

DIRECTORATE OF MINORITIES

MINORITY WELFARE DEPARTMENT

**SCIENCE MODEL QUESTION PAPERS
WITH ANSWERS**

ACCORDING TO SSLC BOARD KARNATAKA REDUCED SYLLABUS

SCIENCE

ENGLISH MEDIUM

SSLC-2021



DIRECTORATE OF MINORITIES. VV TOWERS, 20TH& 21ST FLOOR, MAIN, DEVARAJ URS ROAD,
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General Instructions to the Candidate:

1. There are three parts in the question paper. PART A: Physics, PART B: Chemistry, PART C: Biology.
2. This question Paper consists of 38 objective and subjective types of questions.
3. This question paper has been sealed by reverse jacket. You have to cut on the right side to open the paper at the time of commencement of the examination. Check whether all the pages of the question paper are intact.
4. Follow the instructions given against both the objective and subjective types of questions.
5. Figures in the right hand margin indicate maximum marks for the questions.
6. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.

2020-21 MODEL QUESTION PAPER SET-1

Subject: SCIENCE

Time: 3 hrs. 15 minutes

Subject Code: 83E

Max. Marks: 80

**PART: A
PHYSICS**

Q.1. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet. 1X4=4

1) If magnification of image is +1, then

- A) Image size is equal to object and erect.
C) Image size is double the size of object.

- B) Image size is equal to object and inverted.
D) Image size cannot be decided by the given value

2) Is the circuit symbol for?



A) Voltmeter

B) plug key

C) ammeter

D) resistor

3) Inside the magnet, the field lines moves

A) from north pole to south pole

B) from south pole to north pole

C) away from south pole

D) away from north pole

4) Which among these is not the characteristic feature of a good source of energy?

A) Low energy output per unit volume

B) easy availability

C) Safe to use

D) low in cost

II. Answer the following questions.

2 x 1 = 2

5) Name the instrument used in DC motor to change the direction of current in the coil

6) Name the lens that always produces erect, diminished and virtual image

III. Answer the following questions.

2 x 2 = 4

7) Draw the diagram of the electric circuit used to study Ohm's law and label voltmeter.

8) What are the advantages of biogas?

IV. Answer the following questions.

3 x 3 = 9

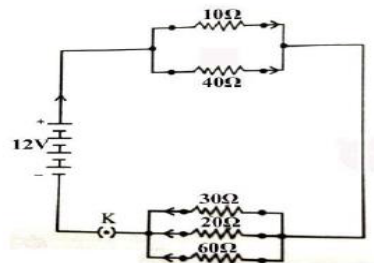
9) Draw the ray diagram to show the formation of image by a convex lens when the object is placed beyond $2F_1$. Mention the position and nature of the image with help of the diagram. (F_1 : Principal focus of the convex lens)

10) State Joule's law of heating effect and list the applications of the law in our daily life.

11) The resistivity of manganese wire of length 1 m is $1.84 \times 10^{-6} \Omega\text{m}$ at 20°C . If the diameter of the wire is 3×10^{-4} m, what will be the resistance of the wire at that temperature?

OR

In the figure calculate the total electric current flowing in the circuit.



V. Answer the following question.

1 x 4 = 4

12) A 3cm tall object is placed perpendicular to the principle axis of convex lens of focal length 15cm. The distance of the object from the lens is 30cm. Find the nature, position and size of the image

OR

State the laws of refraction of light. Different media have different refractive index. Why? 'The refractive index of glass is 1.5'. What is the meaning of this statement?

VI. Answer the following question.

1 x 5 = 5

13. Explain Faraday's experiment of magnet and coil. What factors can be observed when the magnet is replaced by a coil carrying current? What are the conclusions that can be drawn by you from these experiments? State electromagnetic induction with the help of this experiment.

PART: B

CHEMISTRY

VII. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

2 x 1 = 2

14) How many C-H bonds present in ethane (C_2H_6)

A) 4

B) 6

C) 8

D) 10

15) Solder is composed of the following metals

A) Lead and tin

B) Lead and Zinc

C) Lead and Copper

D) Lead and Iron

VIII. Answer the following questions.

4 x 1 = 4

16) Name the base which neutralizes the acidity in the stomach.

17) What is addition reaction?

18) State the modern periodic law.

19) Hydrogen do not get proper position in Mendeleev's periodic table? Give reasons for your answer.

IX. Answer the following questions.

3 x 2 = 6

20) The pH value of rain water of an area is 5.2. Can you consider this as acid rain? What happens to aquatic animals when this water flows to river?

OR

You have two solutions, A and B. The pH of solution A is 6 and pH of solution B is 8. Which solution has more hydrogen ion concentration? Which of these is acidic and which is basic?

21) What is a homologous series? Explain with an example.

22) Arrange Mg, Cl, P and Ar in descending order of their atomic size and give reasons for your answer.

X. Answer the following questions.

3 x 3 = 9

23) Draw the diagram of the arrangement of the apparatus showing the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning. Label the following parts:

(i) Zinc granules (ii) Delivery tube

24) Explain how soap cleans clothes. More amount of soap is required to clean the clothes in hard water. Why?

OR

Explain the addition and substitution reaction with the help of examples. C_2H_6 undergoes substitution reaction but not addition reaction. Why?

25. Draw the diagram of the apparatus used in the electrolytic refining of copper. Label the following parts.

(i) Cathode (ii) Anode mud

XI. Answer the following question.

1 x 4 = 4

26) Mention the difference between calcination and roasting. How these processes are used in the extraction of zinc? Explain with the help of chemical equations. After these processes is reduction necessary to obtain zinc? Why?

PART: C

BIOLOGY

XII. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

2 x 1 = 2

27). The gap between two nerve cells is said to be

A) Dendrite B) Axon C) Synapse D) Impulse

28) Pollutants causes acid rain is

A) Carbon oxides B) Nitrogen oxides
C) Sulphur oxides D) sulphur and nitrogen oxides

XIII. Answer the following questions.

2 x 1 = 2

29) Which is pollutant that causes ozone depletion?

30) What are the two methods of water management?

XIV. Answer the following questions.

3 x 2 = 6

31) Explain the process of translocation of food materials in plants

OR

Write the function of pulmonary arteries and pulmonary veins.

32) List the advantages of 'reduce' and 'reuse' to save environment.

33. Draw the diagram showing the germination of pollen on stigma and label 'female germ cell'.

XV. Answer the following questions.

3 x 3 = 9

34) Explain the significant function of each structure in human male reproductive system.

OR

Explain the structure and important role of placenta during gestation period of woman.

35) Mendel crossed plants bearing red flowers (RR) with the plants bearing white flowers (rr) and produced progeny from them. The plants with red flowers obtained in F1 generation were different from the plants with red flowers of parental generation. Why? Explain with reasons

OR

How do genes control the expression of 'tall' or 'short' traits in plants?

36. Draw the diagram showing the structure of nephron. Label the following parts.

- (i) Bowman's capsule (ii) Collecting duct

XVI. Answer the following questions.

2 x 4 = 8

37) (i) How does relative method help to determine the age of fossils?

(ii) "Experiences of an individual during its life time cannot direct evolution." Why?

(iii) "Chromosomes inherited from the father determine the sex of a child." Explain.

38) a) A person's face has become pale and his breathing rate has increased due to fear. Analyse the process which enables the person to deal with this situation.

b) Which is the control centre of reflex action? What is the route taken by the reflex action called?



2020-21 MODEL QUESTION PAPER SET-2

Subject: SCIENCE

Time: 3 hrs. 15 minutes

Subject Code: 83E

Max. Marks: 80

PART: A

PHYSICS

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

1. The resistance of a conductor is 27Ω . If it is cut into three equal parts and connected in parallel, then its total resistance is:

- A. 6Ω B. 3Ω C. 9Ω D. 27Ω

2. Which among the following has highest Refractive index?

- A. Air B. Ice C. Glass D. Diamond

3. The magnetic lines of force of a conductor carrying current are:

- A. Parallel to conductor B. Concentric circles
C. Perpendicular to the conductor D. None of these

II. Answer the following questions.

2 x 1 = 2

4. If the power of a lens is $-2.0D$, then what type of lens is that?

5. The object distance of a lens is $-30cm$ and image distance is $-10cm$. Find the magnification of the lens.

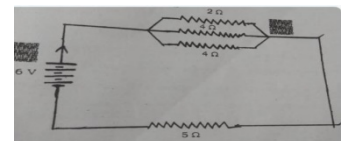
III. Answer the following questions.

3 x 2 = 6

6. Draw the ray diagram to show the formation of image by a convex lens when the object is kept at F_1 . (F_1 : Principal focus of the convex lens)

7. A bulb is marked $220V$ and $40W$. Calculate the current flowing through the bulb and its resistance.

8. Observe the following circuit: Calculate the total resistance in the circuit.



IV. Answer the following questions.

3 x 3 = 9

9. Draw the diagram of an electric motor. Label the following parts.

- (i) Brushes (ii) Split rings

10. A concave lens has focal length of $15cm$. At what distance should the object from the lens be placed so that it forms an image at $10cm$ from the lens? Also find the magnification produced by the lens.

OR

Explain an activity to show that "A ray of light incident on a rectangular glass slab immersed in any medium emerges parallel to itself."

11. Explain why we are looking at the alternate sources of energy?

V. Answer the following questions.

2 x 4 = 8

12. Describe any four safety measures that should be taken while dealing with electric appliances connected in domestic electric circuit.

OR

A coil of insulated copper wire is connected to a galvanometer. What happens if a bar magnet is

- (i) Pushed into the coil?
- (ii) Withdrawn from inside the coil?
- (iii) Held stationary inside the coil? Give reasons for your observations.
- (iv) Mention one more method of inducing current in a coil.

13. i) What is meant by potential difference? State its SI unit.
- ii) Name the device that helps to maintain a potential difference across a conductor.
- iii) Calculate:
- a) The highest b) the lowest resistance that can be obtained by the combination of four coils of resistance 4Ω , 8Ω , 12Ω and 24Ω .

PART: B

CHEMISTRY

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

14. The metal liquid at room temperature is:

- A. Sodium B. Potassium C. Mercury D. Bromine

15. An example for saturated hydrocarbon is:

- A. C_2H_6 B. C_3H_4 C. C_2H_2 D. C_2H_4

16. The atomic numbers of elements A, B, C and D are 3, 9, 4 and 8 respectively. Elements having metallic nature among these are

- A. B and D B. A and B C. A and C D. B and C

VII. Answer the following questions. 3 x 1 = 3

17. Does the chemical reaction take place when zinc is added to ferrous sulphate solution? Justify your answer.

18. How can ethanol be converted into ethanoic acid?

19. Sodium and potassium are placed in the same group of modern periodic table. If the molecular formula of sodium sulphate is Na_2SO_4 , then decide the molecular formula of potassium sulphate. Give reason for your answer.

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

20. The general formula of two specific groups of saturated and unsaturated hydrocarbons is C_nH_{2n} . Write the structures of the member of each group when $n = 3$.

OR

Explain substitution reaction in hydrocarbons with an example.

21. Draw the neat labelled diagram of the apparatus used to show the reaction of zinc granules with dil. Sulphuric acid.

22. The pH values of four solutions A, B, C and D are 5, 12, 8 and 9 respectively. Arrange them in the increasing order of their hydroxyl ion concentration. Which solution among them has strong acidic property? Explain what happens if our mouth contains the pH of solution A?

IX. Answer the following questions.

3 x 3 = 9

23. How are the limitations of Mendeleev's periodic table rectified in the modern periodic table?

OR

Explain how the trends in the modern periodic table change do as we go down the group and along the period.

i) Atomic size ii) metallic character iii) electropositive character

24. Explain the mechanism of cleaning action of soaps.

25. Draw the diagram of electrolytic refining of copper. Label the following.

(i) Cathode (ii) Anode mud

X. Answer the following question.

1 x 4 = 4

26. Give reasons:

- i) Ionic compounds in solid state do not conduct electricity, whereas in molten state are good conductors of electricity.
- ii) Silver articles when exposed to air gradually turn blackish.
- iii) Alloys of iron are more useful when compared to pure iron.

PART: C

BIOLOGY

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

2 x 1 = 2

27. By constructing khadin check dams in level terrains

- A. Underground water level decreases
- B. Underground water level increases
- C. Vegetation's in the nearby areas are destroyed due to excess moisture
- D. Underground water gets polluted

28. Ozone layer is essential because it absorbs most of the:

- A. infrared radiations B. heat C. solar radiations D. ultraviolet radiations

XII. Answer the following questions.

3 x 1 = 3

29. Reuse of plastic products is better than recycle method. Why?

30. How is ozone formed in the upper part of the atmosphere of the earth?

31. List any two measures that you suggest for better management of water resources.

XIII. Answer the following questions.

2 x 2 = 4

32. A person's face has become pale and his breathing rate has increased due to fear. Analyse the process which enables the person to deal with this situation.

OR

Define positive geotropism and negative geotropism. Give one example of each.

33. Draw the diagram showing the germination of pollen on stigma and label pollen tube.

XIV. Answer the following questions.

3 x 3 = 9

34. i) Write the differences between homologous organs and analogous organs.

ii) What are fossils?

OR

What is evolution? Explain the three evidences for evolution.

35. State one function of each of the following parts of human male reproductive system.

i) Vas deferens

ii) Testes

iii) Prostate gland

OR

Suggest three contraceptive methods to control the size of human population which is essential for health and prosperity of a country. State the basic principle involved in each.

36. Explain with the help of a figure that father is responsible for the sex of a child.

OR

The plant bearing round yellow coloured (RrYy) seeds are self-pollinated with the same plant. Represent the result obtained in the F₂ generation of dihybrid cross with the help of a checker board. Mention the varieties of plants obtained in F₂ generation.

XV. Answer the following question.

1 x 4 = 4

37. a) Draw the structure of a neuron. Label the following parts.

i) Dendrite

ii) Axon

b) Name the parts of a neuron.

i) Where information is acquired

ii) Through which information travels as an electrical impulse.

XVI. Answer the following questions.

1 x 5 = 5

38. a) i) What is lymph?

ii) How is composition of lymph different from blood plasma?

iii) List two functions of lymphatic system.

b) Differentiate between artery and vein.

2020-21 MODEL QUESTION PAPER SET-3

PART: A

PHYSICS

I .Four alternatives are given for each of the following questions / incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet. **3X1=3**

- The SI unit of potential difference is _____.
A) Ohm B) volt C) ampere D) Watt
- A soft iron bar is inserted inside a current-carrying solenoid. The magnetic field inside the solenoid ____
A) Will decrease B) Will become zero C) Will increase D) Will remains the same
- Distance between optical centre and principal focus of a lens is
(A) Centre of curvature (B) Radius of curvature (C) Focal length (D) Aperture
- The work done in moving a charge of 2C across two points having a potential difference 12 V is ____
A. 24 J B. 6 J C. 14 J D. 10 J

II Answer the following questions

2 x 1 = 2

- State Right-Hand thumb rule.
- The refractive indices of crown glass and flint glass are 1.52 and 1.65 respectively. Which will allow the light to travel faster? Give reason.

III Answer the following question

2 x 2 = 4

- What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
- Draw the ray diagram to show the formation of image by a convex lens when the object is kept between $2F_1$ and F_1 . (F_1 : Principal focus of the convex lens)

IV Answer the following questions

3 x 3 = 9

- Draw the diagram of an electric motor labels the following parts.
i) Brushes ii) Split rings
- A convex lens forms a real and inverted image of a needle at a distance of 50cm from it. Where is the needle placed in front of the convex lens if the image is equal to the size of the object? Also, find the power of the lens.

[OR]

An object is kept at a distance of 40cm from a diverging lens of focal length 20cm. At what distance the image is formed from the lens? Find the magnification of the image.

- What are the major constituents of biogas? How is it obtained from animal or plant wastes? What are the advantages of this plant?

V Answer the following questions**1 x 4 = 4**

12. a) What is electric power?

b) What is the resistance of a conductor? Mention the factors on which the resistance of a conductor depend.

VI Answer the following questions**1 x 5 = 5**

13. a) How does a solenoid behave like a magnet? Can you determine the north and south poles of a current carrying solenoid with the help of a bar magnet? Explain.

b) Mention 2 important properties of the magnetic field lines.

PART: B
CHEMISTRY

VII. Four alternatives are given for each of the following question / incomplete statements choose the correct alternative and write the complete answer along with its letter of alphabet.**3x1=3**

14. Methyl orange is

- A) Pink in acidic medium, yellow in basic medium.
- B) Yellow in acidic medium, pink in basic medium.
- C) Colourless in acidic medium, pink in basic medium.
- D) Pink in acidic medium, colourless in basic medium.

15. The IUPAC name of $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ is

- A) 3-Butene B) Prop-1-ene C) But-1-ene D) Butyne

16. What happens to the electropositive character of elements on moving from left to right in a periodic table?

- A) Increase B) First increase then decreases C) Decreases D) First decreases then increase

VIII Answer the following questions:**3X1=3**

17. Why are aqueous solutions of Ionic compounds able to conduct electricity?

18. Lithium, sodium and potassium were put in on group or triad on the basic of their similar properties. What is the name of this group? State any one property of it.

19. How will you test for the gas which is liberated when hydrochloric acid reacts with an active metal?

IX Answer the following questions**3 x 2 = 6**

20. Differentiate between saturated and unsaturated hydrocarbons. Give one example each.

OR

Explain combustion reaction of carbon compounds with an example.

21. Draw the diagram of the apparatus used in the electrolytic refining of copper-label the following parts.

i) Cathode

ii) Anode mud

22. Why is a metal oxide called a basic oxide? Name the products obtained when copper oxide reacts with dilute hydrochloric acid?

X Answer the following question

3 x 3 = 9

23. Explain the limitation of Mendeleev's periodic table?

OR

Explain the limitations of Newland's law of Octaves.

24. Draw the diagram of the arrangement of the apparatus showing the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning. Label the following parts:

i) Zinc granules

ii) Delivery tube

25. What is cinnabar? How is metal extracted from cinnabar? Explain briefly.

XI Answer the following questions

1 x 4 = 4

26. a) Write the electron dot structure for sodium and chlorine.

b) Show the formation of NaCl by the transfer of electrons with electron dot structure.

c) Name the ions present in the compound

PART: C

BIOLOGY

XII. Four alternatives are given for each of the following questions/ incomplete statements. Choose the correct alternative and write the complete answer along with its respective letter of alphabet.

2X1=2

27. The group of materials which contain at least one bio non-degradable material is,

A. peels of vegetables, paper, and leather belt.

B. cake, milk packet, wooden sticks.

C. grass, used tea leaves, paper bags.

D. pencil peels, silk saree, old books.

28) The pattern of response in the shoots of plants is,

A. upward directional and negatively phototropic.

B. positively phototropic and negatively geotropic.

C. non directional and positively geotropic.

D. positively hydrotropic and upward directional.

XII. Answer the following questions

2X1=2

29. Why is it compulsory rule that refrigerator manufacturing companies must produce CFC- free Fridges?

30. Name the ancient methods of rain water harvesting systems used in the states Kerala and Rajasthan in India.

XIV. Answer the following questions

3X2=6

31. How deoxygenated blood in the human body gets oxygenated and supplied to different parts of body?

OR

Explain the role of transpiration in the conduction of water in plants.

32. Name any two protests carried out by local people to save the forest in India. Explain any one such protest.

33. Draw the diagram showing germination of pollen on stigma and label the part 'which receives male gamete'.

XV. Answer the following questions.

3X3=9

34. State and Prove the 'law of dominance' given by Mendel taking the example of the cross between round seeded (RR) Peas plants with wrinkled seeded (rr) peas plants.

35. in female reproductive system,

- I. Where does the fertilization take place?
- II. What are the roles of ovary?
- III. If there is no fertilization what happens to the egg? How is it eliminated from the body?

OR

In sexual reproduction,

- a) Name the cell division which helps to get the DNA amount to its half in germ cells. After fertilization what is the DNA amount in the zygote? What is the use of this process?
- b) Differentiate between male and the female germ cells in human beings.

36. Draw the diagram showing the structure of nephron and label the following parts.

- i) Bowman's capsule
- ii) collecting duct

XVI. Answer the following questions:

2 X 4 = 8

37. a) Write the differences between homologous organs and analogous organs in different organisms with suitable examples.

b) Explain law of independent assortment using Mendel's experiment.

38. a) Name the hormone which protects the body in dangerous situation? Explain its working mechanism during the emergency situation?

b) Write any four functions of the fore brain. Name the part of the fore brain which controls the hunger and sleep.



PART: A
PHYSICS

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

1) The SI unit of electric charges is:

- A. volt B. ampere C. coulomb D. joule

2) Which of the following is NOT a property of magnetic lines?

- A. Magnetic field lines are dense near poles
B. Magnetic field lines are closed loops
C. Magnetic field lines intersect each other
D. Magnetic field lines emerge from North Pole and merge at the South Pole

3) The inner surface of solar cooker is coated with black paint to

- (A) Absorb more heat (B) reflect light
(C) Prevent rusting (D) converge the light rays

II. Answer the following questions.

2 x 1 = 2

4) The convex lens forms a real and inverted image of an object. The size of image is the same as the object. Where is the object placed?

5) "The magnification produced by the lens is -2." Write the points that you have understood by the statement.

III. Answer the following questions.

3 x 2 = 6

6) Draw the ray diagram to show the formation of image by a convex lens when the object is kept between $2F_1$ and F_1 . (F_1 : Principal focus of the convex lens)

7) A bulb is marked 220 V and 40 W. Calculate the current flowing through the bulb and its resistance.

8) List out the factors on which resistance of a conductor depends.

IV. Answer the following questions.

3 x 3 = 9

9) Draw the diagram of an electric generator. Label the following parts.

- (i) Carbon Brushes (ii) Rings

10) A 3cm tall object is placed perpendicular to the principle axis of convex lens of focal length 15cm. The distance of the object from the lens is 30cm. Find the nature, position and size of the image.

OR

One cm high objects is placed 10cm from a convex lens perpendicular its principle axis. The image formed by the lens is real and inverted with size 2cm. Calculate the power of the lens.

11) List out the advantages and disadvantages of solar cooker.

V. Answer the following questions.

2 x 4 = 8

12) What is the meaning of the statement "The potential difference between two points is 1 V"? Name the device used to measure potential difference. What is resistance of a conductor? What is electric power? Write three formulae used to find it.

13) Briefly explain the construction and working of an electric motor

OR

Describe the activity to show that a current carrying conductor experiences a force in a magnetic field. State the rule to determine the direction of force.

**PART: B
CHEMISTRY**

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

14) The functional groups present in propanol and propanal respectively are

- (A) — OH and — CHO (B) — OH and — COOH
(C) — CHO and — COOH (D) — CHO and — CO

15) The gas liberated when an acid reacts with a metal is:

- A. Hydrogen. B. Chlorine C. Carbon dioxide D. Nitrogen dioxide

16).The element 'X' with atomic number 16 belongs to the following block and period.

- A. 'p' block and 3rd period B. 'p' block and 2nd period
C. 's' block and 3rd period D. 'd' block and 2nd period

VII. Answer the following questions.

3 x 1 = 3

17) Lithium sodium and potassium are Dobereiner's triad. Lithium and potassium's atomic mass is 7 and 39 respectively. Find the atomic mass of sodium?

18) What is catenation?

19) Why school bells are made from metals?

VIII. Answer the following questions.

3 x 2 = 6

20) Write your observation and balanced equation, when iron nail is dipped in copper sulphate solution.

21) Draw the diagram of the apparatus used to show that acid solution in water conducts electricity and label dilute hydrochloric acid.

22) What is a homologous series? Explain with an example.

OR

What is hydrogenation? What is its industrial application?

IX. Answer the following questions.

3 x 3 = 9

23) The elements A and B have atomic number 11 and 12 respectively. Which element has high metallic property? Why? Write the molecular formula of the compound formed when the above elements react with the element of atomic number 8.

(OR)

Calcium atomic number is 20 and potassium's atomic number is 19. Based on this answer the following questions:

- i) Is calcium a metal or non-metal?
ii) Which element's atomic radii are smaller among the above? Write its oxides with molecular formula.

24) Explain the mechanism of the cleaning action of soaps.

25) Draw the diagram of the arrangement of the apparatus showing the reaction of steam on metal. Label the following.

(i) Metal Sample

(ii) Delivery tube

X. Answer the following question.

1 x 4 = 4

26) In thermite process iron compound reacts with a metal. Based on this, write the metal used. Name the metal obtained in liquid state. Write balanced chemical equation for above reaction. Mention the common use of product obtained from above reaction.

**PART: C
BIOLOGY**

XI. Four alternatives are given for each of the following questions/incomplete statements.

Choose the correct alternative and write the complete answer along with its letter of alphabet.

2 x 1 = 2

27) The practice of using used materials without changing their shape and form is

- A. Reuse B. Recycling C. Repurpose D. Reduce

28) The correct statement with respect to biodegradable substances among the following is; these substances

- A. remain inert in the environment for a long time
B. harm various organisms in the ecosystem
C. increase the density of harmful chemicals in different tropic levels
D. undergo recycling naturally in the environment

XII. Answer the following questions.

3 x 1 = 3

29) Which is pollutant that causes ozone depletion?

30) What are the two methods of water management?

31) Write two important uses of constructing dams.

XIII. Answer the following questions.

2 x 2 = 4

32) Which is the control center of reflex action? What is the route taken by the reflex action called?

OR

Which is the largest part of the brain? Write its function.

33. Draw the diagram showing the longitudinal section of a typical flower and label 'anther'.

XIV. Answer the following questions.

3 x 3 = 9

34) a) Explain the development of fertilized egg in to a foetus in woman

b) In humans, how the surgical contraceptive methods can be used to prevent pregnancy?

OR

Define puberty? Write the functions of testosterone hormone? What are the common changes that occurs in both boys and girls during teenage periods?

35) Growth the thread like structures along with the gradual spoilage of tomato can be observed when a cut tomato is kept aside for four days, Interpret the causes for this change.

36) Why are fossils considered important in the study of evolution? Explain two ways by which age of fossils can be estimated.

OR

What is evolution? Explain the three evidence for evolution.

XV. Answer the following question.

1 x 4 = 4

37. Draw the diagram showing the longitudinal section of the human brain. Label the following

i) Hypothalamus

ii) Medulla

XVI. Answer the following questions.

1 x 5 = 5

38) a) What are the functions of the fluids 'blood' and 'lymph' in humans?. In mammals and birds oxygenated blood and deoxygenated blood gets separated why?

b) Mention the main functions of kidney. Name the factors which involved in the re-absorption of water in nephron.

2020-21 MODEL QUESTION PAPER SET-5

PART: A

PHYSICS

I. Four alternatives are given for each of the following questions. Choose the correct alternative and write the complete answer along with its letter of alphabet. 3x1=3

1. The SI unit of Resistance is

A) ohm

B) volt

C) coulomb

D) joule

2. Light travels fastest in

A) Water

B) air

C) glass

D) diamond

3. At the time of short circuit, the current in the circuit,

A) Reduces substantially

B) does not change

C) Increases heavily

D) vary continuously

II. Answer the following questions

2x1=2

4. The refractive index of diamond is 2.42. What is the meaning of this statement?

5. Find the power of the concave lens of focal length 2m.

III. Answer the following questions

3x2=6

6. Draw the ray diagram to show the formation of image by convex lens when object is kept beyond $2F_1$.

7. Why does the cord of an electric heater does not glow while the heating element does?

8. What are the advantages of connecting electrical appliances in parallel instead of connecting in series?

IV. Answer the following questions.

3x3=9

9. Draw the diagram of electric motor. Label the following parts.

i) Split rings

ii) Brushes

10. A ray of light travelling in air enters obliquely into water. Does the light ray bend towards or away from the normal? Why? Draw the ray diagram to show the refraction of light in this situation.

OR

A concave lens has focal length of 15cm. At what distance should the object from the lens be placed, so that it forms an image at 10cm from the lens? Also find the magnification produced by the lens.

11. Why are we looking at alternate sources of energy?

V. Answer the following questions.

2x4=8

12. a) Give advantages of AC over DC.

b) What is meant by earthing? Why should electrical appliances be earthed?

OR

State Fleming's right hand rule. Give the construction & working of AC generator with diagram. What modifications will you suggest so that output is DC?

13. a) What is meant by overloading? Mention any two precautions to be taken to avoid overloading.

b) An electric iron box consumes energy at a rate of 840W when heating is at maximum & 360W when heating is at minimum. The voltage is 220V. What is the current and resistance in each case?

PART: B

CHEMISTRY

VI. Four alternatives are given for each of the following questions. Choose the correct alternative and write the complete answer along with its letter of alphabet.

3x1=3

14. Rain is called acid rain when its pH is

A) Below 7

B) below 6

C) below 5.6

D) above 7

15. The functional group present in the CH_3COCH_3 is

A) Alcohol

B) carboxylic acid

C) ketone

D) aldehyde

16. The basis for the modern periodic table is

A) Atomic mass

B) Atomic number

C) valency

D) Atomic radius

VII. Answer the following questions.

3x1=3

17. Write the electron dot structure of ethane (C_2H_6) molecule.

18. State Mendeleev's periodic law.

19. What are amphoteric oxides? Give examples.

VIII. Answer the following questions.

3x2=6

20. Name the ketone having three carbon atoms & write its structure.

OR

Explain the substitution reaction of carbon compounds with example.

21. Draw the diagram of reaction of Zinc granules with dilute sulphuric acid. Label the following parts

i) Zinc granules

ii) Hydrogen gas bubbles.

22. A student dropped few pieces of marbles in dilute HCl taken in a test tube. The evolved gas is then passed through lime water. What change is observed in lime water? Explain the observations with balanced chemical equations.

IX. Answer the following questions.

3x3=9

23. Explain the achievements of Mendeleev's periodic table.

OR

Explain Dobereiner's Law of triads.

24. Draw the diagram of the apparatus showing the reaction of steam on metal. Label the following parts.

- i) Metal sample ii) Delivery tube

25. a) define functional group.

b) Define catenation.

c) State one difference between soap and detergent.

X. Answer the following.

1x4=4

26. i) Give reasons.

a) Copper is used to make hot water tanks and not steel.

b) Sodium, Potassium, Lithium are stored under oil.

ii) What is corrosion? Mention any two ways to prevent corrosion.

PART: C
BIOLOGY

XI. Four alternatives are given for each of the following questions. Choose the correct alternative and write complete answer along with its letter of alphabet.

2x1=2

27. Which of the following is the age old concept of water harvesting system in Madhya Pradesh

- A) Bundhis B) ponds C) Bhandaras D) Nadis

28. The substance which is responsible for depletion of Ozone layer is

- A) CFCs B) CH₄ C) DDT D) O₂

XII. Answer the following questions.

3x1=3

29. What is the function of ozone layer in the earth's atmosphere?

30. Name any two forest products which are basis for some industry.

31. Mention any two advantages of ground water

XIII. Answer the following questions.

2x2=4

32. Draw the diagram showing the germination of pollen grain and label pollen tube.

33." Smita's father has been advised by doctor to reduce sugar intake."

i) Name the disease he is suffering from?

ii) Name the hormone whose deficiency is responsible for the disease?

XIV. Answer the following questions

3x3=9

34. Raghu often taunts his wife for having only daughters and no son. As a student of biology how will you convince Raghu that his wife has no role in giving birth to only girls?

OR

What are fossils? What do they tell us about the evolution?

35. What is the role of seminal vesicles and prostate gland? How the embryo does gets nourishment inside the mother's body?

OR

What happens when?

i) Egg is fertilised

ii) Egg is not fertilised.

36. a) Differentiate between Homologous organs and Analogous organs.

b) Define speciation.

XV. Answer the following question

1x4=4

37. Draw the diagram showing the longitudinal section of human brain and label the following parts

a) Hypothalamus

b) medulla oblongata

XVI. Answer the following question.

1x5=5

38. a) Define excretion. Explain the formation of urine. 3

b) How plants get rid of their excretory products? 2



I. Four alternatives are given for each of the following questions/incomplete statements.

Choose the correct alternative and write the complete answer along with its letter alphabet

4 x 1 = 4

- The main constituent of biogas is :
 - Methane
 - carbon dioxide
 - hydrogen
 - Hydrogen sulphide
- In Fleming's right hand rule middle Finger indicates the direction of
 - Magnetic field
 - induced electric current
 - mechanical energy
 - motion of the conductor
- A Car headlight bulb working on a 12 Volt, car battery draws a current of 0.5 ampere .the resistance of the light bulb is
 - 0.5 ohm
 - B. 6 ohm
 - 12ohm
 - 24 ohm
- Keeping the potential difference constant, the resistance of a circuit is doubled the current will become
 - Double
 - Half
 - One-fourth
 - Four times

II. Answer the following questions.

2 x 1 = 2

- State the principle of an electric generator
- Why is the refractive index of atmosphere different at different altitudes?

III. Answer the following questions.

2 x 2 = 4

- Draw the diagram of the electric circuit In parallel connection
- How does biogas plant help to reduce the problem of pollution

IV. Answer the following questions.

3 x 3 = 9

- Draw the ray diagram to show the formation of image by a convex lens when the object is placed between F_1 and $2F_1$. Mention the position and nature of the image with help of the diagram.
- Explain two disadvantages of series arrangement for household circuit. And list the factors on which the resistance of a conductor depends.
- (i) Calculate the current through lamp of 25w at operating at 250 Volt
(ii) Why elements of electrical heating devices are made up of alloys?

OR

A copper wire has diameter 0.5 mm and resistivity of $1.6 \times 10^{-8} \Omega \text{ m}$. What should be the length of this wire to make its resistance 10 Ω .

V. Answer the following question.

1 x 4 = 4

12. State the laws of refraction of light. Different media have different refractive index.

Why? 'The refractive index of glass is 1.5'. What is the meaning of this statement?

OR

A concave lens of focal length 15 cm forms an image 10 cm from the lens. How far is the object placed from the lens? Find the magnification Produced by the lens. With the help of this mention the nature of the image.

VI. Answer the following question.

1 x 5 = 5

13. Explain Faraday's experiment of magnet and coil. What factors can be observed when the magnet is replaced by a coil carrying current? What are the conclusions that can be drawn by you from these experiments? State electromagnetic induction with the help of this experiment.

**PART: B
CHEMISTRY**

VII. Four alternatives are given for each of the following questions. Choose the correct alternative and write the complete answer along with its letter of alphabet.

2 x 1 = 2

14. The soap molecule has a
- A. Hydrophilic head and Hydrophobic tail
 - B. Hydrophobic head and Hydrophilic tail
 - C. Hydrophobic head and hydrophobic tail
 - D. Hydrophilic head and Hydrophilic tail
15. The type of bond that formed between chlorine and potassium is
- A. Covalent bond
 - B. Ionic bond
 - C. Metallic bond
 - D. Hydrogen bond

VIII. Answer the following questions.

4 x 1 = 4

16. Which type of drugs used in the treatment of indigestion?
17. State modern periodic law.
18. The atomic radius decreases in moving from left to right along a period. Give scientific reason ?
19. What is Catenation?

IX. Answer the following questions.

3 x 2 = 6

20. Explain the formation of scum when hard water is treated with soap.
21. Which elements has
- Two shells, both of which are completely filled with electrons?
 - The electron configuration 2,8,2?
 - A total of three shells, with four electrons in its valence shell?
 - The total of two shells, with three electrons in its valence shell?
22. You have two solutions, A and B. The pH of solution A is 6 and pH of solution B is 8. Which solution is more hydrogen ion concentration? Which of this is acidic and which one is basic?

X. Answer the following questions.

3 x 3 = 9

23. Draw the diagram of the arrangement of the apparatus showing the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning. Label the following parts :
- (i) Zinc granules (ii) Delivery tube
24. What is homologous series? State two properties of a homologous series. And find the homologous series of $C_{10}H_{20}$ molecule.

OR

What are functional groups? An organic compound having the molecular formula C_2H_6 . Give names and formula of the compound formed:

- When one H atom of C_2H_6 is replaced by-OH group.
 - When one H atom of C_2H_6 is replaced by-CHO group.
25. Draw the diagram of the apparatus used in the electrolytic refining of copper. Label the following parts.
- (i) Cathode (ii) Anode mud

XI. Answer the following question.

1 x 4 = 4

26. a) List out the general characteristics of ionic compounds
- b) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.

PART: C

BIOLOGY

XII. Four alternatives are given for each of the following statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

2 x 1 = 2

27. Which one the following is biodegradable substance ?
- A. Glass B. Plants C. Plastics D. Polythene
28. The movement of food in phloem is called

A. Transpiration

C. Respiration

B. Translocation

D. Evaporation

XIII. Answer the following questions.

2 x 1 = 2

29. Mention the reason for the depletion of ozone layer.
30. What does the high level of total coli form count in river Ganga indicate?

XIV. Answer the following questions.

3 x 2 = 6

31. Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

OR

How is food transported in plants?

32. List four stakeholders which may be helpful in the conservation of forests.
33. Draw the diagram showing the germination of pollen on stigma and label ovule.

XV. Answer the following questions.

3 x 3 = 9

34. What is speciation? What factors could lead to the speciation?

Or

Explain the importance of fossils in deciding evolutionary relationships.

35. Explain the significant function of each structure in human male reproductive system.

Or

Explain three different methods of contraception in human reproductive system.

36. Draw the diagram showing the structure of nephron. Label the following parts.

(i) Bowman's capsule (ii) Collecting duct

XVI. Answer the following questions.

2 x 4 = 8

37. a) Write differences between homologous and analogous organs
b) What is monohybrid cross? Write its genotypic and phenotypic ratio?
38. a) A person's face has become pale and his breathing rate has increased due to fear. Analyse the process which enable the person to deal with this situation.
b) Why are some patients of diabetes treated by giving injection of insulin?

2020-21 MODEL QUESTION PAPER SET-7

PART: A

PHYSICS

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

1. Which of the following terms does not represent electrical power in a circuit?

- A. I^2R B. IR^2 C. VI D. V^2/R

2. Where should an object be placed in front of a convex lens to get a real image of the size of the object?

- A. At the principal focus of the lens B. At twice the focal length
C. At infinity D. Between the optical centre of the lens and its principal focus.

3. At the time of short circuit, the current in the circuit

- A. Reduces substantially B. Does not change
C. increases heavily D. Vary continuously

II. Answer the following questions.

2 x 1 = 2

4. Find the focal length of a lens of power -2.0 D.

5. A ray of light travelling in air enters obliquely into water. Does the light ray bends towards the normal or away from the normal? Why?

III. Answer the following questions.

3 x 2 = 6

6. Draw the ray diagram to show the formation of image by a convex lens when the object is kept beyond $2F_1$ or C_1

7. Will current flow more easily through a thick wire or a thin wire of the same material, when connected to the same source? Why?

8. The potential difference between the terminals of an electric heater is 60 V when it draws a current of 4 A from the source. What current will the heater draw if the potential difference is increased to 120 V?

IV. Answer the following questions.

3 x 3 = 9

9. Draw the diagram of an electric motor. Label the following parts. (i) Carbon Brushes (ii) split rings

10. A concave lens has focal length of 15 cm at what distance should the object from the lens be placed so that it forms an image at 10 cm from the lens? Also, find the magnification produced by the lens.

Or

A 2.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10cm. The distance of the object from the lens is 15cm. Find the nature, position and size of the image. Also find its magnification.

11. Name two energy sources that you would consider to be renewable. Give reasons for your choices.

V. Answer the following questions.

2 x 4 = 8

12. Explain the underlying principle and working of an electric generator, what is the function of brushes?

Or

State the rule to determine the direction of a

- (i) magnetic field produced around a straight conductor-carrying current,
- (ii) Force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it, and
- (iii) Current induced in a coil due to its rotation in a magnetic field.

13.

- (a) According to Joule's law of heating, mention the factors on which heat produced in a resistor depends. According to this law write the formula used to calculate the heat produced.
- (b) Define electric power. Express it in terms of potential difference V and resistance R.
- (c) An electrical fuse is rated at 2 A. What is meant by this statement?

PART: B

CHEMISTRY

VI. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.

3 x 1 = 3

14. The pH of a sample of vegetable soup was found to be 3.5. This soup is likely to taste

- A. Sour B. Salty C. Sweet D. Bitter

15. The compound formed when three hydrogen atoms are replaced by chlorine atoms from methane are

- A. Chloroform B. carbon tetra chloride C. DDT D. Methanol

16. Electronic configuration of element 'X' is 2,8,1 and for 'Y' is 2,8,7 then mention the bond existing between 2 elements.

- A. Covalent bond B. Ionic bond
C. Hydrogen bond D. Metallic bond

VII. Answer the following questions.

3 x 1 = 3

17. How do the melting and boiling points of the hydrocarbons change with increase in molar mass?

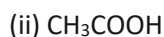
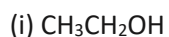
18. Sodium and Potassium are placed in the same group of modern periodic table. If the molecular formula of sodium sulphate is Na_2SO_4 , then decide the molecular formula of potassium sulphate. Give reason for your answer.

19. Write the balanced chemical equation for the reaction taking place when aluminium reacts with dilute hydrochloric acid.

VIII. Answer the following questions.

3 x 2 = 6

20. What is meant by a functional group in an organic compound? Name the functional group present in



OR

Differentiate between saturated and unsaturated hydrocarbons. Give one example for each.

21. Draw a diagram showing the reaction of Zinc granules with dilute Sulphuric acid and testing Hydrogen gas by burning and label the following parts.

- a) Zinc granules b) soap solution.

22. The given equation represents by X, among Fe and Ag? Justify your answer. Write the molecular formula of the compound represented by Y.



IX. Answer the following questions.

3 x 3 = 9

23. The atomic numbers of two elements are 8 and 16 respectively. Write the electronic configuration of these two elements. Do you keep these two elements in the same group of the modern periodic table? Justify your answer. Find out which of these two elements is more electronegative. Give reason for your answer.

OR

How could the Modern Periodic Table remove various anomalies of Mendeleev's Periodic Table?

24. Explain the nature of the covalent bond using the bond formation in CH_3Cl .

25. Draw the diagram of the arrangement of the apparatus showing the reaction of steam on metal. Label the following.

- (i) Metal Sample (ii) Delivery tube

X. Answer the following question.

1 x 4 = 4

26. Give reasons

- (a) Platinum, gold and silver are used to make jewellery.
(b) Sodium, potassium and lithium are stored under oil.
(c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
(d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction

PART: C

BIOLOGY

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

2 x 1 = 2

27. 4. Which of the following is a non-biodegradable substance?

- A. Bio-plastic B. Plastic C. Plants D. Plant producers

28. By constructing khadin check dams in level terrains,

- A) Underground water level decreases
B) Underground water level increases

C) Vegetation in the nearby areas is destroyed due to excess moisture.

D) Underground water gets polluted.

XII. Answer the following questions.

3 x 1 = 3

29. Write the cause for depletion of ozone layer.

30. Mention the two conservative methods for the ground water.

31. Why should we conserve forests and wildlife?

XIII. Answer the following questions.

2 x 2 = 4

32. Give two examples of a plant hormone that promotes growth and write its function.

OR

How does chemical coordination occur in plants?

33. Draw the diagram showing the longitudinal section of a typical flower and label

i) Stamen

ii) pistil

XIV. Answer the following questions.

3 x 3 = 9

34. How is the sex of the child determined in human beings?

OR

(i) How does relative method help to determine the age of fossils?

(ii) "Experiences of an individual during its life time cannot direct evolution.

(iii) "Chromosomes inherited from the father determine the sex of a child." Explain.

35. What are the advantages of sexual reproduction over asexual reproduction? What are the functions performed by the testis in human beings?

OR

a) Explain the development of fertilized egg into a foetus in a woman.

b) In humans, how the surgical contraceptive methods can be used to prevent pregnancy?

36. Explain the terms analogous and homologous organs with examples.

XV. Answer the following question.

1 x 4 = 4

37. Draw the diagram showing the longitudinal section of the human brain. Label the following parts.

i) Cerebrum

ii) Medulla

XVI. Answer the following questions.

1 x 5 = 5

38. What are the components of the transport system in human beings? What are the functions of these components? Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

2020-21 MODEL QUESTION PAPER SET-8

PART: A

PHYSICS

I. Four alternatives are given for each of the following questions/incomplete statements.

Choose the correct alternative and write the complete answer along with its letter of alphabet.

4 x 1 = 4

- Spent slurry (Bio-waste after obtaining biogas) is used as
A. fuel B. manure C. food for livestock D. used again for generating biogas
- Choose the instrument used to detect the presence of electric current in a circuit?
A. Generator B. Motor C. Galvanometer D. None of above
- Which of the following terms does not represent electrical power in a circuit?
A. I^2R B. IR C. VI D. V^2/R
- The frequency of the current produced in A.C. dynamo depends on the
A. rate of rotation of the armature B. strength of the magnetic field
C. number of turns of the coil parallel D. size of the dynamo.

II. Answer the following questions.

2 x 1 = 2

- What is electromagnetic Induction?
- Define one diopetre of power of a lens?

III. Answer the following questions.

2 x 2 = 4

- Draw the diagram of the resistors in series and label ammeter.
- List the characteristics of a good source of energy.

IV. Answer the following questions.

3 x 3 = 9

- Draw the ray diagram to show the formation of image by a convex lens when the object is placed at $2F_1$. Mention the position and nature of the image with help of the diagram. (F_1 : Principal focus of the convex lens)
- State Ohm's law. How ammeter and voltmeter should be connected in electric circuit? What is the use of these instruments, in the circuit?
- There are two electric lamps M and N which are joined in a series having resistance equal to 15 and 20 respectively. If the potential difference between two terminals of electric circuit is 220V, find the total resistance and electric current through the circuit. Also find the potential difference across the two lamps separately.

OR

A copper wire of resistivity $2.6 \times 10^{-8} \Omega\text{m}$, has a cross sectional area of $30 \times 10^{-4} \text{cm}^2$. Calculate the length of this wire required to make a 10Ω coil.

V. Answer the following question.

1 x 4 = 4

- State the laws of refraction of light. Different media have different refractive index. Why? 'The refractive index of glass is 1.5'. What is the meaning of this statement?

OR

A concave lens has focal length 30 cm. At what distance should the object be placed from the lens so that it forms an image at 20 cm from the lens? Find the magnification produced by the lens. With the help of this mention the nature, size and position of the image.

VI. Answer the following question.

1 x 5 = 5

- With the help of a diagram of experimental set-up describe an activity to show that the force acting on a current carrying conductor placed in a magnetic field increases with increase in field strength. (Note: Apparatus Required, Procedure, Observations, Conclusion)

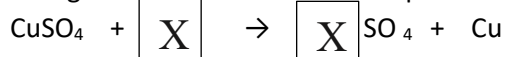
VII. Four alternatives are given for each of the following questions/incomplete statement. Choose the correct alternative and write the complete answer along with its letter of alphabet. **2 x 1 = 2**

14. Which of the following belongs to homologous series of alkynes?

C_4H_8 , C_3H_8 , C_5H_8 , C_6H_6 .

- A. C_3H_8 B. C_5H_8 C. C_3H_6 D. C_6H_6

15. In the following chemical reaction metal represented by 'X' is



- A. Ag B. Au C. Fe D. Hg

VIII. Answer the following questions. **4 x 1 = 4**

16. What will be the product, when aqueous solution of sodium hydroxide reacts with aqueous solution of hydrochloric acid?

17. Write the one difference between Mendeleev's and Modern periodic Table.

18. The metallic property of elements increases down the group in the modern periodic table. Why?

19. Write the electric dot structure of ethane?

IX. Answer the following questions. **3 x 2 = 6**

20. What is substitution reaction? Give one example.

21. The atomic numbers of two elements are 8 and 16 respectively. Write the electronic configuration of these two elements. Do you keep these two elements in the same group of the modern periodic table? Justify your answer.

22. With the help of an example explain what happens

i) When an acid reacts with a metal carbonate.

ii) When carbon dioxide gas is passed through lime water for a short duration and for long duration?

OR

A,B,C,D and E are solutions having pH value 5,1,11,7 and 9 respectively, then which of the solution has
i) more acidic and ii) more basic.

X. Answer the following questions. **3 x 3 = 9**

23. Draw the diagram of the arrangement of the apparatus showing the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning. Label the following parts :

- (i) Zinc granules (ii) Delivery tube

24. Write the structural formula of the following hydrocarbons. i) Benzene. ii) Cyclo hexane. iii) Butane.

OR

Explain the cleaning action of soaps.

25. Draw the diagram of the apparatus used in the electrolytic refining of copper. Label the following parts.

- (i) Cathode (ii) Anode mud

XI. Answer the following question. **1 x 4 = 4**

26. Mention the difference between calcination and roasting. How these processes are used in the extraction of zinc? Explain with the help of chemical equations. After these processes is reduction necessary to obtain zinc? Why?

XII. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet. **2 x 1 = 2**

27. The substance which is chiefly responsible for the depletion of ozone layer is:

- A. CFCs B. CH₄ C. DDT D. O₃

28. The main function of the plant hormone called abscisic acid is to:

- A. increase the length of cells. B. Promote cell division.
C. inhibit growth. D. Promote growth of stem and roots.

XIII. Answer the following questions. **2 x 1 = 2**

29. Which disease is caused in human beings due to depletion of ozone layer in the atmosphere?

30. Name the bacteria found in human intestine of people leaving around the Ganga River.

XIV. Answer the following questions. **3 x 2 = 6**

31. state two differences between arteries and veins?

OR

What is excretion? How do unicellular organisms remove their wastes?

32. Why must we conserve our forests? List any two causes for deforestation to take place..

33. Draw the diagram showing the germination of pollen on stigma and label 'female germ cell'.

XV. Answer the following questions. **3 x 3 = 9**

34. With the help of a flow chart explain in brief how the sex of a newborn is genetically determined in human beings. Which of the two parents, the mother or the father, is responsible for determination of sex of a child?

Or

What is meant by the term speciation? List four factors which could lead to speciation.

35. Explain the significant function of each structure in human male reproductive system.

OR

Explain the structure and important role of placenta during gestation period of woman.

36. Draw the diagram showing the structure of nephron. Label the following parts.

- (i) Bowman's capsule
(ii) Collecting duct

XVI. Answer the following questions. **2 x 4 = 8**

37. The plant bearing round yellow coloured (*RrYy*) seed are self-pollinated with the same plant.

Represent the result obtained in the *F*₂ generation of dihybrid cross with the help of a checker board. Mention the varieties of plants obtained in *F*₂ generation.

38. Write the functions of,

- a) Forebrain b) Cerebellum c) Mid brain d) Medulla.

***** END *****

KEY ANSWERS SECTION

MODEL ANSWER SET 1

PART:A - PHYSICS

1. B) Image size is equal to object and inverted.

2. D) resistor

3. B) from South Pole to North Pole

4. A) Low energy output per unit volume

5. Commutator

6. Concave lens

7. Refer page number 98 in part -1

8. Bio-gas is pollution free.

It is cheap as raw material {i.e., cow dung and waste of plants and vegetables) to produce biogas is available free of cost to the farmers.

The remains or used slurry in a bio-gas plant is used as manure by the farmers in the fields to get good yields of crops.

9. Refer page number 90, fig 10.16 (b), in part-2

10. According to Joule's law of heating, the amount of heat produced in a conductor is

- directly proportional to the square of electric current passing through the conductor,
- directly proportional to the resistance of the conductor, and
- Directly proportional to the time for which electric current passes through the conductor.

Applications of joules law of heating

- Electric fuse is a safety circuit devices work on this principle
- Electric iron we use to iron our cloths works on this principle

11. We are given

Resistivity of manganese is $= 1.84 \times 10^{-6} \Omega\text{m}$

Length of the wire is $(l) = 1 \text{ m}$

The diameter $(d) = 3 \times 10^{-4} \text{ m}$

Resistance = ?

$$\rho = RA/l = R\pi d^2 / 4l$$

$$R = \rho \times 4l / \pi d^2 = 1.84 \times 10^{-6} \times 4 \times 1 / 3.14 \times 9 \times 10^{-2} = 26 \Omega$$

Therefore resistance is = 26 Ω

OR

Given data: $R_1 = 10 \Omega$, $R_2 = 40 \Omega$, $R_3 = 30 \Omega$, $R_4 = 20 \Omega$ & $R_5 = 60 \Omega$

$R' = ?$ & $R'' = ?$, $I = ?$

$$1/R' = 1/10 + 1/40 = 5/40$$

$$R' = 8 \Omega$$

$$1/R'' = 1/30 + 1/20 + 1/60 = 6/60$$

$$R'' = 10 \Omega$$

$$\text{Total resistance, } R = R' + R'' = 8 \Omega + 10 \Omega = 18 \Omega$$

According to OHM's law

$$I = V/R = 12V/18 \Omega = 0.67A$$

12. A 3cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 15cm. The distance of the object from the lens is 30cm. Find the nature, position and size of the image

Given data: height of the object = +3 cm

Focal length, f = +15 cm

Object distance, u = -30 cm

Image distance, v = ?

Height of the image, h' = ?

$$\text{Since } \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{-30} + \frac{1}{15} = \frac{-1+2}{30} = \frac{1}{30}$$

$$v = +30 \text{ cm}$$

The positive sign of v shows that the image is formed at a distance of 30 cm on the other side of the optical centre. The image is real and inverted.

$$\text{Magnification, } m = \frac{h'}{h} = \frac{v}{u}$$

$$h' = \frac{v \times h}{u} = \frac{30 \times 3}{-30} = -3 \text{ cm}$$

The negative sign of h' shows that the image is **inverted and real**

Here h & h' values are equal, it indicates the image is also **same size** of the object.

OR

Laws of refraction

i) The incident ray, the refracted ray and the normal ray all lie in the same plane.

(ii) The ratio of the sine of the angle of incidence in the first medium to the sine of refraction in the second medium is a constant. This law is also known as Snell's Law.

Because, variations in the velocities of light in different media cause the refractive indices to be different.

This means that the ratio of the speed of light in air and the speed of light in crown glass is equal to 1.52.

13. Take a coil of wire of large turns connect the ends to a galvanometer.

Take a strong bar magnet move its north pole into the coil. The galvanometer shows deflection. This indicates the presence of current in the coil. Withdraw the north pole of the magnet away from the coil. The galvanometer shows deflection This indicates the current is set up in the coil but opposite to the first. When the coil is kept stationary with respect to magnet the deflection of the galvanometer drops to zero. This indicates that no current is set up in the coil.

When the magnet is replaced by a coil carrying current induces current in another coil.

electromagnetic induction.

The process by which a changing magnetic field in conductor induces a current in another conductor.

Part B: chemistry

14. B) 6

15. A) Lead and tin

16. Milk of magnesia (antacid)

17. Addition of dihydrogen with unsaturated hydrocarbon in the presence of catalysts such as nickel or platinum or palladium are known as Hydrogenation (addition) reaction.

18. "The physical and chemical properties of elements are the periodic function of their atomic numbers."

19. because it resembles alkali metals by forming positive ions and resembles halogens by forming diatomic molecule.

20. as we know, the pH value of rain water of an area is 5.2 then it is considered as acid rain.

When acid rain enters into river then its effects the aquatic animals, it may cause sever conditions up to the death of that organisms.

OR

Solution A has more hydrogen ion concentrations than solution B

A is acidic & B is basic nature.

21. Series of organic compounds having the same functional group and chemical properties and successive members differ by a $-CH_2$ unit or 14 mass units are known as Homologous series.

Number of Carbon	Homologous series of Alkanes		Homologous series of Alkenes		Homologous series of Alkynes	
	1	Methane	CH ₄			
2	Ethane	C ₂ H ₆	Ethene	C ₂ H ₄	Ethyne	C ₂ H ₂
3	Propane	C ₃ H ₈	Propene	C ₃ H ₆	Propyne	C ₃ H ₄
4	Butane	C ₄ H ₁₀	Butene	C ₄ H ₈	Butyne	C ₄ H ₆
5	Pentane	C ₅ H ₁₂	Pentene	C ₅ H ₁₀	Pentyne	C ₅ H ₈

22.

Mg > P > Cl > Ar

Along the Period :- On moving from left to right in a period, the atomic size decreases due to the increased effective nuclear charge that pulls the valence electrons closer to the nucleus..

Down the Group :- On moving from top to bottom in a group, the atomic size increases due to the addition of an extra shell at each step.

23. DIAGRAM

24. cleaning action of soap:

- When a cloth with dirt attached to it is immersed in water containing soap, then the hydrocarbon chain (hydrophobic end) is attached to the dirt particle whereas the ionic end (hydrophilic end) points outward, towards water.
- So the dirt particles are surrounded by the soap molecules forming a micelle.
- This micelle gets attached with water molecules through the ionic end and is washed away along with the dirt particles.

Because soap gives less lather in hard water.

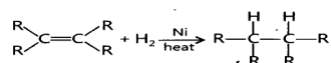
OR

Addition Reaction:

Addition of dihydrogen with unsaturated hydrocarbon in the presence of catalysts such as nickel or platinum or palladium are known as Hydrogenation (addition) reaction.

For Example:-

Process of converting vegetable oil into solid fat (vegetable ghee) is called Hydrogenation of Oil.



Substitution Reaction:

Replacement of one or more hydrogen atom of an organic molecule by another atom or group of the atom is known as Substitution Reaction.

For Example :-

in the presence of sunlight chlorine replaces hydrogen atom by one from methane.



C_2H_6 is example for alkanes. Alkanes undergo only substitution reaction but not addition reaction.

25. DIAGRAM

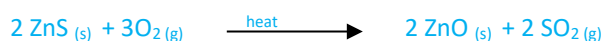
26.

<u>Roasting</u>	<u>Calcination</u>
Roasting is a process of converting sulphide ores into oxides by heating strongly in the Presence of excess air.	Calcium is a process of converting carbonate ores into oxides by heating strongly in limited air.
$2\text{ZnS}_{(s)} + 3\text{O}_{2(g)} \longrightarrow 2\text{ZnO}_{(s)} + 2\text{SO}_{2(g)}$	$\text{ZnCO}_3_{(s)} \longrightarrow \text{ZnO}_{(s)} + \text{CO}_{2(g)}$

When ZnCO_3 undergoes calcinations ZnO is formed.



When ZnS undergoes roasting, ZnO is formed.



After these processes reduction is necessary.

Because zinc oxide is then reduced to zinc using a suitable reducing agent.

PART C- BIOLOGY

27. C) Synapse

28. D) sulphur and nitrogen oxides

29. chloro fluoro carbons (CFC)

30. waste water recycling & irrigation of rain water.

31. Transport of soluble product of photosynthesis or food from leaves to other parts of **plants** is called **translocation**.

For **translocation**, food molecules enter the part of the phloem called the sieve tubes where they can be transported upwards or downwards to all the parts of the **plant** including roots.

OR

The pair of pulmonary arteries take blood away from the heart to the lungs of the respective side. The two pair of pulmonary veins carry oxygen-rich blood from the lungs to the heart.

Blood in pulmonary arteries is oxygenated.

Blood in pulmonary veins is deoxygenated.

32. **Reduce**: By the practice of '**Reduce**' we can **save**. (i) Electricity. (ii) Water. (iii) Food. (iv) Natural resources.

Reuse: By the practice of '**Reuse**' (i) **Environment** pollution can be controlled. (ii) Materials are available for immediate use.

33. DIAGRAM

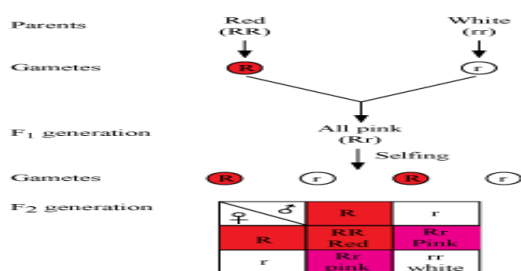
34. Male reproductive system

- **Testis**: They produce sperms and testosterone hormone which is responsible for male characters.
- **Scrotum**: They regulate temperature necessary for production of sperms .
- **Urethra and vas deferens**: Transport sperm from testis.
- **Prostate gland and seminal vesicle**: They add their secretion to make the sperm transport easier and provide nutrition.
- **Penis**: Delivers the sperms to the site of fertilization.

OR

- During pregnancy period the embryo gets nutrition from the mother's blood with help of disc shaped special tissue embedded in the uterine wall is called placenta.
- It contains villi on the developing side of the tissue.
- Villi provide glucose and oxygen to pass from mother to embryo.
- Removes the wastes generated from the embryo.

35.



- **Phenotypic Ratio** – 1:2:1 that denotes Red: Pink: White
- **Genotypic Ratio** – 1:2:1 that denotes RR: Rr: rr

It shows that alleles of red and white coloured flowers were unable to dominate the other, thus resulting in **incomplete dominance**. Thus, the **law of incomplete dominance** says that when none of the two alleles exerts complete **dominance** over the other, the offspring will be a mixture of parents' phenotypes.

OR

A gene is the section of DNA on a chromosome that codes the formation of a protein controlling a specific characteristic of the organism.

Suppose, a plant progeny possesses gene for the characteristic called 'tallness'. The gene for tallness will give instructions to the plant cells to generate many plant-growth hormones due to which the plant will grow tall.

On the other hand, if the plant has the tall. gene for shortness, less plant-growth hormones will be produced, due to which the plant will grow dwarf.

36. DIAGRAM

37. i) **Relative dating** is used to **determine** a **fossils** approximate **age** by comparing it to similar rocks and **fossils** of known **ages**. **Absolute dating** is used to **determine** a precise **age** of a **fossil** by using radiometric dating to **measure** the decay of isotopes, either within the **fossil** or more often the rocks associated with it.

ii) **Experiences of an individual during its life time** are in the somatic cells of the body. That is, in non-reproductive tissues that **cannot** be passed to the next generation. Thus, they **cannot** contribute directly in **evolution**.

iii) Men determine the sex of a baby depending on whether their sperm is carrying an X or Y chromosome. An X chromosome combines with the mother's X chromosome to make a baby girl (XX) and a Y chromosome will combine with the mother's to make a boy (XY)

38. a) Adrenaline is directly secreted into the blood. The blood to the skin is reduced due to contraction of muscles around small arteries.

The breathing rate increases because of the contractions of the diaphragm and the rib muscles. The heart beats faster, resulting in supply of more oxygen to the muscles.

b)

- **Reflex action** is mainly controlled by the **central nervous system**.
- Among three parts of the nervous system, **cerebellum** controls its action.
- Reflex action is the kind of impulse that travels to and from the **spinal cord**.
- Spinal cord is the kind of **neural pathway** in which this action travels.

Route taken by reflex action is called reflex arc.

2020-21 MODEL KEY ANSWER SET-2

PART: A: PHYSICS

- | | | |
|----|--|-----------------------------|
| 1. | B. 3Ω | 1 |
| 2. | D. Diamond | 1 |
| 3. | B. Concentric circles | 1 |
| 4. | It's a concave lens because the power of a concave lens is always negative. | $\frac{1}{2} + \frac{1}{2}$ |
| 5. | $u = -30\text{cm}$
$v = -10\text{cm}$
$m = \frac{v}{u} = + \frac{10}{+30} = \frac{1}{3}$ | $\frac{1}{2} + \frac{1}{2}$ |
| 6. | Refer part 2 text book: Page no 91, Figure 10.16(e) | 2 |

7. Given: $V = 220V$, $P = 40W$, $R = ?$

$$I = \frac{P}{V} = \frac{40}{220} = 0.18A \quad 1$$

$$R = \frac{V}{I} = \frac{220}{0.18} = 1222.22 \Omega \quad 1$$

8. Given: $R_1 = 2\Omega$, $R_2 = 4\Omega$, $R_3 = 4\Omega$

$R_4 = 5\Omega$, $V = 6V$, $R_T = ?$, $I = ?$

In parallel connection,

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{2} + \frac{1}{4} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} + \frac{1}{4} = \frac{4}{4}$$

$$R_p = 1\Omega$$

Total resistance of the circuit $R_T = R_p + R_4 = 1 + 5 = 6\Omega$ $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$

$$\text{Electric current, } I = \frac{V}{R} = \frac{6}{6} = 1A$$

9. Refer part 1 text book: Page no 126, Figure 13.15 2+1

10. A concave lens always forms a virtual, erect image on the same side of the object.

Image distance, $v = -10\text{cm}$

Focal length, $f = -15\text{cm}$

Object distance, $u = ?$

$$\text{Since } \frac{1}{v} - \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{u} = \frac{1}{v} - \frac{1}{f} \quad 1$$

$$\frac{1}{u} = \frac{1}{-10} - \frac{1}{-15} = -\frac{1}{10} + \frac{1}{15}$$

$$\frac{1}{u} = -3 + \frac{2}{30} = \frac{1}{-30}$$

$$\text{Or } u = -30\text{cm}$$

Thus, the object distance is 30cm.

$$\text{Magnification, } m = -\frac{10}{-20} = \frac{1}{3} = +0.33$$

The positive sign shows that the image is erect and virtual. The image is one third of the size of the object.

OR

Materials Required

A drawing board, 4-6 all pins, white sheet of paper, rectangular glass slab, a protractor, a scale, a pencil and thumb pins.

Procedure: Take a soft drawing board. Fix a white sheet on it with the help of thumb pins.

- Place the rectangular glass slab in the centre of the white paper and draw its outline boundary with pencil. Mark this rectangular figure obtained as ABCD. $\frac{1}{2}$
- On one side of this figure, i.e., AB take one point E, draw a perpendicular EN and label it as normal ray. $\frac{1}{2}$
- With the help of a protractor draw one angle of 30° with the EN. Fix two pins P and Q on the ray of this angle, the distance between the pins should be more than 4-5 cm.
- Put the glass slab on the rectangular figure ABCD. See through the glass slab from side CD and fix pin R and S such that when seen through the glass slab all $\frac{1}{2}$

the pins lie in straight line, [i.e., Pins P, Q, R and S should lie in straight line when seen through the glass slab], ‘

- Now, remove the pins P, Q, R and S one by one and draw small circles around the pin points. Remove the glass slab. Join points R and S such that it meets CD at point F.
Draw perpendicular to CD at point F as N'M'. ½
- Join points E and F with the pencil. Measure the angles formed at AB and CD, i.e., the incident angle, refracted angle and emergent angle. ½
- Extend ray PQ with scale and pencil in dotted line. It will be parallel to ray FRS. Repeat the above procedure for angles 45° and 60°. ½

11. The reasons for our looking at alternative sources of energy are:

- The conventional sources of energy like fossil fuels are in danger of getting exhausted soon.
- Conventional sources of energy are not sufficient to run the machines to do more and more tasks.
- Unlimited use of conventional sources of energy has led to the problem of energy crisis.
- Uncontrolled use of conventional sources of energy has created many problems of environmental pollution.

12. To avoid shocks from electrical appliances, use proper earthing arrangement.

- Replace old worn out and damaged wires with a new set.
- Put the main switch off while removing any fault in the electric circuit.
- Wear rubber shoes and gloves while dealing with any replacement of any electrical appliance.
- Work with electric circuits in proper light.
- Do not touch the electrical appliances with wet hand. (Any four) 1 X 4

OR

(i) When a bar magnet is pushed into the coil, an induced current is set up in the coil due to change in the magnetic field through it. Galvanometer shows the deflection. 1

(ii) When a bar magnet is withdrawn from inside the coil, again an induced current is set up in the coil due to change in the magnetic field through it. But Galvanometer shows the deflection in opposite direction. 1

(iii) If a bar magnet is held stationary inside the coil, then there is no induced current in the coil, because there is no change in the magnetic field through it. As a result Galvanometer does not show any deflection. 1

iv) By changing current in another coil placed near it. 1

13. i) Potential difference between two points in an electric circuit carrying same current is the work done to move a unit charge from one point to another. SI unit is volt. 1+1

ii) A battery 1

iii) a) The highest resistance: $R_s = R_1 + R_2 + R_3 + R_4 = 4 + 8 + 12 + 24 = 48\Omega$ 1

b) The lowest resistance: $R_p = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$

$$\frac{1}{R_p} = \frac{1}{4} + \frac{1}{8} + \frac{1}{12} + \frac{1}{24}$$

$$\frac{6}{24} + \frac{3}{24} + \frac{2}{24} + \frac{1}{24} = \frac{12}{24}$$

$$R_p = \frac{24}{12} = 2\Omega \quad \text{1}$$

PART: B: CHEMISTRY

14. C. Mercury 1

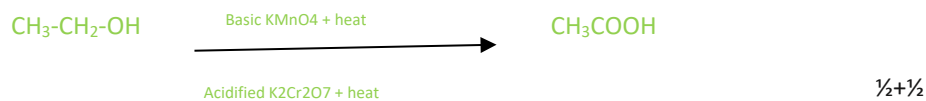
15. A. C₂H₆ 1

16. C. A and C

1

17. Yes, the chemical reaction takes place, because zinc is more reactive than the iron. 1

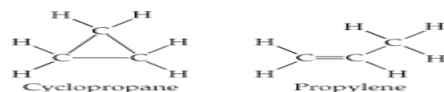
18. Alkaline potassium permanganate or acidified potassium dichromate is added to ethyl alcohol. When it is heated it oxidizes to ethanoic acid.



19. Molecular formula of potassium sulphate is K_2SO_4 .

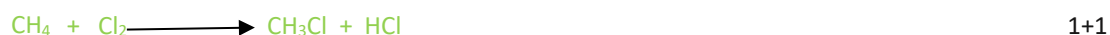
Because both sodium and potassium have same number of valence electrons. $\frac{1}{2} + \frac{1}{2}$

20.



OR

Saturated hydrocarbons are fairly unreactive but undergo substitution reactions in the presence of sunlight. Chlorine can replace the hydrogen atoms one by one.



21. Refer part 1 text book: Page no 19, Figure 2.1 1+1

22. Increasing order of hydroxyl ion concentration: $A < C < D < B$ 1

- Solution A has strong acidic property. $\frac{1}{2}$
- Tooth decay starts. $\frac{1}{2}$

23. In Mendeleev's periodic table, since the elements were arranged based on increasing order of atomic mass, the sequence was inverted so that the elements with the similar properties should be grouped together. (Ex: Cobalt appeared before nickel)

- Isotopes did not have any places.
- Limitations of Mendeleev's periodic table, were rectified in the modern periodic table by arranging the elements in the increasing order of atomic number and also electronic configuration.
- The problem of isotopes was solved. 3

OR

- Atomic size: Down the group increases due to addition of new shell and decrease in nuclear charges. Along the period, decreases as the nuclear charge increases due to large positive charges on the nucleus. 1
- Metallic character: Down the group increases as the size increases it can easily loose electron. Along the period, decreases due to increase in nuclear charge. 1
- Electropositive character: Down the group increases, as the metallic nature increases down the group. Along the period, decreases as the metallic nature decreases down the group. 1

24.

- The ionic end of soap interacts with water while the carbon chain interacts with oil.
- The soap molecules thus form structures called micelles, when one end of the molecules is towards the oil droplet while the ionic end faces outside.
- Thus an emulsion forms in water.
- The soap micelle helps in pulling out the dirt in water and thus cleans clothes. 3

25. Refer part 1 text book: Page no 53, Figure3.12 $2 + \frac{1}{2} + \frac{1}{2}$

26. Give reasons:

i) Ionic compounds in solid state do not conduct electricity, because movement of ions in the solid is not possible due to their rigid structure, because of strong force of attraction between the positive and negative ions.

In molten state, electrostatic forces of attraction between the oppositely charged ions overcome due to the heat. Thus ions move freely and conduct electricity. 1

ii) Silver reacts with sulphur in the air to form a coating of silver sulphide. 1

iii) Pure iron is very soft, stretches easily when hot. Alloys are hard, the properties of iron can be changed if it is mixed with other substances. 1

PART: C: BIOLOGY

27. B. Underground water level increases 1

28. D. ultraviolet radiations 1

29. Recycling method uses energy. Energy is not used in reuse method. 1

30. Ozone at higher level of atmosphere is a product of UV radiation acting on oxygen (O₂) molecule.

31. i) Rooftop rain water harvesting ½+ ½

ii) Watershed management

32.

- Adrenaline is directly secreted into the blood. The blood to the skin is reduced due to contraction of muscles around small arteries.
- The breathing rate increases because of the contractions of the diaphragm and the rib muscles. The heart beats faster, resulting in supply of more oxygen to the muscles. 1+1

OR

The movement of plant part in response to gravity is called geotropic movement and phenomenon involved is called geotropism. 1

Positive geotropism: Growth of roots towards gravity ½

Negative geotropism: Growth of shoot away from earth's gravitational force. ½

33. Refer part 2 text book: Page no 45, Figure8.8 1½ + ½

34. i)

Homologous organs	Analogous organs
<ul style="list-style-type: none">• Organs of different organisms have common origin.	<ul style="list-style-type: none">• Organs of different organisms have different origin.
<ul style="list-style-type: none">• They have similar structure and perform different function.	<ul style="list-style-type: none">• They have different structure and perform similar function.
<ul style="list-style-type: none">• Ex: Forelimbs of frog and forelimbs of bird	Ex: Wings of bird and wings of bat

ii) The preserved traces of the living organisms are called fossils. 2+1

OR

Phenomenon of gradual change of organisms from simple form into complex form in a long period is called evolution.

Three evidences are:

- Homologous organs: The organs which have same basic structures but modified to form different functions are called homologous organs. Provide the information that organisms of different species might be evolved from common ancestor.
- Analogous organs: The organs which have different basic structures but they perform same function are called homologous organs. Provide the information that though the organs of different organisms perform same function, they may not have same function but they may not be evolved from common ancestor.

- Fossils: The dead remains of past organisms under the rocks/ deep earthen layers are called fossils. They help to study evidence and missing link between different species. They help to understand the sequence of evolution and help in classification of organisms.

35. i) Vas deference: It helps in the passage of sperms.

ii) Testes: It produces sperms and male sex hormone – testosterone.

iii) Prostate gland: It secretes alkaline fluid which is discharged into the urethra. It protects sperms from acidity of male urethra. 1+1+1

OR

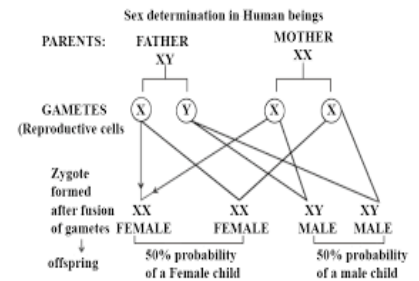
Three contraceptive methods are –

- Barrier method/ mechanical method: Condom/ diaphragm, to prevent the meeting of sperm and ova.
- Chemical method/ oral pills: Changes the hormonal balance of female partner so that the eggs are not released.
- Surgical method: To block the vas deference in males/ vasectomy or the fallopian tube (oviduct) in females/ tubectomy, to prevent the transfer of sperms or egg and hence no fertilization takes place.
- IUCDs/ Loop or the copper – T placed in the uterus, to prevent pregnancy. (Any three)

36. i) Sex of a child depends on what happens during fertilization.

- If a sperm carrying X chromosome fertilizes an ovum which carries X chromosome, child born will be a girl.
- If a sperm carrying Y chromosome fertilizes an ovum which carries X chromosome, child born will be a boy.
- Thus, sperm (from father) determines the sex of the child.

1+1+1



OR

Refer part 2 text book: Page no 55, Figure 9.5

3

37. a) Refer part 1 text book: Page no 81, Figure 7.1(a)

2

b) i) The information is acquired at the end of dendritic tip of a nerve cell.

1

ii) The information travels as an electrical impulse to the cell body, then along the axon to its end.

1

38. a) i) Lymph is a tissue fluid, that contain plasma, proteins and blood cells which escape into intercellular spaces.

ii) Lymph is colourless and contains less protein than plasma.

iii) Lymph carries digested food. Drains excess fluid from extracellular space back into the blood.

b)

Artery	Vein
• Wall is thick.	• Wall is thin.
• Valves absent.	• Valves present.
• Blood flows from heart to different organs.	• Blood flows from different organs to heart.
• The flow of blood is fast and with great pressure.	• The flow of blood is slow and with low pressure.

1. (B) Volt

2. (C) Will increase

3. (C) Focal length

4. A). 24 J

5. "If a current carrying conductor is imagined to be held in right hand such that Thumb- points in direction of current Then curled fingers of hand indicate the -direction of magnetic field. "

6. Light will travel faster through crown glass. Because greater the refractive index, greater is the density of the medium. Greater the density of the medium , lesser is the speed of light.

7. There is no division of voltage among the appliances when connected in parallel

.The potential difference across each appliance is equal to the supplied voltage

.The total effective resistance of the circuit can be reduced by connecting electrical appliances in parallel.

8. DIAGRAM

9. DAIGRAM ELECTRIC MOTOR

10. Object distance , $u = -50\text{cm}$ Image distance ,

$$V = 50\text{cm}$$

Focal length , $f = ?$, Power $P = ?$

According to the lens formula

$$1/f = 1/V - 1/u$$

$$1/f = 1/-50 - 1/50$$

$$1/f = -2/50 = 1/25$$

$$\text{Power of lens} = 1/f = -1/25$$

$$f = -25\text{cm}$$

$$\text{Power of lens} = 1/f = -1/25 = -0.04\text{D}$$

[OR]

Object distance , $u = 40\text{cm}$

Focal length , $f = -20\text{ cm}$

Image distance , $V = ?$

Magnification , $M = ?$

According to len's formula

$$1/f = 1/V - 1/u$$

$$1/v = -1/20 - 1/40$$

$$1/v = -2 - 1/40 = -3/40$$

$$v = +40/3 = 13.33\text{cm} \text{ \& } m = v/u = -13.33/-40 = 0.334$$

11. The major constituents of biogas are methane, carbon dioxide, Nitrogen, Hydrogen sulphide and oxygen.

It is produced by breakdown of organic matter in an anaerobic environment, primarily consisting of methane and carbon dioxide.

The advantages of this plant are:

- a) It is eco-friendly, less cost.
- b) Biogas generation produces organic fertilizer.

12. a) The rate at which electric energy is consumed in an electric circuit. ($P = VI$)

b) The property of a conductor to resist the flow of charges through it.

- Length of the conductor
- Cross-sectional area of the conductor
- Material of the conductor
- Temperature of the conductor

13.

a) A solenoid is a long coil of circular loops of insulated copper wire. Magnetic field lines are produced around the solenoid when a current is allowed to flow through it.

. The magnetic field produced by it is similar to the magnetic field of a bar magnet. The field lines

- produced in a current-carrying solenoid is shown in the following figure. In the above figure, when the north pole of a bar magnet is brought near the end connected to
- the negative terminal of the battery, the solenoid repels the bar magnet. Since like poles repel each other, the end connected to the negative terminal of the battery
- behaves as the north pole of the solenoid and the other end behaves as a south pole. Hence, one end of the solenoid behaves as a north pole and the other end behaves as a south pole.

b).

- No of field lines are found to cross each other.
- The density of the magnetic field lines are more in their poles.

PART B - CHEMISTRY

14. (A) Pink in acidic medium, yellow in basic medium.

15. (C) But-1-ene

16. Ans:- (C) Decreases

17. Aqueous solutions of ionic compounds contain ions which help to conduct electricity.

18. Lithium, sodium and potassium formed a group called alkali metal group. Their similar properties are

- They have one electron in outermost shell.
- All these are soft metals.

19. Will test it by bringing a burning candle near the hydrogen gas, where a pop sound is heard due to combustion of hydrogen gas.

20.

Saturated hydrocarbon	Unsaturated hydrocarbon
1. It consists of a single bond between carbon atoms.	1. Double or triple bond between carbon atoms is present.
2. It burns with a blue flame.	2. It burns with a sooty flame.
3. Show substitution reaction	3. Show addition reaction.
4. Less reactive Eg. CH ₄ , Methane C ₂ H ₆ , Ethane	4. More reactive E.g. H ₂ C=CH ₂ , Ethene HC≡CH, Ethyne

OR

Carbon, its allotropic forms and compounds burn in sufficient oxygen to give CO_2 and H_2O , with the liberation of large amount of heat and light.



21. DAIGRAM ELECTRIC REFINING OF COPPER

22. Metallic oxides are basic in nature because they react with dilute acids to form salt and water. They also react with water to form metal hydroxides which are alkaline in nature, as these metal hydroxides release OH^- ions in solution.

The products obtained when copper oxide reacts with dilute hydrochloric acid is copper chloride and water.

23. The limitation of Mendeleev's periodic table is

- Elements with large differences in properties were included in the same group. for example hard metal like copper and silver were included along with soft metals like sodium and potassium.
- The increasing order of atomic mass was not strictly followed throughout. For example in cobalt and nickle and Tellurium and indium
- No proper position could be given to the element hydrogen. In the periodic table , the Location of hydrogen is uncertain. It was put with alkali metals within 1A class but Certain hydrogen properties are close to those of halogens. So, it can also be put for halogens in the band.
- Isotopes haven't been given separate place in periodic table.

OR

The limitation of Newland's law of octaves are

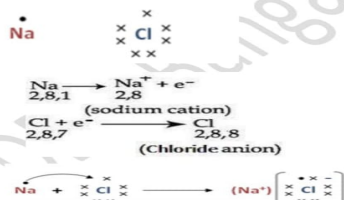
- Newlands assumed that only 56 elements existed in nature and no more elements would be further discovered in the nearer future. But later on several new elements were discovered, whose properties couldn't be defined as per the law of octaves.
- In order to fit elements into law of octaves Newlands not only adjusted two elements in the same slot but also adjusted some unlike elements under the same note.
- Iron possessing similar properties as cobalt and nickel is placed far away from these elements.

24. DAIGRAM OF REACTION OF ZINC GRANULES WITH HCL.

25. Cinnabar (HgS) is an ore of mercury. The metals beings less reactive can be obtained by reducing their oxides to metals by heating alone. So, when cinnabar is heated in air , it first changes into its oxide and then into mercury metal.

26.

a) The electron dot structure for sodium[Na] and chlorine[Cl] are



27. (B) cake, milk packet, wooden sticks

28. (B) positively phototropic and negatively geotropic

29. CFCs are chemically reactive with the ozone, and deplete it. To protect ozone layer, manufacturing companies produce CFC free refrigerators, as International treaty with UNEP.

30. Ancient methods of rainwater harvesting systems used in the states

Kerala- surangam , Rajasthan- Khadin

31. Deoxygenated blood from different parts of the body is received by the right Atrium through superior and inferior Venacava.

Then blood moves into right ventricle from where it goes to lungs through Pulmonary artery.

In lungs it gets oxygenated, reaches left atrium through pulmonary veins.

Then the blood moves to left ventricle from where it is pumped to different body parts through Aorta

OR

Through the process of transpiration the plants loose the water from its aerial parts like leaves. This creates suction in the xylem which helps the roots in absorption of water by osmosis and upward transportation of water in a continuous channel.

32. The protests carried out by local people to save forests in India are:

A- The Chipko Movement started in Naini village Himalaya. In 1972, the villagers, mostly women, Niniy gerewal in Himalayas protested against the contractor sent by government. They successfully protected the trees by hugging them.

B- The sacrifice of life by more than 300 people in khejrli village of Rajasthan during 18 th century. They saved Kejrli trees against soldiers of king.

33. DAIGRAM

34. When the peas plant producing round seeds(RR) was crossed with the peas plant producing wrinkled seeds(rr) in F1 generation, all were round seeded(Rr) plants

Further in F2 generation, peas plants produced by self- pollination methods, only one fourth were wrinkled seeded plants.

Conclusion: The gene which codes for rounded seeds is dominant ,the gene which codes for the wrinkled seeds is recessive.

When paired with dominant gene, the recessive gene does not get phenotypically Expressed. The recessive gene gets expressed only when it is in pair with the other recessive gene.

OR

Statement: "We can say that very dissimilar looking structures evolve from a common ancestral design". Name a current example of a plant species and explain this statement.

Since 2000 years humans cultivated wild cabbage as food plant and generated different vegetables by artificial selection methods. They are, Broccoli and cauliflower which were selected for arrested flower development. Cabbage ,Kale, were selected for the large leaves, Radish ,carrot, kohlrabi where cultivated for that's swollen parts. Conclusion : By studying artificial selection of different recently cultivated plants, by humans, it is clear that variety of new species can be developed from a common ancestral plant species. We say that even by natural selection for many years, so many diversified species might have developed from common ancestral design.

35. i) The fertilization takes place in the oviduct or fallopian tube.

ii) Roles of ovary are:

A- Releases one egg every month alternatively

B- Produces female sex hormones, oestrogen and progesterone

iii) If there is no fertilization after one day the egg dies. it is eliminated from the body menstrual bleeding.

OR

In sexual reproduction,

(a) The cell division which helps to get the DNA amount to its half in germ cells is "meiosis".

After fertilization the DNA amount in zygote becomes double that of germ cells, called diploid number (paired set) of chromosomes.

This process helps to maintain constant number of chromosomes in the next generation, equal to that of the parental organism.

b) Male germ cells are very small microscopic in size. They are motile. They have elongated structure. They are produced in the testis of male reproductive system, in large numbers.

Female germ cells are large (as they store nutrition) macroscopic in size. They are immotile. They are spherical. They get produced in ovaries of female reproductive system only one in a month.

36. Diagram showing the structure of 'nephron' in human beings.

37. a) Homologous organs are structurally same organs of different organisms performing different functions. Examples : hands of human beings, fore legs of tiger, wings of the birds.

Analogous organs are structurally different organs of different organisms performing similar functions. Examples: wings of birds, Wings of insects, Wings of bats

b) Conclusions of Mendel's experiment conducted on pea's plant by considering cross between two characters in each generation:

* for each characteristics there are two genes one is from maternal origin other one is the origin. Dominant gene controls the expression of the character.

*Inheritance of each characteristic is independent of other characters because they are controlled by separate genes present in different chromosomes.

38.

a) The hormone which protects the body in dangerous situation is" adrenaline". In emergency adrenaline gets released to blood which reaches the target organs. It increases rate of heartbeat to provide more oxygen to the muscles. During this time the muscles of blood vessels near skin and digestive system contracts which decrease blood supply to that parts. This increases the flow of blood to the diaphragm and rib muscles, which increases rate of respiration. In this way the animal will be able to face the emergency situations.

b) 4 functions of the fore brain are:

A- It is the Centre for thought memory and understanding.

B- It receives the impulses the sense organs true sensory nerves

C- It also sense the messages to the organs of response muscles

D- It controls the logical thinking memory.

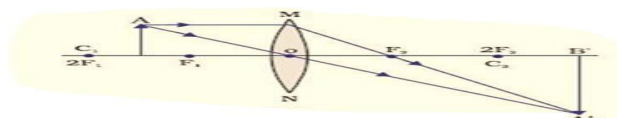
The part of the forebrain which controls hunger and sleep is hypothalamus.

2020-21 MODEL KEY ANSWER SET-4

- 1) (C) Coulomb.
- 2) (C) Magnetic field lines intersect each other.
- 3) (A) Absorb more heat.
- 4) The object is placed at $2F_1$.
- 5) When the magnification of object is -2 then the image will be real and inverted and $m > 1$ means its enlarged image.

6)

- Position of the image: Beyond $2F_1$
- Nature of the image: Real, inverted
- Size of the image: Enlarged



7) Voltage of the bulb, $V = 220\text{ V}$

Power of the bulb, $P = 40 \text{ W}$

Let I is the current through the bulb. The formula for the power in terms of voltage is given by :

$$P=VI \qquad I=220/40$$

$$I=V/P \qquad I=5.5\text{A}$$

$$V=IR$$

$$R=V/I$$

$$R=220/5.5$$

$$R=40 \text{ ohm}$$

8) The factors on which the resistance of a conductor depend are :

- (a) Length of the conductor
- (b) Cross-sectional area of the conductor
- (c) Material of the conductor
- (d) Temperature of the conductor

9) DIAGRAM

10) Solution:

They have given the convex lens

$$f= 15\text{cm}$$

$$u= -30\text{cm} \quad (\text{taken negative its always negative in both convex and concave})$$

$$h_o= 3\text{cm} \quad v=? \quad m= h_i/h_o \quad \text{or} \quad v/u$$

$$h_i=?$$

$$h_i = v/u * h_o$$

$$h_i= 30/-30 * 3$$

$$\triangleright 1/v= 1/u + 1/f \quad h_i= -3$$

$$\triangleright 1/v= 1/-30 + 1/15$$

$$\triangleright m = -3/3 \quad m= -1$$

$$= -1-2/30$$

nature: real and inverted size: enlarged

$$1/v = 1/30$$

position: on the side of lens

$$V= 30\text{cm}$$

11) ADVANTAGES

- *There is no cost of fuel
- *It is environmental free and there is no residue like ash etc..
- *cooking is hygienic and nutritious.

DIS ADVANTAGES

- *cooking is slow
- *solar cooker cannot be used at night and during cloudy weather .
- *it is not available at every place and at every time.

12)

- ❖ One volt is the potential difference between two points in a current carrying conductor when 1 joule of work is done to move a charge of 1 coulomb from one point to the other.

$$1V = 1 \text{ joule}/1 \text{ coulomb}$$

- ❖ Rheostat is the device use to measure the potential difference.
- ❖ Resistance is opposition to the flow of electric current in a substance.

An electric power measure of the rate of electrical energy transfer by an electric circuit per unit time.

$$P = VI$$

$$P = I^2R$$

$$P = V^2/R$$

13)

Construction of Electric Motor

(1) Armature coil: It consist of a single loop of an insulated copper wire in the form of a rectangle.

- (2) Strong field magnet: Armature coil is placed between 2 pole pieces of a strong magnet which provide strong magnetic field.
- (3) Split ring type commutator: It consists of 2 halves of a metallic ring. The two ends of armature coil are connected to these 2 halves of ring.
Role of split ring: Commutators reverses the direction of current in armature coil.
- (4) brushes: Two carbon brushes press against the commutator. These brushes act as contact between commutator and terminal battery.
- (5) Battery: It is connected across the carbon brushes. It supplies current to the armature coil.

Working of Electric Motor

- (i) In the side AB of the rectangular coil ABCD, the direction of current is from A to B and in the side CD of the coil, the direction of current is from C to D. The direction of magnetic field is from N pole of the magnet to its S pole.
- (ii) Applying Fleming's Left hand rule to sides AB and CD of the coil, the force on side AB of the coil is in downward direction whereas the force on side CD of the coil is in upward direction. Due to this the side AB of the coil is pushed down and side CD is pushed up. This makes the coil ABCD rotate in the anticlockwise direction.
- (iii) While rotating, when the coil reached vertical position, then the brushes will touch the gap between the two commutator rings and current of the coil is cut off. Though the current to the coil is cut off when it is in the exact vertical position, the coil does not stop rotating because it has already gained momentum due to which it goes beyond the vertical position.
- (iv) After half rotation, when the coil goes beyond vertical position, the side CD of the coil comes on the left side whereas side AB of the coil comes to the right side, and the two commutator half rings automatically change contact from one brush to the other.
- (v) After half rotation of the coil, the commutator half ring R makes contact with brush B whereas the commutator half ring R makes contact with brush B. This reverse the direction of current in the coil.
- (vi) The reversal of direction of current reverses the direction of force acting on the sides AB and CD of the coil. The side CD of the coil is now on the left side with a downward force on it whereas the side AB is now on the right side with an upward force on it. Due to this the side CD of the coil is pushed down and the side AB of coil is pushed up. This makes the coil rotate anticlockwise by another half rotation.
- (vii) The reversing of current in the coil is repeated after every half rotation due to which the coil continue to rotate as long as current from the battery is passed through it.

OR

Take a small aluminium rod AB (of about 5 cm).

- Using two connecting wires suspend it horizontally from a stand, as shown in Fig. Place a strong horse-shoe magnet in such a way that the rod lies between the two poles with the magnetic field directed upwards. Connect the aluminium rod in series with a battery, a key and a rheostat.
- Now pass a current through the aluminium rod from end B to end A. The rod is displaced towards the left.
- Reverse the direction of current flowing through the rod and
- observe the direction of its displacement. It is now towards the right.

FLEMINGS LEFT HAND RULE

Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the forefinger points in the direction of magnetic field and the middle finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. When thumb, forefinger and middle finger of left hand are held perpendicular to each other Forefinger - the direction of magnetic field Middle finger- the direction of current Thumb - direction of motion or the force acting on the conductor

PART: B: CHEMISTRY

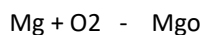
- 14) A. — OH and — CHO
- 15) A. Hydrogen
- 16) A. 'p' block and 3rd period
- 17) According to Dobereiner's triad rule
 $A + C / 2 = B$
 SO, sum of masses lithium and potassium / 2 = we get sodium
 $7 + 39 / 2 = 23$ -Therefore atomic mass of sodium is 23
- 18) **Catenation:** The self-linking property of an element mainly carbon atom through covalent bonds to form long straight, branched and rings of different sizes are called Catenation.
- 19) School bells are made up of metal because metals are sonorous that's why they produce ringing sound so school bells are made up of metal.
- 20) When iron nails are dipped in copper sulphate solution then iron is high reactive than the copper it displace the copper from copper sulphate solution and copper became attracts on the nails and solution becomes iron sulphate solution. The copper is displaced by the iron.
- 21) DIAGRAM
- 22) Series of organic compounds having the same functional group and chemical properties and successive members differ by a CH₂ unit or 14 mass units are known as Homologous series.
 Ex: alkanes CH₄, C₂H₆, C₃H₈, C₄H₁₀, C₅H₁₂

OR

Addition of hydrogen with unsaturated hydrocarbon in the presence of catalysts such as nickel or platinum or palladium is known as Hydrogenation (addition) reaction.

Ex: Process of converting vegetable oil into solid fat (vegetable ghee) is called Hydrogenation of Oil.

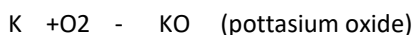
- 23) The element A has the high metallic property because along the period metallic property will be decrease.
 When elements having atomic no. 11 and 12 if they react with element having atomic no. 8 it forms following compounds.
 $Na + O_2 \rightarrow Na_2O$



OR

i) Calcium is metal

ii) calcium atomic radii is smaller because there is more force of attraction in between the electrons and nucleus. Along the period atomic size decreases.



24) **Cleansing Action of Soap:**

- When a cloth with dirt attached to it is immersed in water containing soap, then the hydrocarbon chain (hydrophobic end) is attached to the dirt particle whereas the ionic end (hydrophilic end) points outward, towards water.
- So the dirt particles are surrounded by the soap molecules forming a micelle.
- This micelle gets attached with water molecules through the ionic end and is washed away along with the dirt particles.

25) DIAGRAM action of steam on metal.

26)

- In the thermit reaction the metal used is Aluminium.
- Metal obtained in liquid state is iron.
- The chemical equation for this is $\text{Fe}_2\text{O}_3(\text{s}) + 2\text{Al}(\text{s}) \rightarrow 2\text{Fe}(\text{l}) + \text{Al}_2\text{O}_3(\text{s}) + \text{Heat}$.
- Reaction of iron oxide with aluminium used to join railway tracks or cracked machine parts.

PART: C: BIOLOGY

27) A. Reuse

28) D. undergo recycling naturally in the environment

29) CFC is pollutant causes ozone depletion.

30) The two methods water management are

- 1) Rain water harvesting and 2) Dams.

31) Important uses of constructing dams are

- 1) helps to preserve the water in different conditions like summer.
- 2) helps to change the route of the river.
- 3) useless flow of water will be prevented

32) The control centre of reflex action is taken place in Spinal cord.

The route of reflex action is known as Reflex arc.

OR

Cerebrum is the biggest part of the brain its main function it is thinking part and centre of intelligence.

33) DIAGRAM longitudinal section of flower

34) a) The fertilized eggs starts dividing and forms a ball of cells or embryo.

The embryo is implanted in the lining of the uterus where they continue to grow and develop organs to become foetus.

(b) If the vas deferens in the man is blocked, sperm transfer will be prevented, Fertilization will not take place.

If the fallopian tube in the woman is blocked, the egg will not be able to reach the uterus. Fertilization will not take place

OR

- Puberty is time period in human beings life when the both boy and girl becomes sexually mature.

- Function of testosterone hormone is Control development of male sex organ and male sex features such as deeper voice, beard etc. Also makes the male gamete sperms.

The changes seen in girls and boys at the time of puberty are:

- Increase in breast size in girl.
- Appearance of hair in the genital area.
- Appearance of hair in other areas of skin like underarms, face, hands, and legs.

35) *The thread like structures that grow on the tomato are hyphae of Rhizopus (Bread mould)

* They have rod like structures called sporangia.

*Sporangia contain spores, they are reproductive structures.

* When spores come into contact with moist surface, they began to grow. Therefore cut tomato gets spoiled gradually.

36) Fossils are the remains of organisms that once existed on earth.

They tell us about the development of the structures from simple structured to complex structured organisms.

They tell us about the phases of evolutions through which they must have undergone in order to sustain Fossil provide us evidence about

→ The organisms that lived long ago such as the time period during which they lived, their structure etc.

→ Evolutionary development of species i.e., line of their development.

OR

Evolution is the net directional changes occur in organisms or population over many generations is called evolution.

- Evolutionary development of species i.e., line of their development.
- Connecting links between two groups. For example, feathers present in some dinosaurs means that birds are very closely related to reptiles.
- which organisms evolved earlier and which later.
- Development of complex body designs from the simple body designs.

37) DIAGRAM

38) a) **BLOOD**

- Blood is connective tissue which is fluid in nature.
- Solid components of blood (**Blood corpuscles**):
- RBC (Red blood cells): It carries O₂ and CO₂ and also contains Haemoglobin which impart red colour to the blood.
- WBC (White blood cells): It provides body defence by engulfing the germs and produces antibodies.
- Blood Platelets: It helps in blood clotting during injury.
- → Liquid components (**Plasma**): It is a yellow colour fluid which contain 90% water & 10% organic substances.

LYMPH

- It is a yellowish fluid which escapes from the blood capillaries into the intercellular spaces.
- It contains less proteins than blood.
- It flows from the tissues to the heart which helps in transportation and destroying germs.
- It carries digested and absorbed fat from intestine and drains excess fluid from extra cellular space back into the blood.
- Direction of Flow: Lymph flows from tissues to sub clavian veins—It is unidirectional.
- Functions of Lymphatic System: Lymph functions as a middleman that exchanges materials between blood and tissue fluid.

AND

- This means they can control their body temperature and do not have to depend on environment for their body temperature regulation.
- Because of this birds and mammals require optimum oxidization of glucose which would be possible with good supply of oxygen.
- So it is required to have separate oxygenated and de-oxygenated blood to supply the required amount of oxygen.

b) • Each kidney contains many filtration units called as nephron.

- Nephron are made up of a cluster of thin walled capillaries called glomerulus which is associated with a cup like structure called as Bowman's capsule and the long tube which terminates through this capsule.
- The renal artery brings oxygenated blood to the kidneys along with the nitrogenous wastes like urea and uric acid and many other substances.
- The blood gets filtered through the glomerulus and this filtrate enters the tubular part of nephron.
- As this filtrate moves down the tubular part, glucose, amino acids, salts and excess of water gets selectively reabsorbed by the blood vessels surrounding these tubules.
- So the fluid now flowing in the tubular part is urine which gets collected in collecting ducts of nephron.
- These collecting ducts together leave the kidney at a common point by forming the ureter.
- Each ureter drains the urine in the urinary bladder where it is stored until the pressure of expanded bladder leads to an urge to pass it out through urethra.

-The amount of water reabsorbed depends upon :

- How much excess of water is there in the body and,
- How much nitrogenous wastes need to be excreted out.

2020-21 MODEL KEY ANSWER SET-5

PART: A: PHYSICS

1. A) Ohm

2. B) Air

3. C) Increases heavily

4. This means that the speed of light in a diamond will reduce by a factor of 2.42 compared to speed of light in air.

5. $P=1/f$

$$= 1/2 = 0.5D$$

6. Refer NCERT text book part 2 page no 90 fig.10.16

7. Electric heater heating element is made up of alloy which has high resistance when current flows through the heating element it becomes red and glow. But the cord's resistance is low so it does not glow.

8. i) The current is divided throughout all electrical devices. Total resistance is decreased and devices work properly.

ii) If one of the devices in parallel combination fuses or fails, then other devices keep working without being affected.

9. Electric motor diagram, Refer NCERT Text book part 1 page no 126 fig:13.15

10. Light bends towards the normal because water is denser than air.

Refer fig:10.10 in page no 83 of NCERT text part2

OR

A concave lens always forms virtual erect image on the same side of the object

Image distance:- -10cm

Focal length:- -15cm

Object distance:- ?

Since $1/v - 1/u = 1/f$

Or, $1/u = 1/v - 1/f$

$1/u = 1/-10 - 1/-15 = -1/10 + 1/15$

$1/u = -3+2/30 = 1/-30$

Or, $u = -30\text{cm}$

Thus the object distance is 30cm.

Magnification, $m = v/u$

$M = -10/-20 = 1/2 = +0.5$

The positive sign indicates that the image is erect and virtual.

11. Because the conventional sources of energy like coal, petroleum are non-renewable sources of energy, once they get depleted we can't get back so there is a need to look for alternate sources of energy.

12. a) i) AC can be stepped up and stepped down which means that the voltage can be increased or decreased.

ii) AC can be transmitted to long distances without much loss of energy.

b) The metal body of the appliances like fridge, cooler, mixer etc. are connected to an earth wire so that any leakage of current to the body of the appliance goes to earth does not give electric shock. This is called earthing.

Earthing is done as a safety measure to avoid electric shock to the users.

OR

According to Fleming's right hand rule, when the thumb, fore finger and middle finger are kept mutually perpendicular to each other, the thumb shows the direction of motion of conductor, the fore finger shows the direction of magnetic field, then the middle finger shows the direction of induced current.

To get the direct current, in place of slip rings, split rings (commutator) are used so that one brush is always in contact with the arm and goes downwards. This type of generator is called DC generator.

13. a) overloading: The current flows in domestic circuit depends on the power ratings of appliances being used. If too many electrical appliances of high power ratings are switched on at the same time, they draw extremely large amount of current from the circuit. This is called overloading.

Precaution: A fuse of proper rating must be used to avoid such damages. Fuse will melt before the temperature of the heated circuit wire becomes too high and causes circuit to break.

b) At maximum heating:

The consumption of energy is given at the rate of 840W at voltage 220V.

Therefore, $P=840\text{W}$, $V=220\text{V}$ then $I=?$

$P = V \times I$

$I = P/V = 840/220 = 3.81\text{A}$

Resistance $R_1 = ?$

$$V = I \times R_1, \quad R_1 = V/I = 220/3.82 = 57.60 \text{ Ohm.}$$

At minimum heating:

$$I = 360/220 = 1.64 \text{ A}$$

$$\text{Resistance } R = V/I = 220/1.64 = 134.15 \text{ Ohm.}$$

PART: B: CHEMISTRY

14. C) below 5.6

15. C) ketone

16. B) atomic number.

17. Refer fig:4.7 in page no 7 NCERT TEXT PART 2

18. Mendeleev's periodic law states that " the properties of elements are the periodic function of their atomic masses."

19. Metal oxides which react with both acids as well as bases are called amphoteric oxides.

Example: aluminium oxide (Al_2O_3)

20. The ketone having three carbon atoms is propanone $\text{CH}_3\text{-CO-CH}_3$

OR

The hydrocarbons react with chlorine in presence of sunlight. Chlorine can replace the hydrogen atom one by one. It is called substitution reaction.

Reaction refer page no 15

21. Diagram to show the Reaction of Zinc granules with dilute sulphuric acid Refer fig:2.1 page no 19 NCERT text part 1

22. Lime water turns milky due to the liberation of CO_2



If excess of CO_2 gas is passed through the lime water milky ness disappears due to the formation of calcium bicarbonate which is soluble in water



23. Merits of Mendeleev's periodic table are

- Elements with greater atomic mass were placed before the elements with slightly lower atomic mass. for ex: Cobalt with atomic mass 58.9 was placed before nickel with atomic mass 58.7
- He left some gaps in the periodic table with the prediction of existence of some elements that were not discovered at that time.
- He named the future elements by prefixing a Sanskrit numeral Eka (one) to the name of preceding element in the same group.

24. Diagram to show the reaction of steam on metal Refer fig:3.3 page no 43

25. a) An atom or group of atoms present in the molecule which determines the Characteristics property of the carbon compounds.

b) Carboxylic acid

c) Soaps are the sodium or potassium salts of long chain carboxylic acids.

Detergents are the sodium salts of sulphonic acids or ammonium salts with chloride or Bromide ions.

26. i) Give reasons

a) Copper does not react with cold water or hot water or steam but steel is an alloy of Iron reacts with steam or hot water because iron is more reactive than copper.

b) Because sodium potassium lithium are highly reactive metals, they react vigorously with oxygen moisture present in the air and catches fire easily.

ii) Corrosion is the slow process of eating away of metals by the reaction of air, and moisture Corrosion can be prevented by painting, galvanisation, oiling, anodising.

PART: C: BIOLOGY

27. A) Bundhis

28. A) CFCs

29. It protects the earth from harmful ultraviolet radiations coming from the sun. These radiations cause skin cancer in humans.

30. i) Pine wood for matchbox industry

ii) Bamboo for paper industry.

31. i) It does not evaporate.

ii) It is protected from contamination.

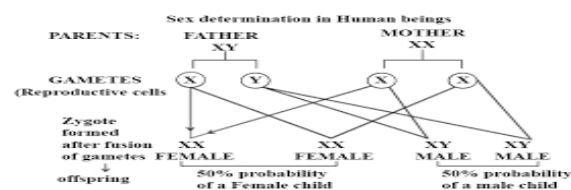
32. Diagram showing the germination of pollen grains Refer page no 45 fig: 8.8

33. i) Diabetes mellitus.

ii) Insulin hormone.

34. The explanation will be the sex chromosomes of human beings are called sex Chromosomes. Women have perfect pair of sex chromosomes both are XX. But men have a mismatched pair in which one is a normal sized X while the other is called Y. So women are XX, while men are XY.

A child who inherits an X chromosome from her father will be a girl, and the child who inherits a Y chromosome from his father will be a boy. Thus, the sex of the children will be determined by what they inherit from their father.



OR

- i) Fossils are the preserved remains of the animals, plants, and other organisms from the past.
- ii) Fossils are the important evidence for evolution because they show that life on earth was once different from life found on earth today.
- iii) They tell us about the evolutionary relationships with the present living organisms.
- iv) They estimate how far the evolutionary relationship goes.

35.

- Prostate gland produces secretions which along with sperms forms semen. Seminal vesicles produce many of the constituent ingredients of semen.
- The embryo derives its nourishment from the mother's blood through the placenta.
- The placenta contains villi on the side of the embryo and blood vessels surrounding villi on the side of the mother. Oxygen and glucose pass from mother to the embryo through the placenta.

OR

- I. The fusion of male nucleus from sperm & female nucleus from egg is called fertilisation. If fertilisation takes place the resulting cell is called zygote. It starts dividing and forms a ball of cells called embryo. The embryo is implanted in the lining of the uterus where it continues to grow and develop to become foetus.
- II. If the egg is not fertilised, it lives for about one day. Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilised egg. Thus its lining becomes thick and spongy, this would be required for nourishing the embryo. Now, however this lining is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucous.

36. a) Homologous organs: homologous organs are those which have similar structure & origin but different functions. ex: fore arm of frog, lizard, bird and humans.

Analogous organs: organs which perform similar function but are different in structure and origin. Ex: wings of bird and wings of an insect.

b) Speciation is an evolutionary process of the formation of new and distinct species. The species evolve by genetic modification.

37. Diagram of longitudinal section of human brain Refer fig: 7.3 page no 84

38. a) The process of removal of unwanted harmful nitrogenous metabolic waste from the body is called excretion.

Urine is produced by the nephrons of kidneys. It takes place in three steps:

- Glomerular filtration: filtration of water dissolved substances out of the blood in the glomeruli and into Bowman's capsule.
- Selective reabsorption: reabsorption of water and dissolved substances out of kidney tubules back to the blood.
- Tubular secretion: separation of unwanted substances from blood and actively secreting them into kidney tubules.

The concentrated urine is then taken to urinary bladder through ureter and stored there until release.

b) Plants produce the gaseous waste products that are oxygen during photosynthesis and carbon dioxide during respiration, excretion of gaseous waste takes place through stomatal pores on the leaves. Excess water also excreted through stomata. Many plants store wastes in the form of resins and gums.

2020-21 MODEL KEY ANSWER SET-6

PART: A: PHYSICS

1. A. Methane

2. B. induced electric current

3. D. 24 ohm

4. B. Half

5. Electric generator works on the principle of electromagnetic induction.

6. Because the air density changes with altitude.

7. Refer text book Part-1 page no-104

8.

- Biogas obtained from biogas plant does not produce smoke during burning and hence there is no air pollution.
- Biogas plant operates with materials like cow dung and waste of plants. These materials lying in open can cause air and water pollution.

9. Refer part-2 text book page no-90

10. Disadvantages of series circuits for domestic wiring

- In series circuit if one electrical appliance stops working due to some defect then all other appliances also stop working because the whole circuit is broken.
- In series circuit all the electrical appliances have only one switch due to which they cannot be turned off or on separately.

Resistance of a conductor depends on

Length of conductor (l), Area of cross section (A), Resistivity of material

11. (i) power of the lamp $P=25\text{W}$

Potential difference $V=250\text{V}$

Current $I=?$

Formula: $P=VI$, e $25=250$

Current $I=25/100=1/10=0.1\text{A}$

(ii) Because the resistivity of an alloy is more than the resistivity of a pure metal.

OR

$$\begin{aligned}
 d &= 0.5\text{mm} = 0.5 \times 10^{-4}\text{m} \\
 A &= \pi r^2 = 3.14 \times (0.25 \times 10^{-4})^2 \\
 &= 0.19625 \times 10^{-8}\text{m}^2 \\
 \rho &= 1.6 \times 10^{-8}\Omega\text{m} \\
 R &= 10\Omega \\
 I &=? \\
 R &= \frac{\rho l}{A} \\
 10 &= \frac{1.6 \times 10^{-8} \times l}{0.19625 \times 10^{-8}} \\
 1.6 \times 10^{-8} \times l &= 10 \times 0.19625 \times 10^{-8} \\
 l &= \frac{1.9625}{1.6} \\
 l &= 1.2265 \times 100 \\
 l &= 122.7\text{m}
 \end{aligned}$$

12.

1. The incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane.
2. The ratio of sine of incidence to the sine of angle of refraction is a constant for the light of a given colour and for the given pair of media. This law is also known as *Snell's law of refraction*.

Different media have different refractive index because the speed of light in them are different.

Refractive index of glass is 1.5 meaning of this statement is the ratio of speed of light in air to the speed of light in glass is equal to 1.5.

OR

$$f = -15\text{cm}$$

$$u = ?$$

$$v = -10\text{cm}$$

$$m = ?$$

$$1/f = 1/v - 1/u$$

$$1/u = -1/10 + 1/15$$

$$1/u = -1/30$$

$$u = -30\text{cm}$$

$$m = v/u$$

$$m = -10/-30$$

$$m = 0.33$$

Positive sign in the magnification indicates it is virtual image. Diminished image.

13.

- Take a coil wire of large turns connect the ends to a galvanometer.
- Take a strong bar magnet move its north pole into the coil. The galvanometer shows deflection. This indicates the presence of current in the coil.
- Withdraw the north pole of the magnet away from the coil.
- The galvanometer shows deflection this indicates the current is set up in the coil but opposite to the first.
- When the coil is kept stationary with respect to magnet the deflection of the galvanometer drops to zero. This indicates that no current is set up in the coil.
- When the magnet is replaced by a coil carrying current induces current in another coil.

Factors observed:

- When the coil and the magnet are both stationary there is no deflection in the galvanometer.
- The motion of a magnet with respect to the coil produces induced potential difference, which sets up an induced electric current in a circuit.

Conclusion: This experiment concludes that whenever there is relative motion between a conductor and a magnetic field, the flux linkage with a coil changes and this change in flux induces a voltage across a coil.

Electromagnetic induction

The production of an electromotive force across an electrical conductor in a changing magnetic field.

PART: B: CHEMISTRY

14. A. Hydrophilic head Hydrophobic tail

15. B. Ionic bond

16. Antacids

17. 'Properties of elements are a periodic function of their atomic number'.

18. Because due an increase in nuclear charge which tends to fill the electrons closer to the nucleus and reduces the size of the atom.

19. Carbon has the unique ability to form bonds with the other atoms of carbon which give rise to large molecules. This property of self-linking is called catenation.

20.

- Hard water often contains salts of calcium and magnesium.
- Soap molecules react with the salts of calcium and magnesium and form a precipitate .
- This precipitate begins floating as an off-white layer over water.this layer is called scum.
- Soaps lose their cleansing property in hard water because of formation of scum.

21. (a) Neon (b) Magnesium (c) Silicon (d) Boron

22. A pH value of less than 7 indicates an acidic solution, while greater than 7 indicates a basic solution. Therefore, the solution with pH=6 is acidic and has more hydrogen ion concentration than the solution of pH=8 which is basic.

23. Referpart-1 text book page no-19

24. A homologous series is group of organic compounds having similar structures and chemical properties in which the successive compounds differ by $-\text{CH}_2$ group.

Characteristics of homologous series.

- All the members have general formula
- All the members have same chemical properties.
- Any two adjacent homololgous differ by $-\text{CH}_2$

$\text{C}_{10}\text{H}_{20}$ molecule belongs to alkene family

OR

An atom or a group of atoms present in a molecule which largely determines its chemical properties.

- (i) Name of formed compound ethanol and molecular formula $\text{C}_2\text{H}_5\text{OH}$
(ii) Name of formed compound propanal and molecular formula $\text{C}_2\text{H}_5\text{CHO}$

25. Refer part-1 text book page no-53

26. (a)

- Solids and are generally hard
- Have high melting and boiling points.
- Generally soluble in water and insoluble in organic solvents like kerosene ,petrol etc
- Do not conduct electricity in solid state but good conductor of electricity in liquid state.

b) Because aluminium reacts with oxygen present in air to form a thin white layer of aluminium oxide (Al_2O_3). This oxide layer prevents further reaction of aluminium due to stability of this oxide, it is also resistant to corrosion and good conductors of heat.

PART: C: BIOLOGY

27. B. Plants

28. B. Translocation

29. CFCs (Chloroflurocarbons)

30. It indicates that water is contaminated by disease causing microorganisms.

31.

- It is necessary to separate oxygenated and deoxygenated blood to maintain efficient supply of oxygen into the body
- This system is essential in animals that have high energy need
- For example animals like mammals and birds which constantly use this energy to maintain their body temperature.

OR

- Phloem transports food materials from the leaves to different parts of the plant.
- The transportation of food in phloem is achieved by utilizing energy from ATP which helps in creating osmotic pressure that transport food from the area of high concentration to low concentration.

32.

- The people who live in or around forests are dependent on forest products.
- The forest department of the government which owns the land and controls the resources from forest.
- The industrialists
- The wildlife and nature enthusiasts

33. Refer part-2 text book page no-45

34. Formation of new and distinct species in the course of evolution from the existing species is called speciation. the factors that could lead to the rise of a new species are

1. Natural selection
2. Genetic drift
3. Geographical isolation.
4. Acquisition of traits during the life time of an individual.

Or

Fossils provide us evidence about

- The organisms that lived long ago such as the time period during which they lived their structures etc...
- Evolutionary development of species i.e., line of their development.
- Connecting links between two groups. For example features present in some Dinosaurs means that birds are very closely related to reptiles.
- Which organisms evolved earlier and which later.
- Development of complex body design from the simple the body designs.

35.

- **Testis:** They produce sperms and testosterone hormone which is responsible for male characters.
- **Scrotum:** They regulate temperature necessary for production of sperms.
- **Urethra and vas deference:** Transport sperm from testis.
- **Prostate gland and seminal vesicle:** They add their secretion to make the sperm transport easier and provide nutrition.
- **Penis:** Delivers the sperms to the site of fertilization.

Or

(a) Natural method:

- It involves avoiding the chance of meeting of sperms and ovum.
- In this method the sexual act is avoided from day 10th to 17th of the menstrual cycle because during this period ovulation is expected and therefore the chances of fertilization are very high.

(b) Barrier method:

- In this method the fertilization of ovum and sperm is prevented with the help of barriers.
- Barriers are available for both males and females, condoms are barriers made of thin rubber that are used to cover penis in males and vagina in females.

(c) oral contraceptives:

- In this method tablets or drugs are taken orally.
- These contain small doses of hormones that prevent the release of eggs and thus fertilization cannot occur.

36. Refer part-2 text book page number-77

37.

a) Homologous organs: the organs which have the same basic structural design and origin but have different functions.
Example: forelimbs of humans and wings of birds.

Analogous organs: the organs which have the different basic structural design and origin but have similar functions.
Example: the wings birds and insects.

- b) A cross between two pea plants with one pair of contrasting Characters is called monohybrid cross.
Phenotypic ratio-3:1
Genotypic ratio-1:2:1

38. a)

- Adrenaline is directly secreted into the blood to the skin is reduced to the contraction of muscles around small arteries.
- The breathing rate increases because of the contractions of the diaphragm and the rib muscles .the heart beats faster, resulting in supply of more oxygen to the muscles.

b)

- Diabetes patients as a treatment they might be taking injections of insulin.
- This is a hormone which is produced by the pancreas and helps in regulating blood sugar levels.
- If it is not secreted in proper amounts the sugar level in the blood rises causing many harmful effects.

2020-21 MODEL KEY ANSWER SET-7

Part A: Physics

1. B) IR^2

2. B. At twice the focal length

3. C. increases heavily

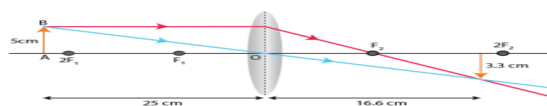
4. Power of lens (P) = $1/f$

$$P = -2D$$

$$f = -1/2 = -0.5 \text{ m}$$

5. The light ray bends towards the normal. When a light ray enters from an optically rarer medium to an optically denser medium , its speed slows down and bends towards the normal.

6. Answer



7. Resistance is given by the equation,

$$R = \rho l/A$$

where, ρ is the resistivity of the material of the wire,

l is the length of the wire & A is the area of the cross-section of the wire.

From the equation, it is evident that the area of the cross-section of wire is inversely proportional to the resistance. Therefore, thinner the wire, more the resistance and vice versa. Hence, current flows more easily through a thick wire than a thin wire.

8. We are given, Potential difference $V=60$ V, Current $I=4$ A,

According to Ohm's law, $R=V/I = 60 \text{ V}/4\text{A} = 15 \Omega$

When the potential difference is increased to 120 V the current is given by

Current $I=V/R = 120 \text{ V}/15 \Omega = 8 \text{ A}$

The current through the heater becomes 8A

9. DIAGRAM

10. A concave lens always forms a virtual, erect image on the same side of the object.

Image distance $V = -10$ cm

Focal length $F = -15$ cm

Object distance $U = ?$

Since $1/V - 1/U = 1/F$

Or $1/U = 1/V - 1/f$

$1/U = 1/-10 - 1/(-15)$

$= -1/10 + 1/15$

$1/U = -3 + 2/30 = 1/-30$

Or $U = -30$ cm

Thus the object distance is -30 cm

Magnification $m=v/u = -10/-30 = 1/3 = +0.33$

The positive sign shows that the image is erect and virtual. The image is $1/3$ of the size of the object.

Or

Height of the object $h = +2.0$ cm

Focal length $f = +10$ cm

Object distance $u = -15$ cm

Image distance $v = ?$

Height of image $h' = ?$

The positive sign of V shows that image is formed at the distance of 30 cm on the other side of the optical centre. The image is real and inverted.

Since $1/V - 1/U = 1/f$ or $1/V = 1/U + 1/f$

$1/V = 1/(-15) + 1/10$

$= -1/15 + 1/10$

$1/V = -2 + 3/30 = 1/3$ or $V = +30$

Magnification $m = h'/h = v/u$

Or $h' = h(v/u)$

Height of the image $h' = (2.0)(+30/-15) = -4.0$ cm

Magnification $m = +30/-15 = -2$

The image is two times enlarged.

11. Following are the two sources of energy that are renewable:

Wind: Wind energy is obtained from the air which is blowing at a high speed. Wind energy is trapped using windmills so as to generate electricity. Blowing of air is dependent on uneven heating of the earth. Since the heating of the earth is forever, wind availability will also be forever.

Sun: The energy obtained from the sun is known as solar energy. It is produced by the fusion of hydrogen into helium, fusion of helium into other heavy metals and it continues. A large amount of hydrogen and helium is available in the sun which will never be exhausted. Hence, solar energy is renewable source of energy.

12. The electric generator converts the mechanical energy into the electrical energy. The working principle of the electric generator is the electromagnetic induction. It generates electricity by rotating a coil in the magnetic field.

When the axle X is rotated clockwise, MN moves upwards while ST moves downward. The movement of MN and ST in the magnetic field results in the production of electric current due to electromagnetic induction. MN moves upwards and the magnetic fields act from left to right. Therefore, according to Fleming's right hand rule, the direction of the induced current will be from M to N along the length MN . Similarly, the direction of the induced current will be from S to T along the length ST . The direction of the current in the coil is $MNST$. Hence, galvanometer shows a deflection in a particular direction.

After half a rotation, length MN starts moving downwards while the length ST starts moving upwards. Now, the direction of the induced current reverses to $TSNM$. Since the direction of the induced current reverses every half rotation, the current induced is known as alternating current.

Function of Brushes

Brushes are kept pressed on to two slip rings separately. Outer ends of brushes are connected to the galvanometer. Thus, brushes help in transferring current from coil to the external circuit.

Or

- (i) The rule used to determine the direction of the magnetic field produced around a straight conductor-carrying current is the Maxwell's right hand thumb rule.
- (ii) The rule used to determine the force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it is the Fleming's left hand rule.
- (iii) The rule used to determine the current induced in a coil due to its rotation in a magnetic field is the Fleming's right-hand rule.

13.

a. It states that the heat produced in a resistor is

- (a) It is directly proportional to square of current, $H \propto I^2$
- (b) It is directly proportional to resistance for a given current, $H \propto R$
- (c) It is directly proportional to time for which current flows through the conductor, $H \propto t$

$$\text{So, } H = I^2 RT$$

b. (i) Electric power: It is the rate of doing work by an energy source or the rate at which the electrical energy is dissipated or consumed per unit time in the electric circuit is called electric power. So,

$$\begin{aligned} \text{Power } P &= \frac{\text{Work done (W)}}{\text{Time (t)}} = \frac{\text{Electrical energy dissipated}}{\text{Time (t)}} \\ &= VI = \frac{V^2}{R} \end{aligned}$$

ii. It means, the maximum current will flow through it is only 2 A. Fuse wire will melt if the current exceeds 2 A value.

PART: B: CHEMISTRY

14. A. Sour

15. A. Chloroform

16. Ionic bond

17. Intermolecular forces of attraction increases due to increase in molar mass, hence the melting and boiling points increase.

18. Molecular formula of potassium sulphate is K_2SO_4

* Because both sodium and potassium have same number of valence electrons



20. (a) Functional group is an atom or group of atoms or reactive part of compound, which determines chemical properties of compounds. (i) $-OH$ (ii) $-COOH$ (Carboxylic acid).

Or

Saturated hydrocarbon	Unsaturated hydrocarbon
1. It consists of a single bond between carbon atoms.	1. Double or triple bond between carbon atoms is present.
2. It burns with a blue flame.	2. It burns with a sooty flame.
3. Show substitution reaction	3. Show additional reaction.
4. Less reactive Eg. CH_4 , Methane C_2H_6 , Ethane	4. More reactive E.g. $H_2C=CH_2$, Ethene $HC\equiv CH$, Ethyne

21. DIAGRAM

22. Fe

The reactivity of Fe is more than Cu.



23. * Atomic number 8 --- 2,6

* Atomic number 16 --- 2,8,6

* Yes, these two elements belong to the same group.

* Because in the outermost shell they have same number of electrons or both has same number of valence electrons.

* Elements with atomic number 8 is more electronegative than the element with atomic number 16 .

* Electronegativity decreases down the group.

Or

(a) In the Modern Periodic table elements are arranged in the increasing order of their atomic number. This removes the anomaly regarding certain pairs of elements in Mendeleev's periodic table.

(b) Atomic number of cobalt is 27 and nickel is 28. Hence, cobalt will come before nickel even though its atomic mass is greater.

(c) All isotopes of the same elements have different atomic masses, but same atomic number; therefore they are placed in the same position in the modern periodic table.

24. Carbon can neither lose 4 electrons nor do gain four electrons as these process make the system unstable due to requirement of extra energy. Therefore CH_3Cl completes its octet configuration by sharing its 4 electrons with carbon atoms or with atoms of other elements. Hence the bonding that exists in CH_3Cl is a covalent bonding.

Here, carbon requires 4 electrons to complete its octet, while each hydrogen atom requires one electron to complete its duplet. Also, chlorine requires an electron to complete the octet. Therefore, all of these share the electrons and as a result, carbon forms 3 bonds with hydrogen and one with chlorine.

25. DIAGRAM

26. (a) Platinum, gold and silver are used to make jewellery for these metals are very less reactive hence they are not affected by air, water or most chemicals. These metals have a lot of luster and they are malleable and ductile in nature and also high corrosion resistance in nature.

(b) Sodium, potassium and lithium readily react with water to produce a lot of heat. As a result, Hydrogen evolved in the reaction results in a fire. On exposure to water they react with moisture (water droplets) present in the atmosphere, In order to prevent contact with water hence these metals are stored under oil.

(c) Aluminium forms on its surface a nonreactive surface of aluminium oxide. Such coating prevents other compounds from reacting to aluminium. So aluminium is being used to produce utensils for cooking.

(d) Reducing metal oxide into free metal is easy. Additionally, because it is easier to obtain metals directly from their oxides than from their carbonates or sulphides, the carbonate and sulphide ores are first transformed to oxides to obtain the metals.

Part C: Biology

27. B. Plastic

28. B) underground water level increases

29. Depletion of ozone layer is caused by CFC (chlorofluro carbon)

30. Crescent shaped earthen embankments Low, straight concrete and rubble check dams.

31. We should conserve forests and wildlife because, they maintain biodiversity

- They are essential for ecological balance.
- Forests prevent flood and also influence rainfall.
- They provide us many life saving drugs, silk, lac, honey, timber, etc.

32. Auxins and Gibberlins are the hormone responsible for the growth of plant.

- Auxins are responsible for the cell elongation in shoot and also regulates growth.
- Gibberlin is responsible for stem elongation and germination

Or

Plant growth, development and responses to the environment is controlled and coordinated by a special class of chemical substances known as hormones. Hormones are produced in one part of the plant and are transported to all the needy parts of the plant. The five major types of phytohormone are auxins, gibberellins, cytokinins, abscisic acid, and ethylene. These phytohormones are either growth promoters (such as auxins, gibberellins, cytokinins, and ethylene) or growth inhibitors such as abscisic acid.

33. DIAGRAM

34. • In human beings, the females have two X chromosomes and the males have one X and one Y chromosome. Therefore, the females are XX and the males are XY. • The gametes, as we know, receive half of the chromosomes. The male gametes have 22 autosomes and either X or Y sex chromosome. • Type of male gametes: $22+X$ OR $22+Y$.

However, since the females have XX sex chromosomes, their gametes can only have X sex chromosome. Type of female gamete: $22+X$ Thus, the mother provides only X chromosomes. The sex of the baby is determined by the type of male gamete (X or Y) that fuses with the X chromosome of the female.

Or

- (i) Gives the information that, fossils which are closer to the surface are most recent than those in deeper layer
- (ii) Change in non-reproductive tissues cannot be passed on to the DNA of germ cells. Experiences gained by the organism are not transferred to the DNA and cannot be transferred to the next generation.

(iii) All children will inherit an X chromosome from mother. Child who inherits an X chromosome from father will be a girl. Child who inherits an Y chromosome from father will be a boy.

35. Advantages of sexual reproduction: → In sexual reproduction, more variations are produced. Thus, it ensures survival of species in a population. → The new formed individual has characteristics of both the parents. → Variations are more viable in sexual mode than in asexual one. This is because in asexual reproduction, DNA has to function inside the inherited cellular apparatus.

Functions of testes: → Produce sperms, which contain haploid set of chromosomes of father. → Produce a hormone called testosterone, which brings about secondary sexual characters in boys.

OR

(a) The fertilized eggs starts dividing and forms a ball of cells or embryo. • The embryo is implanted in the lining of the uterus where they continue to grow and develop organs to become foetus

(b) If the vas deferens in the man is blocked, sperm transfer will be prevented, Fertilization will not take place. If the fallopian tube in the woman is blocked, the egg will not be able to reach the uterus. Fertilization will not take place.

36. Homologous organs: are those organs which have the same basic structural design and origin but have different functions.

For Example: The forelimbs of humans and the wings of birds look different externally but their skeletal structure is similar.

Analogous organs :are those organs which have the different basic structural design and origin but have similar functions.

For Example: The wings of birds and insects.

37. DIAGRAM

38. Heart, blood and blood vessels are the main components of transport system in human beings.

Functions of these components

Heart: Heart pumps oxygenated blood throughout the body. It receives deoxygenated blood from the various body parts and sends this impure blood to the lungs for oxygenation.

Blood: Blood transports oxygen, nutrients, CO₂, and nitrogenous wastes.

Blood vessels: Blood vessels, arteries and veins carry blood to all parts of body.

Mammals and birds are warm blooded animals which keep their body temperature constant irrespective of the environment they leave. This process require lot of oxygen for more cellular respiration so that warm blooded animals produce more energy to balance their body temperature. Hence it is very important for warm blooded animals to separate oxygenated and deoxygenated blood to keep their circulatory system efficient.

2020-21 MODEL KEY ANSWER SET-8

PART: A: PHYSICS

1. B) manure.
2. C) Galvanometer
3. B) IR
4. A. rate of rotation of the armature
5. the process by which a changing magnetic field in a conductor induces a current in another conductor is called electromagnetic induction.
6. power of a lens is one dioptre if focal length of a lens is 1m.
7. Refer figure 12.6 in part -1
8. characteristics of a good source of energy:
 - i) which would do a large amount of work per unit volume or mass.
 - ii) be easily accessible.
 - iii) be easy to store and transport.
 - iv) be economical.
9. Refer page number 90, fig 10.16 (c), in part-2
10. The potential difference V across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it at constant temperature.

- Ammeter should be connected in series.
- Voltmeter should be connected in parallel in the circuit.
- Ammeter is used to measure current.
- Voltmeter is used to measure potential difference.

11.

Given data:

Resistance of electric lamp M (R_1) = 15.2 Ω ,

Resistance of electric lamp N (R_2) = 20 Ω ,

Potential difference (V) through the circuit = 220 V

Potential difference (V) through each of the electric lamp =?

According to ohm's law;

Total resistance in series = sum of resistance of all resistors = 15.2 Ω + 20 Ω = 35.2 Ω

Electric current:

$I = V/R = 220V / 35.2 \Omega = 6.25A$

Potential difference (V1) across electric lamp M = 15.2 Ω / 6.25A = 2.432V

Potential difference (V2) across electric lamp N = 20 Ω / 6.25A = 3.2V

OR

We are given

Resistivity of copper is = $2.6 \times 10^{-8} \Omega m$

Length of the wire is (l) = ?

The area of cross section = $30 \times 10^{-4} cm^2$

Resistance = ?

$R = \rho l/A$

$\rho l = RA$

$l = RA / \rho$

$= 10 \times 30 \times 10^{-8} m^2 / 2.6 \times 10^{-8} \Omega m = 30/26 \times 100 = 1.15 \times 10^2 m$

Length of the wire is = $1.15 \times 10^2 m$

12. Laws of refraction of light

i) the incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane.

ii) the ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for given pair of media. This law is also known as Snell's law of refraction. (this law true for angle $0 < i < 90^\circ$).

- Because different wavelengths interfere to different extents with atoms of the medium
- The refractive index of glass is 1.5 means:
refractive index of glass is 1.5 with respect to air. and the speed of light in glass will be 1.5 times slower in glass than in a vacuum.

OR

$$1/u - 1/v = 1/f$$

$$1/v = 1/u - 1/f$$

$$= 1/-20 - 1/-30$$

$$= 1/-20 + 1/30$$

$$= -3+2 / 60$$

$$= -1/60$$

$$u = -60$$

Object distance is 60 cm

Magnification: $m = u/v$

$$= -20/-60$$

$$= 1/3$$

$$m \sim +0.33.$$

Nature of the image = erect and virtual

Size = the image is one-third of the size of the object.

Position = at $2F_2$

13. Refer activity 13.7 in part -1

Part B: chemistry

14. B) C_5H_8

15. C) Fe

16. Sodium Chloride and water.

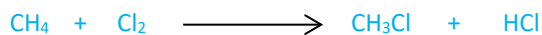
17

Mendeleev's periodic Table	Modern periodic Table
The properties of elements are a periodic function of their atomic mass	The properties of elements are a periodic function of their atomic number

18 because due to the increase in atomic size that makes it easy to lose the valence electrons.

19 Refer figure 4.7 in part -2

20 .the reactions in which an atom or group of atoms in a molecule is replaced or substituted by different atoms are called substitution reaction.



21. Atomic number 8 — 2, 6 2

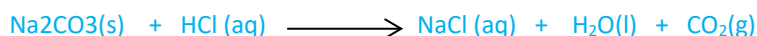
Atomic number 16 — 2, 8, 6 2

Yes, these two elements belong to the same group.

Because in the outer most shell they have same number of Electrons or both have same number of valence electrons.

22 . i)

Metal Carbonate + Acid \longrightarrow Salt + Water + Carbon Dioxide
(any metal carbonate)



ii)

on passing carbon dioxide gas through lime water,
Calcium Hydroxide + Carbon dioxide \longrightarrow Calcium Carbonate + Water
(Lime Water)



on passing excess carbon dioxide gas through lime water,
Calcium Carbonate + Carbon dioxide + Water \longrightarrow Calcium Hydrogen Carbonate
 $\text{Ca}(\text{OH})_2(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{Ca}(\text{HCO}_3)_2(\text{aq})$
(Soluble in water)

OR

i) 'B' is more acidic:

ii) 'D' is more basic.

23. Refer figure 2.1 in part -1

24. i) Refer figure 4.10 in part -2

ii) Refer figure 4.9 (b) in part -2

iii) Refer figure 4.8(b) in part -2

25.

- The molecules of soap are sodium or potassium salts of long chain carboxylic acids.
- The ionic end of soap interacts with water while the carbon chain interacts with oil.
- The soap molecules thus form structure called micells. This forms an emulsion in water.
- The soap micelles thus helps in pulling out the dirt in water and we can wash our clothes clean.
- The reaction of soap with calcium and magnesium salts in hard water develop scum (precipitation, insoluble substance). Hence we need large amount of soap to clean clothes in hard water.

26.

Carbonate ores are converted into oxides by heating strongly in limited air. This process is known as calcination.
Sulphide ores are converted into oxides by heating strongly in the presence of excess of air. This process is known as roasting.

When ZnCO_3 undergoes calcination ZnO is formed.



When ZnS undergoes roasting, ZnO is formed.



After these processes reduction is necessary.

Because zinc oxide is then reduced to zinc using suitable reducing agent.

PART C- BIOLOGY

27. A) CFCs

28. C) inhibit growth

29. Skin cancer .

30. Coliform.

31.

Artery	Vein
i) it carries blood from heart to all part of the body	i) it carries blood from all part of the body to heart.
ii) internal valves are absent	ii) internal valves are present to prevent back flow.
iii) it is thick and elastic.	iii) comparatively thinner and little elastic.

OR

Excretion is the biological process of removal of harmful metabolic waste products from the body. In unicellular organisms, excretion occurs through simple diffusion from the surface.

32. we must conserve our forests as they are of great value. The reasons for conserving forests are :

i) forests help in protection of land and retaining sub-soil water.

ii) forests check floods and maintain ecosystem. Therefore, we must be conserve forest

two causes for deforestation :

i) for industrial needs

ii) for development projects like building of roads or dams.

33. Refer figure 8.8 in part -2

34. Mechanism of sex determination in human beings:

In human beings, the sex of the individual is genetically determined.

- Sex determination is the process by which sex of a new born individual can be determined.
- Human beings have 1 unpaired sex chromosome. Sex chromosome of male is XY and of female is XX
- Sex of a child depends on what happens at fertilisation.

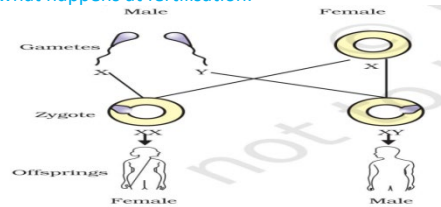


Figure 9.6
Sex determination in human beings

Thus father is responsible for the determination of the sex of a child.

35. Male reproductive system

- Testis:** They produce sperms and testosterone hormone which is responsible for male characters.
- Scrotum:** They regulate temperature necessary for production of sperms .
- Urethra and vas deferens:** Transport sperm from testis.
- Prostate gland and seminal vesicle:** They add their secretion to make the sperm transport easier and provide nutrition.
- Penis:** Delivers the sperms to the site of fertilization.

OR

During pregnancy period the embryo gets nutrition from the mother's blood with help of disc shaped special tissue embedded in the uterine wall is called placenta.

- It contains villi on the developing side of the tissue.
- Villi provide glucose and oxygen to pass from mother to embryo.
- Removes the wastes generated from the embryo.

36. Refer figure 6.14 in part -1

37.

Gametes	RY	Ry	Ry	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

The plants obtained are

Round yellow — 9

Round green — 3

Wrinkled yellow — 3
Wrinkled green — 1

38.

- a) Forebrain: - 1. Control the voluntary actions.
2. Stores information collected from sense organs (Memory)
3. Receives sensory impulses from various body parts and integrates it.
4. Sensation of hunger.
- b) Cerebellum: -1. Controls posture and balance
2. Control precision of voluntary actions
- c) Mid brain: Controls involuntary activities.
- d) Medulla : Controls involuntary actions eg. blood pressure, salivation, vomiting

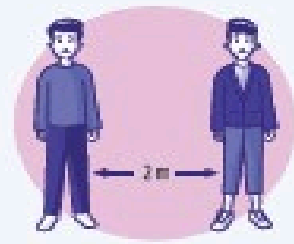
Let's Protect Each Other



Wash hands regularly



Always wear a mask



Avoid physical contact



Catholic Board of Education

