notes on various factors affecting solubility.
35. a) i) Why are thyroid hormones referred as personality hormones?
ii) Define triple fusion.
iii) Enumerate the importance of forest. **(OR)**
- b) i) List out any three parasitic adaptations of leech.
ii) Natural selection is a driving force for evolution. How?

ANSWERS**Govt. Model Question Paper 2019****Question Paper****1****PART - I**

- | | |
|-------------------------|--------------------------|
| 1. d) Both a and c | 7. a) 'O' group |
| 2. c) electrical energy | 8. b) Cirrhosis of liver |
| 3. d) U | 9. b) Ethyl alcohol |
| 4. c) Carbon dioxide | 10. d) Endodermis |
| 5. b) Hg | 11. b) petroleum |
| 6. a) Solute | 12. a) folder |

PART - II

13. **Newton's second law:**
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.
14. **Causes of 'Myopia':**
Myopia also known as short sightedness, occurs due to the lengthening of eye ball with this defect, nearly objects can be seen clearly but distance objects cannot be seen clearly.
15. The minimum distance needed for an echo is 17.2 m .

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16. **The rate of a reaction increase while raising the temperature :**

On increasing temperature heat is supplied to the reactant. This energy breaks more bonds and thus speed up the chemical reaction. Foods kept at room temperature spoils faster than that kept in the refrigerator.

17. **Soaps and Detergents**

No.	Soaps	Detergents
1.	It is sodium salt of long chain fatty acids.	It is sodium salts of sulphonic acids.
2.	Soaps are biodegradable.	Most of the detergents are non-biodegradable.
3.	It has poor foaming capacity.	It has rich foaming capacity.
4.	It forms a sum in hard water.	Does not form a scum in hard water.

18. **The dental formula of rabbit:**

is $I \frac{2}{1}, C \frac{0}{0}, PM \frac{3}{2}, M \frac{3}{3}$ in Rabbit, which is written as $\frac{2033}{1023}$.

19. **Bolting:**

- ★ 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. **The parts of A, B, C & D is:**

A - Exine; B - Intine; C - Generative cell; D - Vegetative nucleus.

21. **Determine the age of fossils:**

The age of fossils is determined by radinactive 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 C^{14} occurs continuously. The time passed since death of a plant or animal can be calculated by measuring the amount of C^{14} present in their body.

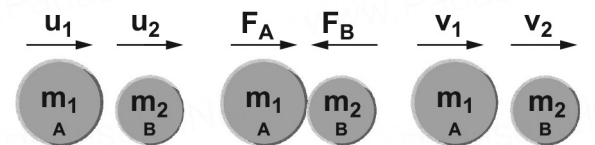
22. **Solution:**

Charge $Q = 12 \text{ C}$, Time = 5s

$$\text{Current } I = \frac{Q}{t} = \frac{10}{5} = 2 \text{ A}$$

PART - III23. **The law of conservation of linear momentum:**

There is no change in the linear momentum of a system of bodies as long as no net external force acts on them. Let us prove the law of conservation of linear momentum with the following illustration:



Let two bodies A and B having masses m_1 and m_2 move with initial velocity u_1 and u_2 in a straight line. Let the velocity of the first body be higher than that of the second body.

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i.e. $u_1 > u_2$. During an interval of time 't' second they tend to have a collision. After the impact both of them move along the same straight line with a velocity v_1 and v_2 respectively.

$$\text{Force on body B due to A} \Rightarrow F_B = m_2 \frac{(v_2 - u_2)}{t}$$

$$\text{Force on body A due to B} \Rightarrow F_A = m_1 \frac{(v_1 - u_1)}{t}$$

By Newton's m law of motion

Action force = Reaction force

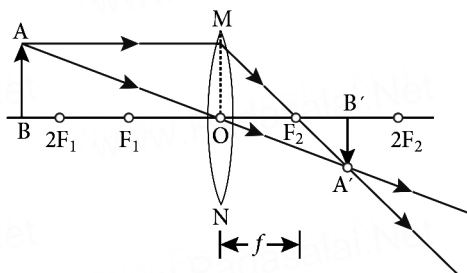
$$F_A = -F_B$$

$$m_1 \frac{(v_1 - u_1)}{t} = m_2 \frac{(v_2 - u_2)}{t}$$

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

This equation confirms in the absence of an external force, the algebraic sum of the momentum after collision is numerically equal to algebraic sum of the momentum before collision. Hence the law of conservation linear momentum is proved.

24. i) **A ray diagram to show the image formed by a convex lens when the object is placed between F and 2F:**



- ii) **One calorie:**

One calorie is defined as the amount of heat energy required to rise the temperature of 1 gram of water through 1°C .

25. i) **Solution:**

Current $I = 5\text{A}$; Time $t = 1$ second; Charge of electrons $e = 1.6 \times 10^{-19} \text{C}$

$$I = \frac{q}{t} = \frac{ne}{t}; \quad n = \frac{It}{e} = \frac{5 \times 1}{1.6 \times 10^{-19}}$$

$$n = 3.125 \times 10^{19}$$

- ii) **Two cases of Doppler effect in sound:**

- ★ When source (S) and listener (L) both are at rest.
- ★ When S and L move in which a way that distance between them remains constant.
- ★ When S and L are moving in mutually perpendicular directions.
- ★ If the source is situated at the center of the circle along which the listener is moving.

26. **The relationship between Relative Molecular Mass and Vapour density:**

- ★ The Relative Molecular Mass of a gas or vapour is the ratio between the mass of one molecule of the gas or vapour to mass of one atom of hydrogen.

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- ★ Vapour density is the ratio of the mass of a certain volume of a gas or vapour to the mass of an equal volume of hydrogen measured under the same conditions of temperature and pressure.

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

- ★ According to Avogadro's law equal volumes of all gases contain equal number of molecules. Thus let the number of molecules in one volume = n. Then,

$$\text{V. D at STP} = \frac{\text{Mass of 'n' molecules of a gas on vapour at STP}}{\text{Mass of 'n' molecules of hydrogen}}$$

- ★ Cancelling 'n' which is common, you get

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

- ★ Since hydrogen is diatomic

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

- ★ By comparing the definition of relative molecular mass and vapour density we can write as follows:

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

- ★ Relative molecular mass (hydrogen scale)

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

- ★ By substituting the relative molecular mass value in vapour density definition,

$$\text{we get vapour density V. D} = \frac{\text{Relative molecular mass}}{2}$$

$$2 \times \text{vapour density} = \text{Relative molecular mass of a gas.}$$

27. Corrosion of metals is prevented:

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

29. a) **Answer the questions:**

i) Tall ii) 1 : 2 : 3 iii) Dwarf plants

b) **The sino-atrial node:**

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

30. i) **Differentiate: Monocot root and Dicot root.**

No.	Monocot root	Dicot root
1.	The xylem is tetrarch.	The xylem is polyarch.
2.	The conjunctive tissue is made up of paranchyma cells.	The conjunctive tissue is made up of sclerenchyma cells.
3.	Young root contains path but in old root pith is absent.	Pith cells are made of parenchyma cells with intercellular spaces and contains abundant of starch grains.
4.	Cambium is present during secondary growth.	Cambium is absent.
5.	Secondary growth is present.	Secondary growth is absent.

ii) **Differentiate: Aerobic and Anaerobic respiration.**

No.	Aerobic respiration	Anaerobic respiration
1.	Occur in the presence of oxygen.	Occurs, when oxygen is absent.
2.	Carbon dioxide, water and ATP are produced.	Latic acid, ethanol and ATP are produced.
3.	In consists of 3 steps: ★ Glycolysis ★ Kreb's cycle ★ Electron transport chain.	In consists of 2 steps: ★ Glycolysis ★ Fermentation (ethyl alcohol or lactic acid are produced)

31. i) **Precautions and preventing heart disease:**

- ★ **Diet Management Reduction** in the intake of calories, low saturated fat and cholesterol rich food, low carbohydrates and common salt are some of the dietary modifications. Diet rich in polyunsaturated fatty acids is essential. Increase in the intake of fibre diet, fruits and vegetables, protein, minerals and vitamins are needed.
- ★ **Physical activity** regular exercise, walking and yoga are essential for body weight maintenance.

ii) **Two maize hybrids rich in amino acid lysine:**

Protina, Shakti and Rathna are lysine rich maize hybrids. Which are developed in India.

32. i) **Nuclear fission and Nuclear fusion**

No.	Nuclear fission	Nuclear fusion
1.	The process of breaking up (splitting) of a heavy nucleus into two smaller nuclei is called 'nuclear fission'.	Nuclear fusion is the combination of two lighter nuclei to form a heavier nucleus.

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2.	It can be performed at room temperature.	Extremely high temperature and pressure is needed.
3.	α , β and γ radiations are emitted.	α rays, positrons and are emitted.
4.	Fission leads to emission of gamma radiation. This triggers the mutation in the human gene and causes genetic transform diseases.	Only light and heat energy is emitted.

ii) **The pH of 0.01 M HNO₃:**

$$[H^+] = 0.01$$

$$pH = -\log_{10}[H^+]$$

$$pH = -\log_{10}[0.01]$$

$$pH = -\log_{10}[1 \times 10^{-2}]$$

$$pH = -[\log 10^{-2} \log 10^{10}]$$

$$= 0 + 2 \times \log 10^{10}$$

$$= 0 + 2 \times 1 = 2$$

$$pH = 2$$

PART - IV

33. a) i) **Boyle's law:**

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

$$p \propto \frac{1}{v}$$

ii) **The experiment of measuring the real and apparent expansion of a liquid:**

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

Now heat the container and the liquid using a burner as shown in the figure initially the container receives the thermal energy and its expands.

As a result the volume of the liquid appears to have reduced. Mark this reduced level of liquid as L_2 .

On further heating the thermal energy supplied to the liquid through the container results in the expansion of the liquid. Hence the level of liquid raises to L_3 . Now the difference between the levels L_1 and L_3 is called as apparent expansion and the difference between the levels L_2 and L_3 is called real expansion. The real expansion is always more than that of apparent expansion.

Real expansion = $L_3 - L_2$; Apparent expansion = $L_3 - L_1$

(OR)

b) i) **Solution:**

$$n' = \left(\frac{v}{v - V_s} \right) n$$

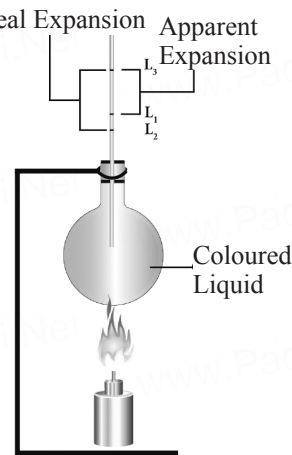
$$n = \left(\frac{1000 \times 280}{330} \right)$$

$$n = 848.48 \text{ Hz}$$

$$1000 = \left(\frac{330}{330 - 50} \right) n$$

The actual frequency of the sound is 848.48 Hz. When the source is moving

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away from the stationary listener the expression for apparent frequency is

$$n' = \left(\frac{v}{v - V_s} \right) n$$

ii) **Solution:**

Linear momentum = mass \times velocity

Velocity (V) = linear momentum / mass

$$= \frac{2}{5}$$

$$= 0.4 \text{ ms}^{-1}$$

$$= \left(\frac{330}{330 + 50} \right) \times 848.48$$

$$n = 736.84 \text{ Hz}$$

34. a) i) **1.51×10^{23} molecule of water:**

Molecular mass of H_2O = 18 g

$$\text{Number of moles} = \frac{\text{Number of molecules of water}}{\text{Avogadro's number}} = \frac{1.51 \times 10^{23}}{6.023 \times 10^{23}} = \frac{1}{4}$$

$$\text{Number of moles} = \frac{\text{Mass}}{\text{Molecular mass}} \Rightarrow 0.25 = \frac{\text{Mass}}{18}$$

$$\text{Mass} = 0.25 \times 18 = 4.5 \text{ g}$$

ii) **The moles of 46 g sodium:**

$$\text{Number of moles} = \frac{\text{Mass}}{\text{Atomic mass}} = \frac{46}{23} = 2 \text{ moles}$$

iii) **The number of molecules present in the 36 g water:**

$$\text{Number of molecules} = \frac{\text{Avogadro number} \times \text{mass}}{\text{Molecular mass}} = \frac{6.023 \times 10^{23} \times 36}{18}$$

$$= 12.406 \times 10^{23} \text{ molecules}$$

(OR)

b) **Various factors affecting solubility:**

There are three main factors.

1. Nature of the solute and solvent.

The nature of the solute and solvent plays an important role in solubility. Although water dissolves an enormous variety of substances both ionic and incovalent it does not dissolve everything.

e.g: common salt is a polar compound and dissolves readily in polar solvent like water.

2. Effect of temperature solubility of solids in liquid:

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

e.g.: A great amount of sugar will dissolve in warm water than in cold water.

Solubility of gases in liquid:

Solubility of gases in liquid decrease with increase in temperature. Generally water contains dissolved oxygen.

3. Effect of pressure:

Effect of pressure is observed only in the case of solubility of a gas in a liquid. When the pressure is increased the solubility of a gas in liquid increases.

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e.g: Solubility of gases in liquids are carbonated beverages. i.e soft drink.

35. a) i) Thyroid hormones referred as personality hormones because they are essential for normal physical, mental and personality development.

ii) **Triple fusion:**

The fusion involving two polar nucleus and sperm nucleus, that occurs in double fertilization in a seed plant and results in the formation of endosperms is called the triple fusion.

iii) **The importance of forest:**

- ★ Forests are the important component of our environment.
- ★ Forests provide a vast habitat for wild animals.
- ★ Forests help for the economic development of our country.
- ★ The natural hazards like food and landslides are prevented.
- ★ Forests maintain the ecological balance.
- ★ It acts as a catchment for water conservation.
- ★ Forests provides wood, food, fodder, fibre and medicine.

(OR)

b) i) **Parasitic adaptations of leech:**

- ★ Blood is sucked by pharynx.
- ★ Anterior and posterior suckers are provided by which the animal attaches itself to the body of the host.
- ★ The three jaws inside the mouth causes a painless Y-shaped wound in the skin of the host.
- ★ The salivary glands producer, flirudin which does not allow the blood to coagulate. So the continuous supply of blood is maintained.
- ★ Parapodia and Setae are absent.

ii) **Natural selection is a driving force for evolution:**

Darwin published his observations under the name "ORIGIN OF SPECIES". It elaborates on the theory of natural selection for evolutionary transformation.

1. Overproduction:

Living beings have the ability to reproduce and have the capacity to multiply in a geometrical manner.

2. Struggle for existence:

Due to overproduction a geometric ratio of increase in population occurs. The space to live and food available for the organisms remain the same. The competition among the organisms for food and space, leading to struggle.

3. Variations:

Small variations are important for evaluation. According to Darwin favourable variations are useful to the organisms and unfavourable variations are harmful on useless to the organisms.

Origin of species:

According to Darwin new species originates by the gradual accumulation of favourable variations for a number of generations.

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PTA - MODEL QUESTION PAPER - 1

CLASS: X

SCIENCE

Question
Paper

2

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- Impulse is the**
a) rate of change of momentum b) rate of change of force and time
c) change of momentum d) rate of change of mass
- If a substance is heated or cooled, then the mass of that substance**
a) increases b) decreases
c) remains same d) either increases or decreases
- Arrange the following media in descending order on the basis of speed of sound**
a) air>glass>water b) water>air>glass c) glass<water<air d) glass>water>air
- Which of the following is a triatomic molecule?**
a) Glucose b) Helium c) Carbon dioxide d) Hydrogen
- In modern periodic table of elements _____ group contains the elements of halogen family.**
a) 17th b) 15th c) 18th d) 16th
- While doing a science practical experiment, a student left a bottle opened after usage which contained solid sodium hydroxide. When the student visited the laboratory again after few days and found only liquid sodium hydroxide in the bottle. This is due to _____ property of sodium hydroxide.**
a) hygroscopic b) deliquescence c) dehydration d) dissociation
- According to the dental formula _____ kind of teeth is absent in rabbit.**
a) molar b) pre-molar c) incisor d) canine
- The part of human brain which acts as relay centre is**
a) pons b) thalamus c) cerebrum d) cerebellum
- The type of cell division occurs in generative cell of mature pollen grain**
a) mitosis b) meiosis c) amitosis d) both b and c
- The best way of direct dating of fossils of recent origin is _____.**
a) radio-carbon method b) uranium-lead method
c) potassium-argon method d) both b and c
- Word 'No Tobacco Day' is observed on _____.**
a) May 31 b) June 6 c) April 22 d) October 2
- Which of the following is used to build scripts?**
a) script area b) block palette c) stage d) sprite

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PART - II**Note: Answer any 7 questions. Question No. 22 is compulsory.****7×2=14**

13. Why does the sky appear blue in colour?
14. Write any two features of natural and artificial radio activity?
15. Distinguish between reversible and irreversible chemical reactions.
16. Classify the following compounds based on the pattern of carbon chain and give their structural formula. (i) Propane (ii) Benzene
17. What is vascular bundle?
18. Why is circulation in man referred to as 'Double Circulation'?
19. Identify the disorder with which the person shown in the figure is suffering.



20. Why is Euploidy considered to be advantageous to both plants and animals?
21. What are the advantages of using biogas?
22. A lift is moving downwards with an acceleration of 1.8 ms^{-2} . What is apparent weight realised by a man of mass 50 kg?

PART - III**Note: Answer any 7 questions. Question No. 32 is compulsory.****7×4=28**

23. Match the following.

Column I		Column II	
a.	Newton's I law	i.	Propulsion of a rocket
b.	Newton's II law	ii.	Stable equilibrium of a body
c.	Newton's III law	iii.	Law of force
d.	Law of conservation of linear momentum	iv.	Flying nature of bird

24. i) Define: Co-efficient of linear expansion.
ii) The length of an aluminium rod at the temperature 303 K is 50 m. What would be its increase in length when it is heated to 323K? (The linear co-efficient of aluminium is $23 \times 10^{-6} \text{ K}^{-1}$)
25. i) State two necessary conditions for hearing an echo.
ii) What are the two medical applications of echo?
26. i) Calculate the percentage of nitrogen atom in ammonia molecule.
ii) A is a silvery white metal. A reacts with O_2 at 800°C to form compound B. The alloy of A is used in making aircraft parts. Identify A and B.
27. i) Give an example for each kind of solution given.
a) gas in liquid b) solid in liquid.
ii) Calculate the pH value of 1.0×10^{-4} molar solution of HNO_3 .
28. i) Distinguish between somatic gene therapy and germ line gene therapy.
ii) What are the various routes by which transmission of human immuno-deficiency virus takes place?
29. List out the functions of brain.

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30. i) How does leech respire?
 ii) Why is vegetative propagation practiced for growing some types of plants?
31. How does fossilization occur in plants?
32. i) From the following clues identify the group number in the periodic table and write the names of any two elements of that group.
 a. The atoms of this group have very stable electronic configuration.
 b. These elements are mostly unreactive.
 ii) Why ethene is more reactive than ethane?

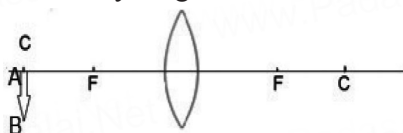
PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. a) i) An Object AB is placed at the centre of curvature C of the convex lens as shown in the picture. Complete the ray diagram.



- ii) A Student in a class room can read text book but he/she can't able to see the letters on the black board distinctly. Write the name of his/her eye defect and what is the cause? Suggest a remedy.
- iii) ${}_{92}\text{U}^{235}$ experiences one α decay. Find the number of neutrons in the final daughter nucleus that is formed. **(OR)**
- b) i) What is meant by electric current?
 ii) Define the unit of electric current.
 iii) Which instrument is used to measure the electric current? How should it be connected in a circuit?
 iv) List any two merits of LED bulb.
34. a) i) The electronic configuration of metal A is 2, 8, 18, 1. Metal A when exposed to air and moisture forms a green coloured compound B. A reacts with con. H_2SO_4 to forms compounds C and D along with water. D is a gaseous compound. Identify A, B, C and D.
 ii) The molecular formula of an alcohol is $\text{C}_4\text{H}_{10}\text{O}$. The locant number of its $-\text{OH}$ group is 2.
 a) Draw its structural formula.
 b) Write its IUPAC name.
 c) Write whether it is a saturated compound or an unsaturated compound? **(OR)**
- b) i) Analyse the following statement about the formation of solutions and explain with example. "Like solvents dissolve Like solutes"
 ii) Classify the following chemical reactions based on rearrangement of atoms and justify your answer.
- $$2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2 \qquad 2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$$
- $$\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu} \qquad \text{Na}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$$

35. a) i) Define respiratory quotient.
 ii) What is cohesion?
 iii) What are the effects of hybrid vigour in animals?
- b) i) What is 3R approach?
- ii) a. In DNA replication, the enzyme that separates the two strands of DNA is _____.
 b. Enzyme that removes the twists formed during the unwinding process of DNA is _____.
 c. Nucleotides are added with the help of an enzyme called _____.
 d. The DNA fragments are joined together by the enzyme _____.
 e. The replication stops when the replication fork of the two sides meet at the site called _____.

ANSWERS**PTA Model Question Paper - 1****Question Paper****2****PART - I**

- | | |
|---------------------------|----------------------------|
| 1. c) change of momentum | 7. d) canine |
| 2. c) remains same | 8. b) thalamus |
| 3. d) glass > water > air | 9. a) mitosis |
| 4. c) Carbon dioxide | 10. a) radio-carbon method |
| 5. a) 17 th | 11. a) May 31 |
| 6. b) deliquescence | 12. a) script area |

PART - II

13. **The sky appears blue in colour**, because

When sun light passes through the atmosphere, the blue colour (shorter wavelength) is scattered to a greater extent than the red colour (longer wavelength). This scattering causes the sky to appear in blue colour.

14. **Features of natural and artificial radio activity:**

No.	Natural Radio Activity	Artificial Radio Activity
1.	It cannot be controlled.	It can be controlled.
2.	It is a spontaneous process.	It is an induced process.
3.	α , β and γ radiations are emitted.	Mostly elementary particles such as neutron, positron etc. are emitted.
4.	Exhibited by elements with atomic number more than 83.	Exhibited by elements with atomic number less than 83.

15. **Reversible Reactions - Irreversible Reactions**

No.	Reversible Reactions	Irreversible Reactions
1.	It can be reversed under suitable conditions.	It cannot be reversed.
2.	It attains equilibrium. It is relatively slow.	Equilibrium is not attained. It is fast.

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PTA - MODEL QUESTION PAPER - 2

CLASS: X

SCIENCE

Question
Paper

3

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

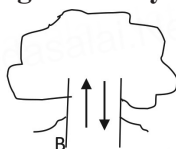
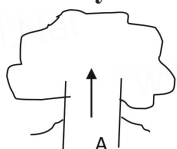
12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- The eye defect 'presbyopia' can be corrected by
a) convex lens b) concave lens c) convex mirror d) Bi focal lens
- The effective resistance of three resistors of resistances $5\ \Omega$, $3\ \Omega$, and $2\ \Omega$ are connected in series is _____.
a) $1.03\ \Omega$ b) $10\ \Omega$ c) $0.97\ \Omega$ d) $2.5\ \Omega$
- In Beta decay _____.
a) number of neutron decreases by one b) atomic number decreases by one
c) number of proton increases by one d) number of neutron increases by one
- Volume percentage of solutions decreases with the increase in temperature due to
a) thermal expansion of liquids b) cooling effect of liquids
c) increase in concentration of solution d) decrease in concentration of solution
- Choose the correct option that shows a perfect match in the following table.

A	Heterocyclic compound	I	Benzene
B	Unsaturated compound	II	Potassium stearate
C	Soap	III	Furan
D	Carbocyclic compound	IV	Ethene

- A-I, B-II, C-III, D-IV b) A-III, B-IV, C-II, D-I
c) A-II, B-I, C-IV, D-III d) A-IV, B-II, C-III, D-I
- In a combustion reaction,
a) oxygen gas is released b) nitrogen gas is released
c) oxygen gas is utilised d) nitrogen gas is utilised
 - Identify the conducting tissues by using the arrow marks
a) A is phloem, B is xylem
b) A is xylem, B is phloem
c) Both A and B are xylem
d) Both A and B are phloem



8. Which of the following is referred to as "Master Gland".

- Pineal gland b) Pituitary gland c) Thyroid gland d) Adrenal gland

9. The formation of nucleolus in the nucleus is by

- secondary constriction b) primary constriction
c) telomere d) locus

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- ## PART - II

$$7 \times 2 = 14$$

- ## PART - III

$$7 \times 4 = 28$$

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24. i) Match the following components and symbols.

a.	Ammeter	i.	
b.	Diode	ii.	
c.	Galvanometer	iii.	
d.	Resistor	iv.	

25. i) Calculate the percentage of oxygen in $\text{Al}_2(\text{SO}_4)_3$ compound.
(Mass number values are: Al - 27, O - 16, S - 32)
- ii) Write the IUPAC name of the simplest ketone and give its molecular formula.
26. i) 3.5 litres of ethanol is present in 15 litres of aqueous solution of ethanol. Calculate volume percent of ethanol.
- ii) Identify and write the type of following chemical reactions.
- a) $\text{NH}_4\text{OH}_{(\text{aq})} + \text{CH}_3\text{COOH}_{(\text{aq})} \rightarrow \text{CH}_3\text{COOH}_{4(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$
- b) $\text{ZnCO}_{3(\text{s})} \xrightarrow{\text{heat}} \text{ZnO}_{(\text{s})} + \text{CO}_{2(\text{g})}$
27. i) Electronegativity value of hydrogen is 2.1 and that of sodium is 1. Find out the nature of bonding present in the compound, when hydrogen combines with fluorine and hydrogen combines with sodium. (Electronegativity value of fluorine is 4).
- ii) Applying IUPAC rules, derive the structural formula of the following compounds.
- a) Pentanoic acid b) 2-methyl-butan-2-ol
28. What is the importance of valves in the heart?
29. i) What are the hormones secreted by posterior lobe of the pituitary gland? Mention the tissues on which they exert their effect.
- ii) What are allosomes?
30. i) Name the types of stem cells.
- ii) What are the agents of soil erosion?
31. i) Differentiate the systematic circulation and pulmonary circulation.
- ii) Minerals in the plants are not lost during the falling of leaves. Give reason.
32. i) Draw the ray diagram of image formation in simple microscope
- ii) Find the position and write its nature and size of the image formed by Simple microscope.

PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. a) i) Shock absorbers are used in luxury buses. Why?
- ii) A weight of a man is 686 N on the surface of the earth. Calculate the weight of the same person on moon. ('g' value of a moon is 1.625 ms^{-2})
- iii) Name the law of motion used in flying of birds. Give another example for the same law.
- (OR)**
- b) i) A source producing a sound of frequency 500 Hz, is moving towards a static listener with a velocity of 30 ms^{-1} . The speed of the sound is 330 ms^{-1} . What will be the frequency heard by listener?

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- ii) Write any four medical applications of radioactivity.
34. a) i) Calculate the mass percentage of each element present in calcium carbonate molecule. (Mass number C - 12, O - 16, Ca - 40)
- ii) In what way hygroscopic substances differ from deliquescent substances? Write three differentiating points. (OR)
- b) i) Fill the blanks in the table using IUPAC nomenclature of organic compounds.

Name of the compound	Structural formula	Functional group present
_____	$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ \\ \text{OH} \end{array}$	-OH
Ethanal	$\begin{array}{c} \text{CH}_3 - \text{C} - \text{H} \\ \\ \text{O} \end{array}$	_____
Butanone	_____	>C=O
_____	CH ₃ -CH ₂ -CH ₂ -COOH	-COOH

- ii) A is the second most abundant metal available next to aluminium on the earth. A forms its magnetic oxide B, when steam is passed over metal A in red hot condition. A forms an alloy C with carbon and nickel. C is used to make aircraft parts and propeller. Identify and write names of B and C. Write the balanced chemical equation for the formation of magnetic oxide.
35. a) i) Match the following.

Organs	Membranous Covering	Location
Brain	pleura	abdominal cavity
Kidney	capsule	mediastinum
Heart	meninges	enclosed in thoracic cavity
Lungs	pericardium	cranial cavity

- ii) How is Corpus luteum formed? Name the hormones secreted by corpus luteum.
- iii) Write the importance of fertilization in plants. (OR)
- b) i) Arun was playing in the garden. Suddenly he saw a dragon fly sitting on a plant. He observed the wings of it. He thought it looked similar to the wing of a crow. Is he correct? Give reason for your answer.
- ii) Although coal and petroleum are produced by degradation of biomass, yet we need to conserve them. Why?

ANSWERS**PTA Model Question Paper - 2****Question Paper 3****PART - I**

- | | |
|---|----------------------------------|
| 1. d) Bi focal lens | 6. c) oxygen gas is utilised |
| 2. b) 10 Ω | 7. b) A is xylem, B is phloem |
| 3. c) number of proton increases by one | 8. b) Pituitary gland |
| 4. a) thermal expansion of liquids | 9. a) secondary constriction |
| 5. b) A-III, B-IV, C-II, D-I | 10. b) Restriction endonucleases |
| | 11. a) hydropower |
| | 12. b) script editor |

PART - II

13. a) Both the assertion and the reason are true and the reason is the correct explanation of the assertion.

14. Two 5 Ω resistors are connected in series which is parallel to 10 Ω resistor.

$$R_s = 5 + 5 = 10 \Omega$$

$$R_p = \frac{1}{\frac{1}{10} + \frac{1}{10}} = \frac{2}{\frac{2}{10}} = \frac{1}{\frac{1}{5}} = 5 \Omega$$

15. ★ In an empty vessel the vibration of air molecules will be more due to multiple reflection.
 ★ Vibration of air is greater than liquids.
 ★ An empty vessel will be in a condition of allowing more amplified vibration because of the more free space available in the vessel.
 ★ Hence an empty vessel produces more sound than a filled one.
16. i) A and R are correct, R explains A.
17. ★ The leech makes a triradiate or Y shaped incision in the skin of the host by the jaws protruded through its mouth.
 ★ The blood is sucked by muscular pharynx and the salivary secretion hirudin is poured.
18. The hind brain is formed of 3 parts. 1. cerebellum 2. Pons 3. Medulla oblongata
19. ★ The first fluid which is released from the mammary gland after child birth is called as colostrum.
 ★ Milk production from alveoli of mammary glands is stimulated by prolactin secreted from the anterior pituitary.
 ★ The ejection of milk is stimulated by posterior pituitary hormone oxytocin.

20. Ethnobotany:

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

Importances:

- ★ It provides traditional uses of plant.
- ★ It gives information about certain unknown and known useful plants.

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35. a) i) Match.

Organs	Membranous Covering	Location
Brain	meninges	cranial cavity
Kidney	capsule	abdominal cavity
Heart	pericardium	enclosed in thoracic cavity
Lungs	pleura	mediastinum

ii) Estrogen is formed produced by the graafian follicles of the ovary and progesterone from the corpus luteum that is formed in the ovary from the recaptured follicle during ovulation.

iii) **Importance of fertilization in plants:**

- ★ It stimulates the ovary do develop in fruit.
- ★ It helps in development of new characters from two different individuals. (OR)

b) i) No, He is not correct both crow and dragonfly have the same function of flying with wings. But it's origin (basic structure) is different dragonfly wings is the membranous extension. But wings of the crow is the modification of forelimb.

- ii) ★ The coal and petroleum reserves can get exhausted, if we use them at rapid rate.
- ★ The formation of the fossil fuel is very slow process and takes very long time for renewal.
- ★ It is necessary to conserve the resource, for the future generation by reducing their consumption.

PTA - MODEL QUESTION PAPER - 3

CLASS: X

SCIENCE

Question
Paper

4

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- A small bulb is placed at the principal focus of a convex lens. When the bulb is switched on, the lens will produce
 - a convergent beam of light
 - a divergent beam of light
 - a parallel beam of light
 - a coloured beam of light
- Nichrome is used as heating element in electric heater, because it has _____.
 - high resistivity
 - high melting point
 - not easily oxidised
 - all the above
- _____ aprons are used to protect us from gamma radiation.
 - Lead oxide
 - Iron
 - Lead
 - Aluminium
- Which of the following is not a type of “element + element → compound” reaction?
 - $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$
 - $2K_{(s)} + Br_{2(l)} \rightarrow 2KBr_{(s)}$
 - $2CO_{(g)} + O_{2(g)} \rightarrow 2CO_{2(g)}$
 - $4Fe_{(s)} + 3O_{2(g)} \rightarrow 2Fe_2O_{3(s)}$
- Biodegradable detergents are made of _____.
 - branched chain hydrocarbons
 - linear chain hydrocarbons
 - both branched and linear chain hydrocarbons
 - cyclic hydrocarbons
- When a sodium atom loses an electron it forms Na^+ ion. The radius of Na^+ ion is lesser than Na atom. This is because,
 - The attractive force of nucleus is more in Na^+ ion than Na atom
 - The attractive force of nucleus is more in Na atom than Na^+ ion
 - Number of protons present in Na atom is less than Na^+ ion
 - Number of electrons present in Na^+ ion is more than Na atom.
- Kreb's cycle takes place in
 - chloroplast
 - mitochondrial matrix
 - stomata
 - inner mitochondrial membrane
- Which of the following process requires energy?
 - active transport
 - diffusion
 - osmosis
 - all of them
- Pancreas acts as _____ gland.
 - exocrine
 - endocrine
 - both a and b
 - flying
- Identify Dibybrid ratio _____.
 - 9 : 3 : 3 : 1
 - 9 : 1 : 3 : 1
 - 9 : 1 : 3 : 3
 - 1 : 2 : 1

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11. Select the odd one from the following about diabetes mellitus _____.
a) Prevalence 10% - 20% b) Juvenile onset
c) Under weight d) Obese
12. Which of the following software is used to create animation?
a) Paint b) PDF c) MS Word d) Scratch

PART - II

Note: Answer any 7 questions. Question No. 22 is compulsory. **7×2=14**

13. Understand the assertion statement and the reason given and choose the correct choice.
Assertion: When a person swims he pushes the water using the hands backwards and the water pushes the person in the forward direction.
Reason : For every action there is an equal and opposite reaction.
a) Both the assertion and the reason are true and the reason is the correct explanation of the assertion.
b) Both the assertion and the reason are true but the reason is not the correct explanation of the assertion.
c) Assertion is true but the reason is false.
d) Both the assertion and the reason are false.
14. State Rayleigh's law of scattering.
15. Define: Relative atomic mass.
16. If the pH value of a solution is zero then what will be the nature of the solution? Give reason.
17. What is photosynthesis and where does it occur in a cell?
18. What are the glands embedded in the Rabbit skin to regulate the body temperature?
19. Correct the following statements:
i) Sympathetic nervous system is a part of central nervous system.
ii) All the nerves in the body are covered and protected by meninges.
20. The degenerated wing of a kiwi can be considered as an acquired character. Give the reason.
21. Understand the assertion statement and the reason given and choose the correct choice.
Assertion : Colchicine reduces the chromosome number.
Reason : It promotes the movement of sister chromatids to the opposite poles.
a) Assertion is correct and reason is wrong b) Reason is correct and the assertion is wrong
c) Both assertion and reason is correct d) Both assertion and reason is wrong
22. A piece of wire having a resistance of 5 ohm cut into five equal parts. If the five parts of the wire are connected in parallel, then find the effective resistance of the combination?

PART - III

Note: Answer any 7 questions. Question No. 32 is compulsory. **7×4=28**

23. i) Why the apples weigh more at poles than at equator?
ii) Differentiate convex lens and concave lens.
24. i) Keeping the temperature as constant, if a gas in a container is compressed four times of its initial pressure. The volume of gas changing from 20cc (V1 cc) to V2cc. Find the final volume V2.

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ii) Write one example each for chemical reactions to be faster and chemical reactions to be slower in your daily life activities.

35. a) i) Transpiration is a necessary evil in plants. Explain.

ii) Describe the types of neuron on the basis of their functions.

(OR)

b) i) Write any two physiological effects of ethylene.

ii) How will you prevent soil erosion?

ANSWERS**PTA Model Question Paper - 3****Question Paper****4****PART - I**

- | | |
|---|----------------------------|
| 1. c) a parallel beam of light | 7. b) mitochondrial matrix |
| 2. d) all the above | 8. a) active transport |
| 3. c) Lead | 9. c) both a and b |
| 4. c) $2\text{CO}_{(g)} + \text{O}_{2(g)} \rightarrow 2\text{CO}_{2(g)}$ | 10. a) 9 : 3 : 3 : 1 |
| 5. b) linear chain hydrocarbons | 11. d) Obese |
| 6. a) The attractive force of nucleus is more in Na^+ ion than Na atom | 12. d) Scratch |

PART - II

13. a) Both the assertion and the reason are true and the reason is the correct explanation of the assertion.

14. **Rayleigh's law:**

The law states that 'The amount of scattering of light is inversely proportional to the fourth power of its wavelength.

$$\text{Amount of scattering } S \propto \frac{1}{\lambda^4}$$

15. **Relative atomic mass:**

Relative atomic mass of an element is the ratio between the average mass of its isotopes to $1/12^{\text{th}}$ part of the mass of a carbon - 12 atom. It is denoted as Ar.

$$\text{Ar} = \frac{\text{Average mass of the isotopes of the element}}{1/12^{\text{th}} \text{ of the mass of one carbon 12 atom}}$$

16. pH scale range is 0.14, where 0.7 is acid, 7 is natural and 7.14 is base decreasing pH increase in acidic character.

pH of a solution is zero means,

$$-\log [\text{H}^+] = 0$$

$$[\text{H}^+] = 1$$

The concentration of hydrogen ion is 1. So it's highly acidic solution.

17. **Photosynthesis:**

- ★ Photosynthesis is a process in which the green plants use sunlight and the green pigment chlorophyll, to synthesize, nutrients from carbon dioxide from air and water.
- ★ It occurs in green parts of plant such as leaves, stems and floral buds.

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18. The sweat glands and sebaceous glands embedded in the skin regulate the body temperature.
19. i) False. Sympathetic nervous system is a part of autonomic nervous system.
ii) False. The brain is covered by three connective tissue membrane or meninges.
20. Kiwi had not used its wings for generation and hence it degenerated. This change in character is over to the next generation also.
21. b) both assertion and reason is wrong.
22. Let length of single part be $L = \frac{L}{5}$

$$R' = \frac{IL'}{A} = \frac{IL}{5A} = \frac{R}{5} = \frac{5}{5} = 1 \Omega$$

Effective resistance in parallel connection

$$\frac{1}{R_p} = \frac{1}{R'} + \frac{1}{R'} + \frac{1}{R'} + \frac{1}{R'} + \frac{1}{R'} = \frac{5}{R'} = 5 \Omega$$

$$R_p = \frac{1}{5} = 0.2 \Omega$$

PART - III

23. i) Weight of a body varies from one place to another place on the Earth. Since it depends on the acceleration due to gravity of the Earth (g), weight of a body is more at the poles than at the equatorial region. So the apples weigh more at poles than at equator.

ii) Convex lens and Concave lenses

No.	Convex lens	Concave lenses
1.	The lens which is thicker at the centre at the edges.	The lens which is thinner at the centre than at the edges.
2.	A beam of light passing through it is converged to a point.	A beam of light passing through it is diverged or spread out.
3.	It is called as converging lens.	It is called as diverging lens.

24. i) Initial pressure (P_1) = p; Final pressure (P_2) = 4p; Initial volume (V_1) = 20 cc = 20 cm³
Final volume (V_2) = ?

Using Boyle's law $Pv = \text{constant}$

$$P_1 V_1 = P_2 V_2$$

$$V_2 = \frac{P_1}{P_2} \times V_1 \Rightarrow \frac{P}{4P} \times 20 \text{ cm}^3$$

$$= 5 \text{ cm}^3$$

ii) Fill in the blanks:

- i. Infrasonic ii. Application of Doppler effect

25. i) **Properties of Gamma radiation:**

- ★ They are electromagnetic waves consisting of photons.
- ★ Very less ionization power. They travel with the speed of light.

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ii) Control rods:

Used to control the number of neutrons in order to have sustained chain reaction.

Eg: boron and cadmium rods.

26. i) Dilute or concentrated nitric acid that renders aluminium passive. Because it does not attack aluminium, but it renders aluminium passive due to the formation of an oxide film on its surface.

ii) Characteristics of chemical equilibrium:

- ★ The rate of the forward and backward reaction are equal in a chemical equilibrium.
- ★ The observable properties such as pressure, concentration, color, density, viscosity etc. of the system unchanged with time.
- ★ In physical equilibrium the volume of all phases remain constant.

27. i) A is correct, R is wrong.

ii) Soaps and Detergents

No.	Soaps	Detergents
1.	It is sodium salt of long chain fatty acids.	It is sodium salts of sulphonc acids.
2.	Soaps are biodegradable.	Most of the detergents are non-biodegradable.
3.	It has poor foaming capacity.	It has rich foaming capacity.
4.	It forms a sum in hard water.	Does not form a scum in hard water.

28. Caccum is a thin walled sac present at the function of small intestine and large intestine. It contains bacteria, that helps in digestion of cellulose. So the digestive system of rabbit is suited for herbivorous mode of feeding.

29. i) Myelinate and Non-myelinated nerve fire

No.	Myelinate nerve fire	Non-myelinated nerve fire
1.	The axon is covered with myclin sheath.	The axon is not covered with myclin sheath.
2.	It forms the white matter of our brain.	It forms the grey matter of our brain.
3.	Nods of Ranvier are present.	Nods of Raniver are absent.

ii) F₁ Generation:

	T	t
t	Tt	tt
t	Tt	tt

$$\begin{aligned}\text{Genotypic ratio} &= 2Tt : 2tt \\ &= 2 : 2 = 1 : 1\end{aligned}$$

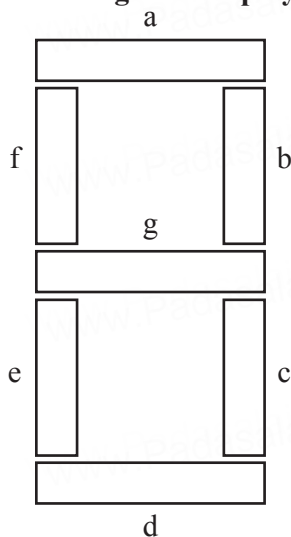
30. The different phases of menstrual cycle. There are four phases are:

★ Menstrual or Destructive phase

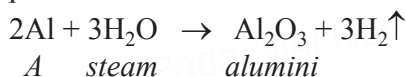
★ Follicular or proliferative phase

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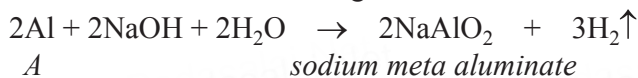
ii) Seven segment display:



34. a) i) Period S and group 13. So Metal A is 'aluminium'.
When steam is passed over red hot aluminium, hydrogen and aluminium oxide is produced.



Aluminium reacts with strong caustic alkalis forming aluminates.



A - aluminium; B - aluminium oxide; C - sodium meta aluminate

- ii) Some detergents having a branched hydrocarbon chain are not fully biodegradable by micro-organisms present in water. So they cause water pollution. They have straight hydrocarbon chains, in biodegradable detergents which can be easily degraded by bacteria.

(OR)

b) i) Mass of NH_3 produced = 1000 kg
= 10^6 g

Molecular mass of NH_3 = $14 + (3 \times 1) = 17$ g

$$\text{No. of moles of } \text{NH}_3 = \frac{\text{Mass of } \text{NH}_3 \text{ produced}}{\text{Molecular mass of } \text{NH}_3} = \frac{10^6}{17}$$

2 moles of NH_3 is produced from 3 moles of H_2

$$\therefore \frac{10^6}{17} \text{ moles of } \text{NH}_3 \text{ is produced from } \frac{10^6}{17} \times \frac{3}{2} \text{ moles of } \text{H}_2$$

$$\begin{aligned} \text{Required mass of } \text{H}_2 &= \text{No. of moles} \times \text{molecular mass} \\ &= \frac{10^6}{17} \times \frac{3}{2} \times (2 \times 1) \end{aligned}$$

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PTA - MODEL QUESTION PAPER - 4

CLASS: X

SCIENCE

Question
Paper

5

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- The coefficient of linear expansion depends on _____.
a) original length b) increasing temperature
c) nature of material d) (a) and (b)
- SI unit of specific resistance is _____.
a) mho b) ohm/metre c) ohm d) ohm metre
- The elements having atomic number is _____ undergo spontaneous radioactivity.
a) more than 83 b) less than 83 c) less than 73 d) equal to 83
- 25 percent (25%) ethanol solution means
a) 25 ml ethanol in 100 ml of water b) 25 ml ethanol in 25 ml of water
c) 25 ml ethanol in 75 ml of water d) 75 ml ethanol in 25 ml of water
- The amount of product formation in a reversible reaction _____ when the periodic removal of the product takes place.
a) increases b) decreases
c) first decreases then increases d) first increases and then decreases
- Analyse the following and choose the correct statement(s).
i) An electron has considerable mass
ii) A hetero atomic molecule is formed from different kinds of atoms.
iii) Mass number and atomic mass of an element are same.
a) i, ii and iii are correct b) i and iii are correct
c) only ii is correct d) only iii is correct
- During photo synthesis at which of the following state, oxygen is produced.
a) when ATP is converted to ADP b) when CO₂ is fixed
c) when H₂O is splitted d) all of these
- Root hairs are
a) cortical cell b) projection of epidermal cell
c) unicellular d) both (b) and (c)
- The organism considered to be the fossil bird is _____.
a) Ginkgo biloba b) Archaeopteryx c) Paleozoic fern d) Indian Gondwana
- In humans, a male and a female gamete fuse and form the zygote. The condition of zygote is _____.

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11. Blood cancer is called _____.
 a) Leukemia b) Sarcoma c) Carcinoma d) Limpoma
12. In computer _____ is used to collect the notes.
 a) Notepad b) Paint c) Scanner d) Scratch

PART - II

Note: Answer any 7 questions. Question No. 22 is compulsory.

7×2=14

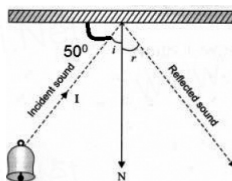
13. Why are traffic signals are used in red colour?
14. State whether the following statement is true or false, justify your answer.
 During the process of transferring heat energy, the body at lower temperature is cooled while the body at higher temperature is heated.
15. A source producing a sound of frequency 90 Hz is approaching a stationary listener with a speed equal to (1/10) of the speed of sound. What will be the frequency heard by the listener?
16. Copper is a reddish brown metal, that reacts with O_2 at less than 1370 K to give A, a black coloured compound. At a temperature greater than 1370 K, copper reacts with O_2 to give B which is a red coloured compound. Write the balanced chemical equations for the formation of A and B.
17. Why is the teeth of rabbit called heterodont?
18. What are the structures involved in the protection of brain?
19. Differentiate phenotype and genotype.
20. Assertion: rDNA is superior over hybridization technique.
 Reason : Desired genes are inserted without introducing the undesirable genes in target organisms.
 a) Assertion is correct and reason is wrong b) Reason is correct and the assertion is wrong
 c) Both assertion and reason is correct d) Both assertion and reason is wrong
21. Write the importance of rainwater harvesting.
22. From the value of ionic product of water at $25^\circ C$, find out the concentration of hydroxylions.
 (At $25^\circ C$ concentration of hydrogen ions in water is $10^{-7} \text{ mol/dm}^{-3}$)

PART - III

Note: Answer any 7 questions. Question No. 32 is compulsory.

7×4=28

23. i) Use the analogy to fill the blanks.
 a) Opening a door : Moment of force ; Opening a water tap : _____.
 b) Pushing a bus by a group of people : Like parallel forces ; Tug of war : _____.
 ii) The power of a lens is $-2D$. Find the focal length of a lens.
24. i) From the given figure, calculate angle of reflection of sound.



- ii) Nuclear fission of a uranium nucleus (U^{235}) as follows
 ${}_{92}U^{235} + {}_0n^1 \longrightarrow X+Y + 3{}_0n^1 + Q \text{ (energy)}$

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25. i) Find the daughter nuclei X and Y emitted from the above reaction.
 a) Atoms of different elements having same number of _____ are called isotones.
 b) The number of atoms present in a molecule is called its _____.
- ii) What is rust? Write the chemical equation for the formation of rust.
26. i) What happens when $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ is heated? Write the appropriate equation.
 ii) Understand the assertion statement and the reason given and choose the correct choice.
 Assertion (A) : Detergents are more effective cleansing agents than soaps in hard water.
 Reason(R) : Calcium and magnesium salts of detergents are water soluble.
 a) A and R are correct, R explains the A. b) A is correct, R is wrong.
 c) A is wrong, R is correct. d) A and R are correct, R doesn't explain A.
27. i) The mass percentage of carbon is 27.28 % and the mass percentage of oxygen is 72.73 %. Calculate the molecular mass of that compound.
 ii) Copper pyrites is the prime ore of copper. It is concentrated by froth flotation method. Give the reason.
28. i) Why are the rings of cartilages found in trachea of rabbit?
 ii) Define reflex arc.
29. What are synthetic auxins? Give examples.
30. i) How can menstrual hygiene be maintained during menstrual days?
 ii) Name three improved characteristics of wheat that helped India to achieve high productivity.
31. i) How is a cancer cell different from a normal cell?
 ii) Why fossil fuels are to be conserved?
32. i) Electric power lines in electrical post, hang very low in hot summer, why?
 ii) An electric heater of resistance 5Ω 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.

PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

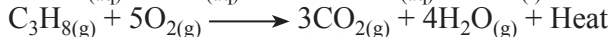
(iii) Draw the diagram wherever necessary.

$3 \times 7 = 21$

33. a) Describe rocket propulsion. **(OR)**
 b) i) With the help of a circuit diagram derive the formula for the resultant resistance of three r resistors in parallel?
 ii) Give the uses of radio isotopes in industries.
34. a) i) How many grams are there in the following substances?
 a) 2 moles of hydrogen molecule b) 3 moles of chlorine molecule
 c) 5 moles of sulphur molecule d) 4 moles of phosphorous molecule
 ii) Find out the following statements whether they are True or False. If false give the correct statement.
 a) In a solution the component which is present in lesser amount is called solvent.
 b) Sodium chloride dissolved in water forms a non-aqueous solution.
 c) When Silica gel is kept open, it absorbs moisture from the air, because it is hygroscopic in nature. **(OR)**
 b) i) a) $\text{CaCO}_{3(s)} + \text{Heat} \longrightarrow \text{CaO}_{(s)} + \text{CO}_{2(g)}$
 $\text{CaCO}_{3(s)} + \text{Heat} \rightleftharpoons \text{CaO}_{(s)} + \text{CO}_{2(g)}$

Analyse the above chemical reactions. At what condition(s) these reactions are feasible?
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b) Which of the following chemical reactions is a neutralization reaction? Reason out.



ii) Read and categorize the following statements that are suitable for ethanol and ethanoic acid.

- 95.5% of this compound's water solution is called rectified spirit.
- Pure form of this compound change into ice like crystals on freezing.
- This compound undergoes decarboxylation on heating with sodalime.

35. a) i) Draw and label the different types of Conjoint vascular bundles.

ii) Give reasons for the following statements.

- The movement of food substances in the phloem can be in all direction.
- Mature RBC in mammals do not have cell organelles.

(OR)

b) i) What are Okazaki fragments?

ii) Octopus, cockroach and frog all have eyes. Can we group these animals together to establish a common evolutionary origin. Justify your answer.

iii) Write any three differences between Type-1 diabetes and Type-2 diabetes.

ANSWERS

PTA Model Question Paper - 4

Question Paper

5

PART - I

- d) (a) and (b)
- d) ohm metre
- a) more than 83
- c) 25 ml ethanol in 75 ml of water
- a) increases
- c) only ii is correct
- c) when H_2O is splitted
- d) both (b) and (c)
- b) Archaeopterix
- b) diploid
- a) Leukemia
- a) Notepad

PART - II

- Traffic signals are used in red colour, because
 - Red light has the highest wavelength.
 - It is scattered by atmosphere particles.
 - So red light is able to travel the longest, distance through fog, rain etc.
- False. Because during the process of transferring heat energy the body at lower temperature is heated while the body at higher temperature is cooled.
- When the source is moving towards the stationary listener the expression for apparent frequency is,

$$n' = \left(\frac{v}{v - v_s} \right) n = \left(\frac{v}{v - \left(\frac{1}{10} \right) v} \right) n = \left(\frac{10}{9} \right) n = \left(\frac{10}{9} \right) \times 90$$

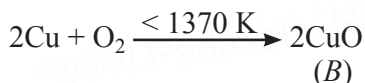
$$= 100 \text{ Hz.}$$

16. A - Raddish brown metal.

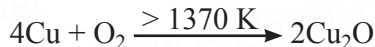
When copper is heated at $< 1370 \text{ K}$ in the presence of oxygen. Copper forms black colour.

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copper II oxide (B), (CuO)



When copper is heated at $> 1370 \text{ K}$ in the presence of oxygen, copper forms red colour copper I oxide (Cu_2O)



A - copper (Cu); B - copper II oxide (CuO); C - copper I oxide (Cu_2O)

17. In rabbit the teeth are of different types. Hence the dentition is called heterodont.
18. Brain is covered by 3 connective tissue membranes called meninges. They are:
1. Outer duramater 2. Middle arachnoid membrane 3. Inner piamater
19. **Phenotype - Genotype:**

No.	Phenotype	Genotype
1.	The characters of an organism which are visible are known as phenotype.	The hereditary information of the organism in the form of gene in the DNA and remains the same throughout the life.
2.	It can be determined by observing the organism.	It can be determined by scientific methods.
3.	Eg: weight, physique, beak of birds.	Eg: blood group, eye colour, height, genetic diseases.

20. c) Both assertion and reason is correct.

21. **Importance of rainwater harvesting:**

- ★ Overcome the rapid depletion of ground water levels.
- ★ To meet the increased demand of water.
- ★ Reduces flood and soil erosion.
- ★ Water stored in ground is not contaminated by human and animal wastes and hence can be used for drinking purpose.

22. $K_w = [\text{H}^+][\text{OH}^-]$

ionic product of water, $K_w = 1.00 \times 10^{-14}$

concentration of hydrogen ions in water $= 1.00 \times 10^{-7}$

concentration of hydroxyl ions in water = ?

$$1.00 \times 10^{-14} = [1.00 \times 10^{-7}][\text{OH}^-]$$

$$[\text{OH}^-] = \frac{1.00 \times 10^{-14}}{1.00 \times 10^{-7}} = 1.00 \times 10^{-7}$$

concentration of hydroxyl ions in water $= 1.00 \times 10^{-7}$

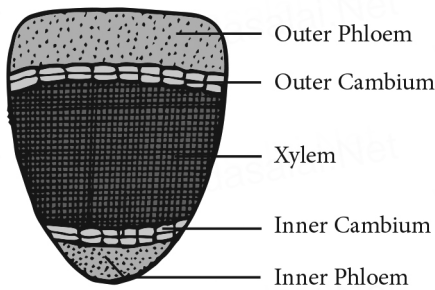
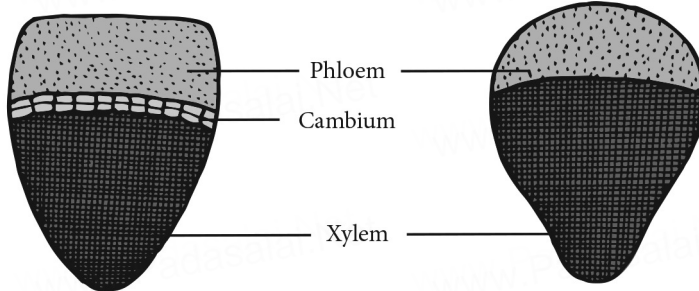
PART - III

23. i) a) Moment of a couple
b) Unlike parallel forces

ii) Power of lens (P) = $\frac{1}{f} = -20$

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35. a) i)

**Conjoint, Bicollateral****Conjoint, collateral and open****Conjoint, collateral and closed**

- ii) a. Phloem transports food when leaves synthesize food it transports food from source to sink. On the basis of plants used (or) season, transfer of food is reversed from sink to source. Therefore the movement of food in phloem can be in all direction.
- b. Mammalian - RBC lack nucleus and makes the cells biconcave and increase surface area for oxygen binding loss of mitochondria allows the RBC to transport all the oxygen to tissues and loss of endoplasmic reticulum allows more flexibility for RBC to move through the narrow capillaries. **(OR)**

b) i) **Okazaki fragments:**

The short segments of DNA are called Okazaki fragments.

- ii) Convergent evolution is the process, by which the independently evolved features may similar to each other but can arise through different developmental pathways. So the octopus, cockroach and frog all have eyes. The independently evolved eye may similar in each other but can arise through different development path ways.

iii) **Type 1 and Type 2 diabetes**

No.	Type 1 diabetes	Type 2 diabetes
1.	People with type 1 diabetes do not produce insulin in pancreas.	People with type 2 diabetes do not respond to insulin.
2.	The immune system destroys insulin producing beta cells in the pancreas.	People with type 2 diabetes are insulins resistant. The body produces insulin but unable to use effectively.
3.	Cannot be controlled with out taking insulin.	Possible to treat initially without medication or treating with tablets.

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PTA - MODEL QUESTION PAPER - 5

CLASS: X

SCIENCE

Question
Paper

6

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

1. F be the force between the two bodies placed at a certain distance. If the distance between them is doubled then the gravitational force F will be _____.
a) 2F b) F/2 c) F/4 d) 4F
2. The scattered light in Raman scattering contains _____ lines.
a) Stoke's b) Anti Stoke's c) Rayleigh's d) all the above
3. Variation in dimensions of any object due to rise in temperature is called as _____.
a) Thermal Expansion b) Thermal variation
c) Thermal convection d) Evaporation
4. If the electronegativity difference between two bonded atoms in a molecule is greater than 1.7 then the nature of bonding is _____.
a) ionic b) covalent c) polar d) co-ordinate covalent
5. Deliquescence is due to
a) Strong affinity to water b) Weak affinity to water
c) Strong hatred to water d) Inertness to water
6. In a chemical equilibrium, the concentrations of reactants and products are _____.
a) remain different b) remain same c) cannot be predicted d) are not equal
7. The blood sucking habit of leech is known as
a) sanguivorous b) herbivorous c) omnivorous d) carnivorous
8. The nervous band connects the two cerebral hemispheres of brain is
a) thalamus b) hypothalamus c) corpus callosum d) pons
9. In metacentric chromosome, the position of centromere is _____.
a) the proximal end b) distal end c) the centre d) near the end
10. DNA fingerprinting is based on the principle of identifying _____ sequences of DNA.
a) single stranded b) mutated c) polymorphic d) reptitive
11. Which of the following is/are fossil fuel?
i. Tar ii. Coal iii. Petroleum
a) i only b) i and ii c) ii and iii d) i, ii and iii
12. More people are using _____ and _____ operating systems in their computers.
a) Mac, Amiga b) Solaris, iOS c) Windows, LINUX d) Android, Minix 3

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PART - II**Note: Answer any 7 questions. Question No. 22 is compulsory.****7×2=14**

13. Understand the assertion statement and the reason given and choose the correct choice.
Assertion : Heat always flows from the body of higher temperature to the body of lower temperature.
Reason : The mass of the body is not altered when it is heated or cooled.
- Both the assertion and the reason are true and the reason is the correct explanation of the assertion.
 - Both the assertion and the reason are true but the reasons is not the correct explanation of the assertion.
 - Assertion is true but the reason is false.
 - Both the assertion and the reason are false.
14. Define the unit of electrical energy consumption?
15. "Aquatic organisms live in large number in cold regions". Write the reason.
16. The hydroxide ion concentration of a solution is 1×10^{-11} M. Find the pH of the solution?
17. What is the common step in aerobic and anaerobic pathway and where is it occur in a cell?
18. Why is the Sino-atrial node called the pacemaker of heart?
19. Name the hormones which regulates water and mineral metabolism in man.
20. Match the following.
- | Column A | Column B |
|---------------------|--|
| a) Atavism | - i) Caudal vertebrae and vermiform appendix |
| b) Vestigial organs | - ii) Radiocarbon dating |
| c) Wood park | - iii) Rudimentary tail and thick hair on the whole body |
| d) W.F. Libby | - iv) Thiruvakkarai |
21. What are the contributing factors for obesity?
22. A strong ultrasonic sound signal is sent from a ship towards the bottom of the sea. It is received by the receiver after 2s. Calculate the depth of sea? The speed of sound in water 1450 ms^{-1} ?

PART - III**Note: Answer any 7 questions. Question No. 32 is compulsory.****7×4=28**

23. i) A force 5 N applied on a body produces and accelerations 5 cm s^{-2} . Calculate the mass of the body.
- ii) An object of height 3 cm is placed at 10cm from a convex lens which produces an image at 20 cm from its optical centre. Calculate the magnification and height of the image produced.
24. Match the following.
- | | |
|-------------------------|-----------------|
| a) Electric Current | - i) volt |
| b) Potential difference | - ii) ohm meter |
| c) Specific resistance | - iii) watt |
| d) Electric Power | - iv) ampere |
25. i) In the nuclear reaction given below, the nucleus X changes to nucleus Y.

$${}_{88}\text{X}^{236} \longrightarrow \text{Y} + {}_2\text{He}^4 + \text{energy}$$
 What are the atomic number and mass number of Y?
- ii) Calculate the amount of energy released when a radioactive substance undergoes fusion and results in a mass defect of 1 kg.

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26. i) Calculate the number of moles in,
 a) 27 g of Aluminium.
 b) 1.51×10^{23} molecules of NH_4Cl
 ii) Understand the assertion and the reasoning statements given below and choose the correct choice.
 Assertion (A) : An uncleaned copper vessel is covered with greenish layer.
 Reason (R) : Copper is not attacked by alkali.
 a) A and R are correct, R explains the A. b) A is correct, R is wrong.
 c) A is wrong, R is correct. d) A and R are correct, R doesn't explain A.
27. An organic compound 'A' is widely used as a preservative and has the molecular formula $\text{C}_2\text{H}_4\text{O}_2$. This compound reacts with ethanol to form a sweet smelling compound 'B'.
 i) Identify the compounds 'A' and 'B'.
 ii) Write the balanced chemical equation for the reaction between compound 'A' and ethanol to form compound 'B'.
 iii) Name the chemical reaction.
28. i) What are the reactants and products for both light and dark reactions.
 ii) Differentiate voluntary actions from involuntary actions.
29. Draw and label the diagram of a typical angiospermic ovule and describe it.
30. i) A pure tall plant (TT) is crossed with pure dwarf plant(tt), what would be the F_1 and F_2 generations? Explain.
 ii) Correct the false statements.
 a) The use and disuse theory of organs was postulated by Charles Darwin.
 b) Birds have evolved from mammals.
31. What are the effects of hybrid vigour in animals.
32. i) What will be the impact of temperature and pressure while dissolving carbon di oxide in water?
 ii) Does pure water conduct electricity? Justify you answer.

PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. i) A body of mass m is initially moving with a velocity u . When a force F acts on the body it picks up velocity v in t second so that the acceleration a is produced. Using this data derive the relation between the force, mass and acceleration.
 ii) Which instrument is used to measure the potential difference? How will you connect it in a circuit? **(OR)**
 b) i) At what speed should a source of sound move away from a stationary observer so that observer finds the apparent frequency equal to half of the original frequency?
 ii) Calculate the frequency of visible light having wavelength 3000 \AA travelling in vacuum
 iii) X-rays should not be taken often. Give the reason.
34. a) i) Write any five salient features of "Modern atomic theory".
 ii) Explain how the nature of reactants and concentration of reactants influence the rate of a chemical reaction. **(OR)**

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- b) i) Calculate the solubility of a solute at 300 K by dissolving 10 g of solute in 50 g of solvent.
 ii) Explain why micelles formation take place with a diagram when soap is added to water?
35. a) i) How does locomotion take place in leech?
 ii) How are arteries and veins structurally different from one another? (OR)
 b) i) How can informational efforts change people's HIV knowledge and behaviour?
 ii) List out the advantages of tidal energy.

ANSWERS**PTA Model Question Paper - 5****Question Paper 6****PART - I**

- | | |
|--------------------------------|-----------------------|
| 1. c) F/4 | 7. a) sanguivorous |
| 2. d) all the above | 8. c) corpus callosum |
| 3. a) Thermal Expansion | 9. c) the centre |
| 4. a) ionic | 10. d) reptitive |
| 5. a) Strong affinity to water | 11. c) ii and iii |
| 6. b) remain same | 12. c) Windows, LINUX |

PART - II

13. b) Both the assertion and the reason are true but the reasons is not the correct explanation of the assertion.
14. **The unit of electrical energy consumption:**
 SI unit of consumption of electrical energy is watt second its longer unit of kilowatt hour (kwh). One kilowatt hour also known as unit of electrical power of 1000 watt has been utilised for an hour.
15. **Reason:**
 Aquatic organisms live more in cold regions because solubility of oxygen is more in cold water (at low temperature). Therefore aquatic organisms are more comfortable in cold water.
16.
$$[H^+][OH^-] = 10^{-14}$$

$$[H^+] \times 1 \times 10^{-11} = 10^{-14}$$

$$[H^+] = 10^{-3}$$

$$pH = -\log [H^+]$$

$$= -\log [10^{-3}]$$

$$= 3$$
17. Glycolysis is the common step in aerobic and anaerobic pathway. Glycolysis takes place in cytoplasm of the cell.
18. Sino-atrial node is called the pacemaker of the heart because it is capable of initiating impulse, which can stimulate the heart muscles to contract.

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19. Antidiurectic or vasopression hormone regulates water and mineral metabolism in man.
20. a - Rudimentary tail and thick hair on the whole body, b - Caudal vertebrae and vermiform appendix, c - i Thiruvakkarai, d - Radiocarbon dating
21. **Obesity** is due to
- ★ Genetic factors
 - ★ Physical inactivity
 - ★ Overacting and
 - ★ Endocrinic factors

22. Speed of sound = $\frac{\text{Distance travelled}}{\text{Time taken}}$

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

$$d = \frac{vt}{2} = \frac{1400 \times 1.6}{2} = 1120 \text{ m}$$

The depth of the sea is 1120 m.

PART - III

23. i) $F = 5\text{N}$; $a = 5 \text{ cms}^{-2} = 0.05 \text{ ms}^{-2}$

$$F = ma \Rightarrow m = \frac{F}{a} = \frac{5}{0.05}$$

$$m = 100 \text{ kg}$$

ii) $h = 3 \text{ cm}$; $n = 10 \text{ cm}$; $v = 20 \text{ cm}$

$$\text{Magnification } m = \frac{v}{u} = \frac{20}{10} = 2$$

$$\text{Magnification } m = \frac{h'}{h}$$

$$h' = 2 \times 3 = 6 \text{ cm}$$

24. a - ampere, b - volt, c - ohm meter, d - watt

25. i) Mass number = $226 - 4 = 222$
Atomic number = $88 - 2 = 86$

ii) Mass defect in the reaction (m) = 1 kg

Velocity of light (c) = $3 \times 10^8 \text{ ms}^{-1}$

By Eistein's equation,

Energy released $E = mc^2$

$$E = 1 \times (3 \times 10^8)^2$$

$$= 9 \times 10^{16} \text{ J (or) } 0.9 \times 10^{17} \text{ J}$$

26. i) a) Number of moles = $\frac{\text{Mass}}{\text{Atomic mass}}$

$$\text{Number of moles in 27 g of Al} = \frac{27}{27}$$

$$= 1 \text{ mole}$$

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PTA - MODEL QUESTION PAPER - 6

CLASS: X

SCIENCE

Question
Paper

7

CLASS: X

SCIENCE

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- The force required to produce an acceleration of 1 cm s^{-2} on a body of mass 1g is
a) 1 N b) 10 c) 10^2 dyne d) 1 dyne
- If the atoms or molecules of a gas do not interact with each other, then the gas is said to be _____.
a) a real gas b) an ideal gas c) a noble gas d) a rare gas
- The frequency, which is audible to the human ear is _____.
a) 50 k Hz b) 20 k Hz c) 15000 k Hz d) 10000 k Hz
- If a molecule is made of similar kind of atoms, then it is called _____.
a) mono atomic molecule b) hetero atomic molecule
c) homo atomic molecule d) poly atomic molecule
- Match the following and choose the correct option given below the table.

A	Galvanisation	i.	Silver-tin amalgam
B	Calcination	ii.	Coating with Zn
C	Redox reaction	iii.	Heating in the absence of air
D	Dental filling	iv.	Alumino thermic process

- a) A-i, B-ii, C-iii, D-iv b) A-i, B-iv, C-iii, D-ii

c) A-ii, B-iii, C-iv, D-i d) A-i, B-iv, C-i, D-iii
- Which of the following shows the right increasing order of reactivity?

a) $\text{CH} \equiv \text{CH} < \text{CH}_4 < \text{CH}_2 = \text{CH}_2$ b) $\text{CH} \equiv \text{CH} < \text{CH}_2 = \text{CH}_2 < \text{CH}_4$

c) $\text{CH}_4 < \text{CH}_2 = \text{CH}_2 < \text{CH} \equiv \text{CH}$ d) $\text{CH}_4 < \text{CH} \equiv \text{CH} < \text{CH}_2 = \text{CH}_2$
- Structure in roots that help to absorb water is _____.

a) root hair b) cuticle c) phloem d) root cap
- In the islets of Langerhans, beta cells secrete _____.

a) Glucagon b) Insulin c) Thymosin d) Oxytocin
- The theory of natural selection for evolution was proposed by _____.

a) Harshberger b) Libby c) Lamarck d) Charles Darwin
- Cancer of the epithelial cells is called _____.

a) Leukemia b) Sarcoma c) Carcinoma d) Lymphoma

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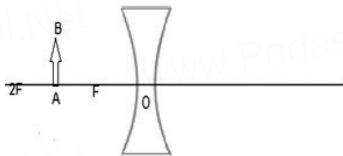
11. The energy obtained from the movement of water due to ocean tides is _____.
 a) Tidal energy b) Wind energy c) Solar energy d) Water energy
12. The application in a computer created any output is generally referred as _____.
 a) command b) folder c) file d) paint

PART - II

Note: Answer any 7 questions. Question No. 22 is compulsory.

7×2=14

13. Complete the ray diagram of a concave lens.



14. A container of capacity 70 ml is filled with a liquid up to 50 ml. When it is heated the liquid level falls to 48.5 ml and then rises to 51.2 ml. Find the apparent and real expansion.
15. Match the following:
- | | | |
|--------------|---|------------------|
| a. Fuel | - | i) lead |
| b. Moderator | - | ii) helium |
| c. Coolant | - | iii) heavy water |
| d. Shield | - | iv) uranium |
16. Calculate the pH value of 1×10^{-5} M KOH solution.
17. How is diastema formed in rabbit?
18. Write the functions of cerebellum.
19. Write the characteristics of insect pollinated flowers.
20. What is meant by transgenic organisms?
21. How are e-wastes generated?
22. i) 'X' is an element that belongs to 1st group of the modern periodic table. 'X' is a gas and its covalent radius value is 0.37 Å. Identify and write the chemical symbol of 'X'.
 ii) A is a metal and belongs to Boron family in modern periodic table acts as a good reducing agent. It reduces iron oxide into iron. It is used to make household utensils. Write the balanced chemical equation for the reduction of iron oxide by 'A'.

PART - III

Note: Answer any 7 questions. Question No. 32 is compulsory.

7×4=28

23. i) Convert 80° F temperature into kelvin scale.
 ii) Write any two advantages of LED TV over the normal TV.
24. i) Why does sound propagate faster on a rainy season than on summer season?
 ii) Use the analogy to fill the blanks:
 a) Nuclear fission : Atom bomb ; Nuclear fusion : _____.
 b) Radio Iodine : Goitre ; Radio Sodium : _____.
25. i) Renu dissolves 50 g of sugar in 250 ml of hot water, Banu dissolves 50 g of same kind of sugar in 250 ml of cold water. Who will get faster dissolution of sugar? Why?
 ii) a) When an aqueous solution of potassium chloride is added to an aqueous solution of silver nitrate, a white precipitate is formed. Give the chemical equation of this reaction.

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- b) Generally the rate of a chemical reaction increases on raising the temperature. Why?
26. i) Give the balanced chemical equation of the following reactions:
 a) Neutralization of NaOH with ethanoic acid.
 b) Oxidation of ethanol by acidified potassium dichromate
 ii) Can nickel spatula be used to stir copper sulphate solution? Justify your answer.
27. Compound A is a colourless having burning taste. When the vapour of compound A is passed over heated copper at 573 K, it is dehydrogenated to acetaldehyde. What is compound 'A'? What is the role of copper in this chemical reaction? Write the balanced chemical equation of this reaction.
28. Draw the structure of a dicot root and label the parts.
29. i) Correct the false statements:
 a) The vas deferens serves to transport the ovum.
 b) The cerebral hemispheres of rabbit are connected by band of never tissue called corpora quadrigemina.
 ii) Who discovered Rh factor? Why it is called as Rh factor?
30. i) How does developing embryo gets its nourishment inside the mother's body?
 ii) Discuss the method of plant breeding for disease resistance.
31. Natural selection is a driving force for evolution - How?
32. i) At what height from the centre of the earth surface, the acceleration due to gravity will be $\frac{1}{4}$ th of its value on the surface of the earth.
 ii) In common What is the value of least distance of distinct vision of a human?

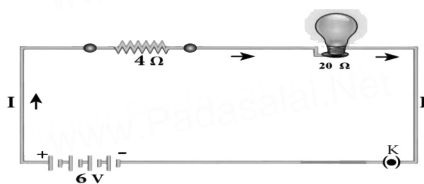
PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. a) i) Differentiate the defects: Myopia and Hypermetropia.
 ii)



An electric lamp of resistance 20 ohm and a resistance of 4 ohm are connected in series to a 6 V battery as shown in the figure.

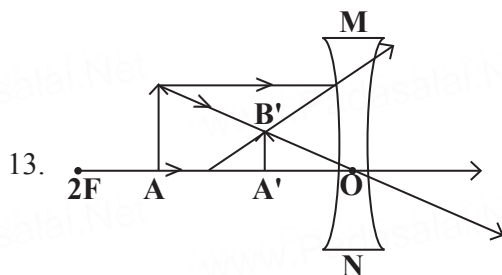
- a) Find the total resistance of the circuit.
 b) Find the current flowing through the circuit.
 c) Find the potential difference across the resistance. **(OR)**
- b) i) What is the co-efficient of cubical expansion.
 ii) Explain why the ceilings of concert halls are curved.
 iii) Differentiate Nuclear fission and Nuclear fusion.
34. a) i) Derive the relationship between Relative molecular mass and vapour density.
 ii) Explain the mechanism of cleansing action of soap. **(OR)**
- b) i) Give reason for the following statements on periodic trends in modern periodic table of elements.

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- a) Along the period, from left to right, the atomic radius value of the elements decrease whereas along the groups, from the top to bottom, the atomic radius values increase.
- b) The electron affinity values increase along the period from left to right and decrease down the group.
- c) The ionization energy value increase along the period from left to right and decrease down the group.
- ii) What is the role of manganese dioxide in the heating reaction of potassium chlorate for the production of oxygen gas?
35. a) i) What is parthenocarpic fruit? Give an example.
- ii) 'A' is a cylindrical structure that begins from the lower end of medulla and extend downwards. It is enclosed in bony cage 'B' and covered by membranes 'C'. As many as 'D' pairs of nerves arise from the structure 'A'
- a) What is A?
- b) Name: bony cage 'B' and membranes 'C'.
- c) How much is D? (OR)
- b) i) Explain the structure of a chromosome.
- ii) Regular physical exercise is advisable for normal functioning of human body. What are the advantages of practising exercise in daily life?

ANSWERS**PTA Model Question Paper - 6****Question Paper****7****PART - I**

- | | |
|--|----------------------|
| 1. d) 1 dyne | 7. a) root hair |
| 2. b) an ideal gas | 8. b) Insulin |
| 3. b) 20 k Hz | 9. d) Charles Darwin |
| 4. c) homo atomic molecule | 10. c) Carcinoma |
| 5. c) A-ii, B-iii, C-iv, D-i | 11. a) Tidal energy |
| 6. c) $\text{CH}_4 < \text{CH}_2 = \text{CH}_2 < \text{CH} \equiv \text{CH}$ | 12. c) file |

PART - II

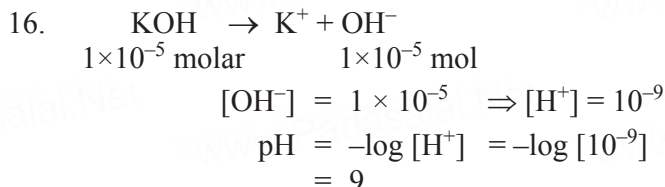
14. Level of the liquid $L_1 = 50$ ml
 Level of the liquid $L_2 = 48.5$ ml
 Level of the liquid $L_3 = 51.2$ ml
 Apparent expansion $= L_3 - L_1$

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 $= 1.2$ ml

$$\begin{aligned}\text{Reel expansion} &= L_3 - L_2 \\ &= 51.2 - 48.5 \\ &= 2.7 \text{ ml}\end{aligned}$$

Real expansion > Apparent expansion

15. a - uranium; b - heavy water; c - helium; d - lead



17. The diastema is formed in Rabbit, as a gap between the incisors and premolars.

18. **The functions of cerebellum:**

Maintenance of posture and balance co ordinate voluntary muscle activity.

19. **The characteristics of insect pollinated flowers:**

Pollination with the help of insects like flies and honey bees are called entomophily. To attract those insects, these flowers are brightly coloured, have smell and nectar.

20. **Transgenic organisms:**

Plants or animals expressing a modified endogenous gene or a foreign gene are called transgenic organisms.

21. E-wastes are generated from

- ★ spoiled
- ★ out dated
- ★ non-repairable electrical and
- ★ electronic devices

22. i) Hydrogen element belongs to 1st group and its covalent radius value is 0.37 Å°. Chemical symbol of hydrogen is H and hydrogen molecule is H₂.

ii) Aluminium is a metal belongs to boron family. It reduces iron oxide into iron.



Aluminium is used to make household utensils.

PART - III

23. i) $K = (F + 460) \times \frac{5}{9}$
 $= (80 + 460) \times \frac{5}{9}$
 $= 300 \text{ K}$

ii) **Advantages of LED TV:**

- ★ It has bright picture quality.
- ★ It is thinner in size.
- ★ It is more reliable.
- ★ Its life span is more.

★ LED TV uses less power and consumes very less energy.

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3.	The focal length of eye lens is reduced or the distance between eye lens and retina increases.	The focal length of eye lens is increased or the distance between eye lens and retina decreases.
4.	The far point will not be infinity for such eyes and the far point has come closer.	Hence the near point will not be at 25 cm for such eyes and the near point has moved farther.
5.	Due to this the image of distant objects are formed before the retina.	Due to this the image of nearby objects are formed behind the retina.
6.	This defect can be corrected using a concave lens.	This defect can be corrected using a convex lens.

ii) a) Total resistance of the circuit = $20\ \Omega + 4\ \Omega \Rightarrow 24\ \Omega$

b) The current through the circuit $\frac{V}{R} = \frac{6}{24} = 0.25\text{ A}$

c) The potential difference across the resistance = $0.25 \times 4 = 1\text{ V}$

(OR)

b) i) **The co-efficient of cubical expansion:**

The ratio of increase in volume of the body per degree rise in temperature to its unit volume is called as co-efficient of cubical expansion.

ii) ★ These are basically curved surfaces, which are used in auditoria and halls to improve the quality of sound. This board is placed such that the speaker is at the focus of the concave surface.

★ The sound of the speaker is reflected towards the audience thus improving the quality sound heard by the audience.

iii) **Nuclear fission and Nuclear fusion**

No.	Nuclear fission	Nuclear fusion
1.	The process of breaking up (splitting) of a heavy nucleus into two smaller nuclei is called 'nuclear fission'.	Nuclear fusion is the combination of two lighter nuclei to form a heavier nucleus.
2.	It can be performed at room temperature.	Extremely high temperature and pressure is needed.
3.	α , β and γ radiations are emitted.	α rays, positrons and are emitted.
4.	Fission leads to emission of gamma radiation. This triggers the mutation in the human gene and causes genetic transform diseases.	Only light and heat energy is emitted.

34. a) i) **The relationship between Relative Molecular Mass and Vapour density:**
Refer Govt. Model Question Paper 2019-20 - Question Paper 1 - Q.No. 26.

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b) i) The structure of a chromosome:

The chromosome are thin, long and thread like structures, with two identical strands called chromatins. They are held together by centromere. The chromatid is made up of spirally coiled thin structure called chromonema, which has a number of bead like structures along its length called chromomeres.

A chromosome consists of the following regions:**a) Primary construction:**

The two arms of a chromosome meet at a point called primary constriction or centromere. The centromere is the region. Where spindle fibres attach to the chromosome during cell division.

b) Secondary constriction:

Some chromosomes have secondary constriction at any point of the chromosome, called the nuclear zone or nucleolar organizer.

c) Telomere:

The end of the chromosome is called telomere. Each extremity of the chromosome has a polarity and prevents it from joining the adjacent chromosome. It maintains and provides stability to the chromosomes.

d) Satellite:

Some of the chromosomes have an elongated knob like appendage at one end of the chromosome, known as satellite. The chromosomes with satellites are called as sat-chromosomes.

ii) The advantages of practising exercise in daily life are as follows:

- ★ Practising exercise daily in our life make us feel happier.
- ★ It helps us with weight loss.
- ★ Exercise are good for the muscles and bows.
- ★ It can increase our energy level.
- ★ It can reduce the risk of chronic pain and chronic diseases.
- ★ It can help our skin, brain, health and memory.
- ★ Exercises can help with relaxation and quality sleep.

GOVT. QUESTION PAPER - Sep. 2020**CLASS: X****SCIENCE****Question
Paper****8****Time allowed: 15 mins + 3 hrs****Marks: 75****PART - I****Note: (i) Answer all the 14 questions.****12×1=12****(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.**

- The eye defect 'Presbyopia' can be corrected by**
a) Convex lens b) Concave lens c) Convex mirror d) Bifocal lenses
- The value of Avogadro number is _____ / mol.**
a) 6.023×10^{-23} b) 6.024×10^{24} c) 6.023×10^{23} d) 6.024×10^{-24}
- Identify the non-aqueous solution.**
a) Sodium chloride in water b) Glucose in water
c) Copper sulphate in water d) Sulphur in carbon disulphide
- If a molecule is made of similar kind of atoms, then it is called _____.**
a) mono atomic molecule b) hetero atomic molecule
c) homo atomic molecule d) poly atomic molecule
- $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$ is**
a) Reduction of ethanol b) Combustion of ethanol
c) Oxidation of ethanoic acid d) Oxidation of ethanal
- Which is formed during anaerobic respiration?**
a) Carbohydrate b) Ethyl Alcohol c) Acetyl CoA d) pyruvate
- Who is regarded as the "Father of Modern Physiology"?**
a) His-Atrio b) William Harvey c) Karl Landsteiner d) Edward C. Kendal
- Node of Ranvier is found in _____.**
a) muscles b) axons c) dendrites d) cyton
- _____ is found abundantly in liquid endosperm of coconut.**
a) Auxin b) Cytokinin c) Gibberellins d) Ethylene
- We can cut the DNA with the help of**
a) Scissors b) Restriction enzymes c) Knife d) DNA ligases
- Match the following**

1) Polyvinyl chloride	-	i) Affects brain development in children
2) Cadmium	-	ii) Affects the growth of reproductive system
3) Lead	-	iii) Asthmatic bronchitis
4) Chromium	-	iv) Neural damage

a) (1)-(i), (2)-(iii), (3)-(iv), (4)-(ii)	b) (1)-(ii), (2)-(i), (3)-(iii), (4)-(iv)
c) (1)-(iii), (2)-(ii), (3)-(iv), (4)-(i)	d) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)

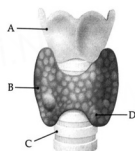
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12. Find the correct pair.

- a) Acrocentric - The centromere is found near the centre of the chromosome with two unequal arms.
- b) Submetacentric - The centromere is found on the proximal end.
- c) Metacentric - The centromere occurs in the centre of the chromosome and forms two equal arms.
- d) Telocentric - The centromere is found at one end with a short arm and a long arm.

PART - II**Note: Answer any 7 questions. Question No. 22 is compulsory.****7×2=14**

13. Write short notes on gears.
14. Mention two cases in which there is no Doppler effect in sound.
15. Define coefficient of real expansion and mention its unit.
16. Write a reaction which is used for the identification of alcohol.
17. Name the three types of neurons and find its location.
18. Identify the parts A, B, C and D in the given figure.

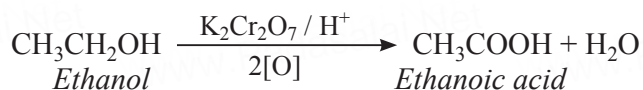


19. How can you determine the age of fossils?
20. State the applications of DNA fingerprinting technique.
21. What is "Stage" in Scratch editor?
22. A beam of light passing through a diverging lens of focal length 0.3 m appears to be focused at a distance 0.2 m behind the lens. Find the position of the object.

PART - III**Note: Answer any 7 questions. Question No. 32 is compulsory.****7×4=28**

23. Describe rocket propulsion.
24. What are the uses of Simple microscope?
25. a) What do you understand by the term 'Ultrasonic waves'?
b) What are the medical applications of echo?
26. What are the methods of preventing corrosion?
27. Differentiate soaps and detergents.
28. Differentiate between Monocot root and Dicot root.
29. Draw the external structure of human heart and label the parts.
30. Define Ethnobotany and write its importance.
31. Explain about Gene Therapy.
32. a) A solution was prepared by dissolving 25 g of sugar in 100 g of water. Calculate the mass percentage of solute.
b) True or false (If false give the correct statement).
i) In our daily life, solution of syrups, mouth wash, antiseptic solution, household disinfectants etc., the concentration of ingredients of solution is expressed as w/w.
ii) In ointments, antacids, soaps etc., the concentration of solution is expressed as v/v.

PART - IV**Kindly send me your district Questions & keys to email id - Padasalai.net@gmail.com**



During this reaction the orange colour of $\text{K}_2\text{Cr}_2\text{O}_7$ changes to green. Therefore this reaction can be used for the identification of alcohols.

17. **Types of neurons and its location:**

- ★ **Unipolar neurons:** Only one nerve process arises from the cyton which acts as both axon and dendron. **Location:** found in early embryos but not in adult.
- ★ **Bi-polar neurons:** The cyton gives rise to two nerve processes of which one acts as an axon while another as a dendron. **Location:** found in retina.
- ★ **Multipolar neurons:** The cyton gives rise to many dendrons and an axon. **Location:** found in cerebral cortex of brain.

18. **The parts A, B, C and D in the given figure:**

A - Thyroid cartilage; B - Thyroid gland; C - Trachea; D - Nodule

19. **Determine the age of fossils:**

The age of fossils is determined by radioactive elements present in it. The element may be carbon, uranium, lead on potassium carbon consumption of animals and plants stops after death and the decaying process of C^{14} occurs continuously. The time passed since death of a plant or animal can be calculated by measuring the amount of C^{14} present in their body.

20. **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 is also helps in the study of genetic diversity of population, evaluation and speciation.

21. **Stage:**

Stage is the one of the main part of scratch editor. 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.

22. **Solution:**

$$f = -0.3 \text{ m}; v = -0.2 \text{ m}$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} ; \quad \frac{1}{u} = \frac{1}{v} - \frac{1}{f} \Rightarrow \frac{1}{u} = \frac{1}{-0.2} - \frac{1}{-0.3} = \frac{-10}{6} \Rightarrow u = \frac{-6}{10}$$

$$u = -0.6 \text{ m}$$

PART - III

23. **Rocket propulsion:**

Refer PTA Model Question Paper 4 - Question Paper 5 - Q.No. 33 (a).

24. **The uses of Simple microscope:**

- ★ By watch repairours and jewellers.
- ★ To read small letter clearly.
- ★ To observe parts of flower, insects do.

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25. a) **Ultrasonic waves:**

Ultrasonic waves are sound waves with a frequency greater than 20 kHz. Human ear cannot detect these waves. But certain creatures like mosquito dogs, bats, dolphins can detect these waves.

e.g: waves produced by bats.

b) **The medical applications of echo:**

- ★ The principle of echo is used in obstetric ultrasonography which is used to create real time visual images of the developing embryo or fetus in the mother's uterus.
- ★ This is a safe testing tool as it does not use any harmful radiations.

26. **Corrosion of metals is prevented:**

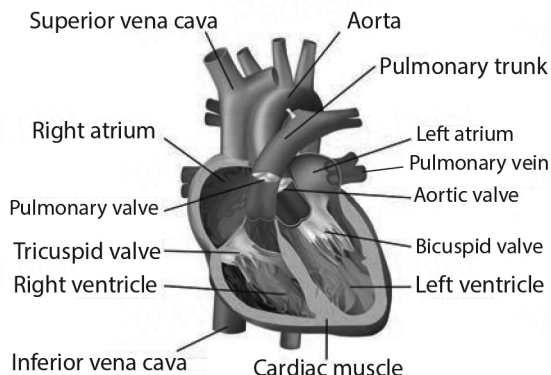
- ★ By coating with paints.
- ★ By alloying with other metals.
- ★ By coating with oil and grease.
- ★ By sacrificial protection.
- ★ By electroplating.
- ★ By the process of galvanization.

27. **Differentiate: Soaps and Detergents**

No.	Soaps	Detergents
1.	It is sodium salt of long chain fatty acids.	It is sodium salts of sulphonic acids.
2.	Soaps are biodegradable.	Most of the detergents are non-biodegradable.
3.	It has poor foaming capacity.	It has rich foaming capacity.
4.	It forms a scum in hard water.	Does not form a scum in hard water.

28. **Differentiate: Monocot root and Dicot root.**

No.	Monocot root	Dicot root
1.	The xylem is tetrarch.	The xylem is polyarch.
2.	The conjunctive tissue is made up of paranchyma cells.	The conjunctive tissue is made up of sclerenchyma cells.
3.	Young root contains pith but in old root pith is absent.	Pith cells are made of parenchyma cells with intercellular spaces and contains abundant of starch grains.
4.	Cambium is present during secondary growth.	Cambium is absent.
5.	Secondary growth is present.	Secondary growth is absent.

29. **The external structure of human heart:**30. **Ethnobotany:**

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

Importances:

- ★ It provides traditional uses of plant.
- ★ It gives information about certain unknown and known useful plants.

31. **Gene Therapy:**

- ★ Gene therapy refers to the replacement of defective gene by the direct transfer of functional genes into humans to treat genetic disease or disorder. The genetic makeup of the 'patient' cell is attend using recombinant DNA technology. It was first successfully implemented in 1990.

Somatic Gene therapy is the replacement of defective gene in somatic cells.

Gene line Gene therapy replacement of defective gene in germ cell (egg and sperm).

- ★ Gene therapy conducted till date has targeted only somatic (non-reproductive) cells.
- ★ Connection of genetic defects in somatic cells may be beneficial to the patient but the corrected gene may not be carried to the next generation.

32. a) **Solution:**

Mass of the solute = 25 g

Mass of the solvent = 100 g

$$\begin{aligned} \text{Mass percentage of solute} &= \frac{\text{Mass of the solute}}{\text{Mass of the solute} + \text{Mass of the solvent}} \times 100 \\ &= \frac{25}{100 + 25} \times 100 = \frac{25}{125} = \frac{2500}{125} \\ &= 20\% \end{aligned}$$

b) **True or false:**

i) False.

Reason: In our daily life solution of syrups, mouth wash, antiseptic solution, household disinfectants etc. the concentration of ingredients of solution is expressed as v/v.

ii) False.

Reason: In ointments, antacids, soaps etc. the concentration of solution is expressed

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GOVT. QUESTION PAPER - Sep. 2021

CLASS: X

SCIENCE

Question
Paper

9

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.

- 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)
- SI unit of resistance is _____.
a) Mho b) Joule c) Ohm d) Watt
- Sound waves travel in air with a speed of about _____ at NTP.
a) 340×10^8 m/s b) 340 m/s c) 3×10^8 m/s d) 3×10^{-8} m/s
- Unit of radioactivity is _____.
a) Roentgen b) Curie c) Becquerel d) All of the above
- Alloy used in the manufacturing of pressure cooker is _____.
a) Brass b) Bronze c) Magnalium d) Duralumin
- 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
- The concept of blood group is derived by _____.
a) Wiener b) Karl Landsteiner c) William Harvey d) His
- Syngamy results in the formation of _____.
a) Zoospores b) Conidia c) Zygote d) Chlamydo spores
- The large elongated cells that provide nutrition to developing sperms are _____.
a) Primary germ cells b) Sertoli cells c) Leydig cells d) Spermatogonia
- Life originates from pre-existing life was showed by
a) Louis Pasteur b) Oparin c) Haldane d) Lamarck
- Pusa Komal is a disease resistant variety of _____.
a) Sugar cane b) Rice c) Cow pea d) Maize
- _____ is a rice variety produced by mutation breeding that grows well in saline soil.
a) Sharbati Sonora b) Atomita 22 c) Pusa Gaurav d) Himgiri

PART - II

Note: Answer any 7 questions. Question No. 22 is compulsory.

7×2=14

13. When a sound wave travels through air, the air particles.

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- a) vibrate along the direction of the wave motion.
 - b) vibrate but not in any fixed direction.
 - c) vibrate perpendicular to the direction of the wave motion.
 - d) do not vibrate.
14. a) What is the audible range of frequency?
b) What is the minimum distance needed for an Echo?
15. Write any 2 uses of ethanol.
16. What is respiratory quotient?
17. Draw and label the parts of a sperm.
18. What is called evolution?
19. Distinguish between somatic gene therapy and germ line gene therapy.
20. How is Cancer Cell different from Normal Cell?
21. How are e-wastes generated?
22. State Avogadro's Law.

PART - III

Note: Answer any 7 questions. Question No. 32 is compulsory.

7×4=28

23. a) Write the symbol for the following component.
i) Ground connection ii) Resistor
iii) Light emitting diode iv) A diode
- b) A charge of 12 Coulomb flows through a bulb in 5 seconds. What is the current through the bulb?
24. a) Define Atomicity.
b) Calculate the molecular mass of CO₂.
25. a) How is rust formed? Give the equation for formation of rust.
b) State 2 methods of preventing corrosion.
26. a) What is photosynthesis and where does it occur in a cell?
b) Differentiate Aerobic and Anaerobic respiration.
27. Name the gaseous plant hormone. Mention any three of its physiological effects in plants.
28. a) What is pollination?
b) State the importance of pollination.
29. Explain the structure of chromosome.
30. Discuss the importance of biotechnology in the field of medicine.
31. How do rainwater harvesting structures recharge ground water?
32. ${}_{92}\text{U}^{238}$ experiences α -decay. Find the number of neutrons in the daughter element.

PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. a) State Newton's laws of motion. **(OR)**
b) i) Differentiate the eye defects: Myopia and Hypermetropia.
ii) Write any 2 applications of concave lens.
34. a) i) What happens when MgSO₄ · 7H₂O is heated? Write the appropriate equation.
ii) Explain hygroscopic substances and deliquescent substances with examples. **(OR)**
b) i) What are called thermolysis reactions?
ii) Differentiate reversible and irreversible reactions.

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35. a) i) Enumerate the functions of blood.
 ii) Guard cells are responsible for opening and closing of stomata. Give reason for this statement. (OR)
- b) i) Suggest measures to overcome the problems of an alcoholic.
 ii) What are the contributing factors for obesity?

ANSWERS**Govt. Question Paper - Sep. 2021****Question Paper 9****PART - I**

- | | |
|------------------------|------------------------|
| 1. d) Both (a) and (c) | 7. b) Karl Landsteiner |
| 2. c) Ohm | 8. c) Zygote |
| 3. d) All of the above | 9. b) Sertoli cells |
| 4. d) Duralumin | 10. a) Louis Pasteur |
| 5. d) Alcohol | 11. c) Cow pea |
| 6. d) Alcohol | 12. b) Atomita 22 |

PART - II

13. a) vibrate along the direction of the wave motion.
14. a) **Audible range of frequency:**
 These are sound waves with a frequency ranging between 20 Hz and 20,000 Hz.
- b) **The minimum distance needed for an Echo:**
- ★ The minimum distance required to hear an echo is 1/20th part of the magnitude of the velocity of sound in air.
 - ★ If you consider the velocity of sound as 334 ms^{-1} , the minimum distance required to hear an echo is 17.2 m.
15. **Uses of ethanol:**
- ★ Ethanol is used in medical wipes, as an antiseptic.
 - ★ It is used as an anti-freeze in automobile radiators.
 - ★ It is used for effectively killing micro organisms like bacteria, fungi, etc by including it in many hand sanitizers.
 - ★ It is used as an antiseptic to sterilize wounds in hospitals.
16. **Respiratory Quotient:**
 The ratio of volume of carbon dioxide liberated and the volume of oxygen consumed during respiration is called Respiratory Quotient (R.Q).
- $$\text{R.Q.} = \frac{\text{Volume of CO}_2 \text{ liberated}}{\text{Volume of CO}_2 \text{ consumed}}$$

b) **Solution:**

Charge $Q = 12 \text{ C}$; Time $t = 5 \text{ seconds}$

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

24. a) **Atomicity:**

The number of atoms present in the molecule is called atomicity.

b) **Molecular mass of CO_2 :**

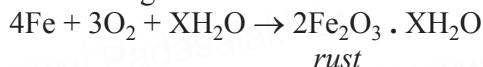
Atomic mass of 1 (C) = $1 \times 12 = 12$

Atomic mass of 2 (O) = $2 \times 16 = 32$

CO_2 molecular mass = Atomic mass of C + Atomic mass of O
= $12 + 32 = 44 \text{ g}$

25. a) **Rust:**

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.

b) **Corrosion of metals is prevented:**

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

26. a) **Photosynthesis:**

- ★ Photosynthesis is a process in which the green plants use sunlight and the green pigment chlorophyll, to synthesize, nutrients from carbon dioxide from air and water.
- ★ It occurs in green parts of plant such as leaves, stems and floral buds.

b) **Differentiate: Aerobic and Anaerobic respiration.**

No.	Aerobic respiration	Anaerobic respiration
1.	Occur in the presence of oxygen.	Occurs, when oxygen is absent.
2.	Carbon dioxide, water and ATP are produced.	Lactic acid, ethanol and ATP are produced.
3.	In consists of 3 steps: <ul style="list-style-type: none"> ★ Glycolysis ★ Krebs's cycle ★ Electron transport chain. 	In consists of 2 steps: <ul style="list-style-type: none"> ★ Glycolysis ★ Fermentation (ethyl alcohol or lactic acid are produced)

27. **The gaseous plant hormone:**

Ethylene is a gaseous plant hormone.

Physiological effects in plants:

- ★ Ethylene promotes the ripening of fruits. e.g: tomato, apple, mango, banana and etc.
- ★ Ethylene inhibits the elongation of stem and root in dicots.
- ★ Ethylene hastens the senescence of leaves and flowers.

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Newton's third law:

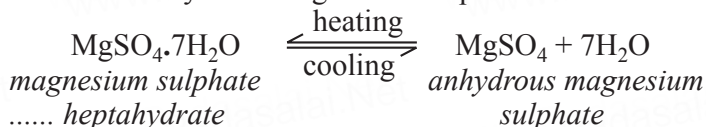
For every action there is an equal and opposite reaction. They always act on two different bodies.

(OR)

b) i) **Differentiate: Myopia and Hypermetropia.****Refer PTA Model Question Paper 6 - Question Paper 7 - 33 (a) (i).**ii) **The applications of concave lens.**

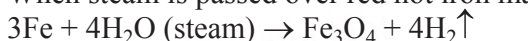
- ★ Concave lenses are used as eye lens of 'Galilean Telescope'.
- ★ They are used in wide angle spy hole in doors.
- ★ They are used to correct the defect of vision called myopia.

34. a) i) $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ has water of crystallization is 7. When magnesium sulphate heptahydrate crystals are gently heated it loses seven water molecules and becomes anhydrous magnesium sulphate.



ii) Second most abundant metal A = Iron

When steam is passed over red hot iron magnetic oxide (B) formed.



B = Fe_3O_4 (Magnetic oxide)

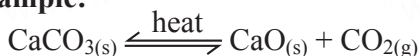
C = Nickel steel (Fe, C, Ni)

It is used to make aircraft parts and propeller.

(OR)

b) i) **Thermolysis reactions:**

A chemical reaction is a process in which old bond breaks up and new chemical bond get formed. Thermolysis chemical reactions is a special type of chemical reaction in which the reactant get decomposed by heat.

Example:

in these reactions heat is supplied to break the bonds. So generally they are endothermic in nature.

ii) **Differentiate: Reversible and Irreversible reactions.**

No.	Reversible Reactions	Irreversible Reactions
1.	It can be reversed under suitable conditions.	It cannot be reversed.
2.	It attains equilibrium. It is relatively slow.	Equilibrium is not attained. It is fast.

35. a) i) **The functions of blood:**

- ★ Transport of respiratory gases (oxygen & CO_2).
- ★ Transport of hormones.
- ★ It maintains proper water balance in the body.

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GOVT. QUESTION PAPER - May 2022

CLASS: X

SCIENCE

Question
Paper

10

Time allowed: 15 mins + 3 hrs

Marks: 75

PART - I

Note: (i) Answer all the 14 questions.

12×1=12

(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding 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) infinity c) 2f d) between f and 2f
- If a molecule is made of similar kind of atoms, then it is called _____ molecule.
a) mono atomic b) hetero atomic c) homo atomic d) poly atomic
- The number of components in a binary solution is _____.
a) 2 b) 3 c) 4 d) 5
- A charge of 12 coulomb flows through a bulb in 5 second. What is the current through the bulb?
a) 60 A b) 17 A c) 2.4 A d) 24 A
- Rectified spirit is an aqueous solution which contains about _____ of ethanol.
a) 95.5 % b) 75.5 % c) 55.5 % d) 45.5 %
- The endarch condition is the characteristic feature of _____.
a) root b) stem c) leaves d) flowers
- The heart of fishes possess _____ chambers.
a) 3 b) 4 c) 2 d) 5
- Male gametes in angiosperms are formed by the division of _____.
a) Generative cell b) Vegetative cell c) Pollen grain mother cell d) Microscope
- Which one is referred as "Master Gland"?
a) Pineal gland b) Pituitary gland c) Thyroid gland d) Adrenal gland
- Himgiri developed by hybridization and selection for disease resistance against rust pathogens is a variety of _____.
a) chilli b) maize c) sugarcane d) wheat
- Match the following:

1) Solar Energy	-	i) Flowing water
2) Petroleum	-	ii) Mobile phone
3) Hydropower	-	iii) Inexhaustible energy
4) Electronic device	-	iv) Exhaustible energy resource

a) (1)-(iv), (2)-(iii), (3)-(ii), (4)-(i)	b) (1)-(iii), (2)-(iv), (3)-(i), (4)-(ii)
c) (1)-(iii), (2)-(i), (3)-(iv), (4)-(ii)	d) (1)-(i), (2)-(iv), (3)-(ii), (4)-(iii)

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12. Find the correct pair.

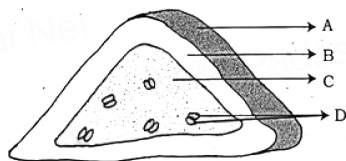
- Gregor Johann Mendel - Theory of Natural Selection
- Waldeyer - Chromosomes
- Watson and Crick - Theory of Evolution
- Jean Baptiste Lamarck - Law of Heredity

PART - II**Note: Answer any 7 questions. Question No. 22 is compulsory.****7×2=14**

- State Newton's second law.
- Write any two applications of echo.
- State Boyle's law.
- Write the functional group and the suffix used for the following class of compounds.

Class of Compounds	Functional Group	Suffix used
Alcohol		
Aldehyde		
Ketone		
Carboxylic Acid		

- What is the importance of rainwater harvesting?
- Identify the parts A, B, C, D in the given figure.



- What is evolution? Who proposed the theories of evolution?
- Name the two maize hybrids rich in amino acid lysine.
- What is the importance of valves in the heart?
- A person with myopia can see objects placed at a distance of 4m. If he wants to see objects at a distance of 20m, what should be the focal length and power of the concave lens he must wear?

PART - III**Note: Answer any 7 questions. Question No. 32 is compulsory.****7×4=28**

- Differentiate mass and weight.
- List any four properties of light.
- Explain why the ceilings of concert halls are curved?
- What is an alloy?
 - Give the reasons for alloying.
- Classify the following compounds based on the pattern of carbon chain and give their structural formula.
 - Propane
 - Benzene
 - Cyclobutane
 - Furan
- What is respiratory quotient?
 - Write the overall reaction for photosynthesis.
- Draw and label the parts of process of transpiration.

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30. a) List the theories postulated to explain the origin of life.
b) Who coined the term 'Ethnobotany'?
31. Discuss the importance of biotechnology in the field of medicine.
32. 'A' is a blue coloured crystalline salt. On heating it loses blue colour and gives 'B'. When water is added, 'B' gives back 'A'. Identify 'A' and 'B'. write the equation.

PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. a) i) What is meant by electric current?
ii) Name and define its unit.
iii) Which instrument is used to measure the electric current? How should it be connected in a circuit? **(OR)**
- b) i) Who discovered natural radioactivity?
ii) Write any three features of natural and artificial radioactivity.
iii) Give any three uses of radio isotopes in the field agriculture.
34. a) i) Define: Atomicity. Give an example.
ii) Consolidate the major differences between atoms and molecules. **(OR)**
- b) i) Define combination reaction.
ii) Give an example for combination reaction.
iii) Differentiate reversible and irreversible reaction.
35. a) i) What are synthetic auxins? Give examples.
ii) Define triple fusion.
iii) Name the secondary sex organs in male. **(OR)**
- b) i) Why did Mendel select pea plant for his experiment?
ii) Suggest measures to overcome the problems of an alcoholic.

ANSWERS**Govt. Question Paper - May 2022****Question Paper 10****PART - I**

- | | |
|-------------------|--|
| 1. c) 2f | 8. a) Generative cell |
| 2. c) homo atomic | 9. b) Pituitary gland |
| 3. a) 2 | 10. d) wheat |
| 4. c) 2.4 A | 11. b) (1)-(iii), (2)-(iv), (3)-(i), (4)-(ii) |
| 5. a) 95.5 % | 12. d) Jean Baptiste Lamarck - Law of Heredity |
| 6. b) stem | |
| 7. c) 2 | |

PART - II**13. Newton's second law.**

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.

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PART - III

23. Mass and weight difference:

No.	Mass	Weight
1.	The quality of matter contained in the body.	The gravitation force exerted on it due to the earth's gravity alone.
2.	Scalar quantity.	Vector quantity
3.	Unit: kg	Unit: N
4.	Constant at all the places.	Variable with respect to gravity.

24. Properties of light.

- ★ Light is a form of energy.
- ★ It always travels along a straight line.
- ★ It does not use any medium for its propagation. It can even travel through vacuum.
- ★ The speed of light in vacuum or air is $c = 3 \times 10^8 \text{ ms}^{-1}$
- ★ Different coloured light has different wave length and frequency.

25. ★ These are basically curved surfaces, which are used in auditoria and halls to improve the quality of sound. This board is placed such that the speaker is at the focus of the concave surface.
- ★ The sound of the speaker is reflected towards the audience thus improving the quality sound heard by the audience.

26. a) Alloy:

An alloy is a homogeneous mixture of two or more metals or of one or more metals with certain non-metallic elements.

b) The reasons for alloying:

- ★ To modify appearance and colour.
- ★ To modify chemical activity.
- ★ To lower the melting point.
- ★ To increase hardness and tensile strength.
- ★ To increase resistance to electricity.

27. Compounds based on the pattern of carbon chain and give their structural formula:

No.	Name	Class	Structural formula
i.	propane	acyclic compounds	$\text{CH}_3 - \text{CH}_2 - \text{CH}_3$
ii.	benzene	cyclic compounds (aromatic compound)	

ii) **Triple fusion:**

The fusion involving two polar nucleus and a sperm nucleus that occurs in double fertilization in a seed plant and results in the formation of endosperm is called the trip fusion.

iii) The secondary sex organs in male:

- | | |
|-------------------|------------------|
| ★ Vas deferens | ★ Prostate gland |
| ★ Epididymis | ★ Penis |
| ★ Seminal vesicle | |

(OR)

b) i) **Mendel select pea plant for his experiment**

- ★ The pea plant is self-pollinating and so it is very easy to raise pure breeding individuals.
- ★ It has a short life span as it is an annual.
- ★ It is easy to cross pollinate.
- ★ It has deeply defined contrasting characters.
- ★ The flower are bisexual.

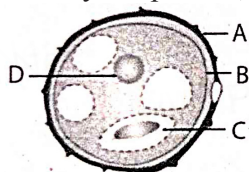
ii) Suggest measures to overcome the problems of an alcoholic.

GOVT. QUESTION PAPER - Aug. 2022**CLASS: X****SCIENCE****Question
Paper****11****Time allowed: 15 mins + 3 hrs****Marks: 75****PART - I****Note: (i) Answer all the 14 questions.****12×1=12****(ii) Choose the most suitable answer from the given four alternative and write the option code with the corresponding answer.**

- 1. To project the rockets which of the following principle(s) is/(are) required?**
a) Newton's Third Law of Motion b) Newton's Universal Law of Gravitation
c) Law of Conservation of Linear Momentum d) Both (a) and (b)
- 2. The gram molecular mass of oxygen is:**
a) 16 g b) 18 g c) 32 g d) 17 g
- 3. _____ is an important metal to form amalgam.**
a) Ag b) Hg c) Mg d) Al
- 4. Kilowatt hour is the unit of:**
a) Resistivity b) Conductivity c) Electrical energy d) Electrical power
- 5. The number of periods and groups in the periodic table are _____.**
a) 6, 16 b) 7, 17 c) 8, 18 d) 7, 18
- 6. During transpiration, there is loss of:**
a) Carbon dioxide b) Oxygen c) Water d) Carbon monoxide
- 7. Which one of the following hormones is naturally not found in plants?**
a) 2, 4-D b) GA3 c) Gibberellin d) IAA
- 8. World 'No Tobacco Day' is observed on:**
a) May 31 b) June 6 c) April 22 d) October 2
- 9. Which of the following is/are a fossil fuel?**
(i) Tar (ii) Coal (iii) Petroleum
a) (i) only b) (i) and (ii) only c) (ii) and (iii) only d) All of the above
- 10. Identify the exocrine gland.**
a) Pituitary gland b) Adrenal gland c) Salivary gland d) Thyroid gland
- 11. The endarch condition is the special characteristic feature of:**
a) Root b) Stem c) Leaves d) Flower
- 12. The heart of fishes possess _____ chambers.**
a) 3 b) 4 c) 2 d) 5

PART - II**Note: Answer any 7 questions. Question No. 22 is compulsory.****7×2=14****13. Classify the types of force based on their application.****Kindly send me your district Questions & keys to email id - Padasalai.net@gmail.com**

14. State Snell's Law.
15. Define one Calorie.
16. Classify the following substances into deliquescent, hygroscopic.
(a) Conc. Sulphuric acid (b) Copper Sulphate Penta hydrate (c) Silica gel
(d) Calcium Chloride (e) Gypsum Salt
17. Why fossil fuels are to be conserved?
18. Identify the parts A, B, C and D.



19. What do you understand by the term Phenotype and Genotype?
20. Why are thyroid hormones referred as 'personality hormone'?
21. Why is the colour of the blood red?
22. A person with myopia can see objects placed at a distance of 4 m. If he wants to see objects at a distance of 20 m, what should be the focal length and power of the concave lens he must wear?

PART - III

Note: Answer any 7 questions. Question No. 32 is compulsory.

7×4=28

23. Differentiate the eye defects: Myopia and Hypermetropia.
24. Describe Rocket Propulsion.
25. Write any four features of natural and artificial radiation.
26. Differentiate reversible and irreversible reactions.
27. What happens when the salt $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ is heated? Write the equation.
28. (i) What is respiratory quotient?
(ii) What are the factors affecting photosynthesis?
29. Differentiate Aerobic and Anaerobic respiration.
30. What are the contributing factors for obesity?
31. Define Ethnobotany and write its importance.
32. Calculate the resistance of a conductor through which a current of 2 A passes, when the potential difference between its ends is 30 V.

PART - IV

Note: (i) Answer all the questions. (ii) Each question carries seven marks.

(iii) Draw the diagram wherever necessary.

3×7=21

33. a) i) Define inertia.
ii) Explain the types of inertia with examples. (OR)
- b) State Newton's Laws of Motion.
34. a) i) Define Relative Atomic Mass.
ii) Define Atomicity.
iii) Give any two examples for heterodiatomic molecules. (OR)
- b) Give the salient features of "Modern atomic theory".

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