BUDHA DAL PUBLIC SCHOOL PATIALA

Pre Board Examination (23 January 2024)

CLASS X

PAPER- SCIENCE (SET-A)

Time:3 hr. **M.M. 80**

General Instructions:

i) *This question paper consists of 39 questions in 5 sections.*

ii) *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*

iii) *Section A consists of 20 objective type questions carrying 1 mark each.*

iv) *Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.*

v) *Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.*

vi) *Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*

vii) *Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

Section – A

Q1. Human body works within the pH range of **(1)**

a) 7.0 to 7.8 b) 4.5 to 5.6 c) 13 to 14 d) 1.2 to 2.2

Q2. Identify the basic salt from the following salts: **(1)**

a) Na_2CO_3
b) NH_4Cl
c) $NaNO_3$
d) KCl

Q3. Write the chemical name and chemical formula of the salt used to remove permanent hardness of water. **(1)**

Q4. The compositions of aqua regia is : **(1)**

a) Dil HCl : conc HNO_3 (3 : 1) b) conc HCl : Dil HNO_3 (3 : 1)

c) concHCl: concHNO$_3$ (3 : 1) d) dil HCl : Dil HNO_3 (3 : 1)

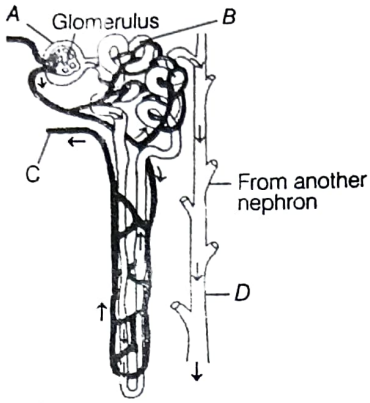
Q5. Generally, nonmetals are not conductors of electricity. Which of the following is good conductor of electricity. **(1)**

a) Diamond b) Graphite c) Sulphur d) Fullerene

Q6. Name the alloy used for welding electric wires together and write its constituents. **(1)**

A-1

Observe the diagram of nephron given below. (1)



Structure of a nephron

Match the labelling referred in Column I and correlate with the function in Column II.

Column I	Column II
A	1. It carries the filtered blood away from the kidney.
B	2. It is involve in filtration of blood.
C	3. It collects the urine.
D	4. Involved in the selectively reabsorption of the substances.

Codes

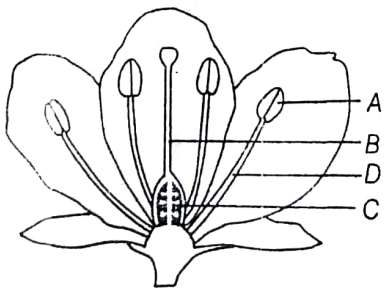
	A	B	C	D
(a)	2	4	1	3
(c)	2	4	3	1

	A	B	C	D
(b)	4	2	1	3
(d)	2	3	4	1

Q8. The number of chromosomes in parents and offsprings of a particular species remains constant due to (1)

a) doubling of chromosomes after zygote formation.
b) halving of chromosomes during gamete formation.
c) doubling of chromosomes after gamete formation.
d) halving of chromosomes after gamete formation.

Q9. Carefully, study the following diagram of flower with labels *A* to *D*. (1)

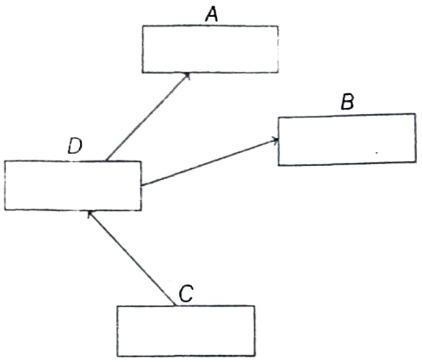


Select the option which gives correct identification and main function and/or characteristic.

(a) *A*—Anther–Formation of ovules
(b) *B*—Stigma–Receives pollen grains
(c) *C*—Ovary–Contains pollens which develop into seeds
(d) *D*—Filament–Lifts anther to disperse pollen grains

(1)

0. Consider the following figure that represents food web.



Which of the following Labels signify producer?

(a) *A* (b) *B* (c) *C* (d) *D*

Q11. Involuntary action in the body are controlled by **(1)**

a) medulla oblongata b) cerebellum c) cerebrum d) thalamus

Q12. Binary fission takes place in Amoeba **(1)**

a) when favourable conditions exist
b) when plenty of food is available
c) when nucleus becomes dumb-bell shaped and then divides into two nuclei
d) all of the above

Q13. Choose the incorrect statement. **(1)**

a) The height of the object is taken to be positive as the object is usually placed above the principal axis.
b) The height of the image should be taken as positive for both virtual and real image.
c) A negative sign in the value of the magnification indicates that the image is real.
d) A positive sign in the value of the magnification indicates that the image is virtual.

Q14. The sky appears dark to passengers flying at very high altitudes mainly because **(1)**

(a) Scattering of light is not enough at such heights.
(b) There is no atmosphere at great heights.
(c) The size of molecules is smaller than the wavelength of visible light.
(d) The light gets scattered towards the earth.

Q15. A conducting wire carries 10^{21} electrons in 4 minutes. What is the current flowing through the wire? **(1)**

(a) 40 A (b) 7 A (c) 4 A (d) 0.7 A

Q16. The strength of magnetic field inside a long current carrying straight solenoids is **(1)**

a) more at the ends than at the centre
b) minimum in the middle
c) same at all points
d) found to increase from one end to the other

For the following questions, two statements are given – one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

a) **Both A and R are true and R is the correct explanation of the assertion.**
b) **Both A and R are true but Reason R is not a correct explanation of Assertion.**
c) **A is true but R is false.**
d) **A is false but R is true.**

Q17. **Assertion :** Following is a balanced chemical equation for the action of steam on iron **(1)**

$$3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$$

Reason: The law of conservation of mass holds good for a chemical equation.

Q18. **Assertion :** Certain pesticides and other chemicals used to protect our crops from diseases and pests are non-biodegradable. **(1)**
Reason: They do not get accumulated at various trophic levels.

Q19. **Assertion :** On changing the direction of flow of current through a straight conductor, the direction of a magnetic field around the conductor is reversed. **(1)**

Reason : The direction of magnetic field around a conductor can be given in accordance with left hand thumb rule.

Q20. **Assertion :** Testies lie in penis outside the body. **(1)**
Reason : Sperms require temperature lower than the body temperature for development.

Section – B

Q21. Leadnitrate solution is added to a test tube containing potassium iodide solution. **(2)**
a) Write the name and colour of the compound precipitated.
b) Write the balance chemical equation for the reaction involved.

Q22. Show the formation of $AlCl_3$. **(2)**

Q23. Sameer was studying in his room. Suddenly he smells something burning and sees smoke in the room. He rushes out of the room immediately. Was Sameer's action voluntary or involuntary? Explain. **(2)**

OR

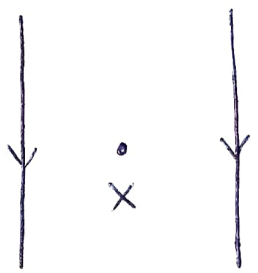
Differentiate between Blood and lymph. (2 points each)

Q24. If the image formed by a lens for all positions of the object placed infront of it is always virtual, erect and diminished, state the type of lens. Draw a ray diagram in support of your answer. **(3)**

Q25. A piece of wire of resistance R is cut into three equal parts. If the equivalent resistance of this parallel combination is R_1, what is the value of the ratio $R_1 : R$? **(2)**

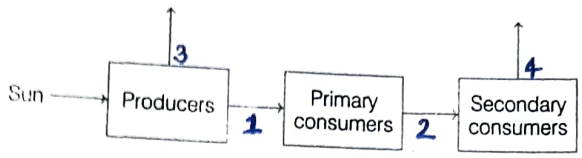
OR

The following diagram shows two parallel straight conductors carrying, same current. Copy the diagram and draw the pattern of the magnetic field lines around them showing their directions. What is the magnitude of magnetic field at a point 'A' which is equidistant from the conductors? Give justification for your answer.



A-4

Q26. The diagram shows the flow of energy through an ecosystem. The smallest amount of energy transferred between organisms and the largest amount of energy lost to the ecosystem is represented by which arrows? Give reason for both. (2)



Section – C

Q27. a) Identify the substance get reduced and oxidized in the following reaction: (3)

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

b) 2g of Ferrous sulphate crystal are heated in a dry boiling tube

i) List any two observation

ii) Write the balanced chemical equation for the reaction.

Q28. a) How would you name the following compounds? (3)

(i) CH_3CH_2Br (ii) $H-\overset{H}{\underset{|}{C}}=O$

(iii) $H-\overset{H}{\underset{H}{C}}-\overset{O}{\overset{||}{C}}-OH$ (iv) $H-\overset{H}{\underset{H}{C}}-\overset{O}{\overset{||}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-H$

b) Draw the isomers of Pentane.

OR

a) A compound 'x' on heating with excess conc. sulphuric acid at 443K given an unsaturated compound 'y'. 'x' also reacts with sodium metal to evolve a colourless gas 'Z'.
Identify 'x', 'y' & (Z). Write the equation of the chemical reaction of formation of 'y'.

b) Draw the electron dot structures for (i) propanone (ii) ethanoic acid

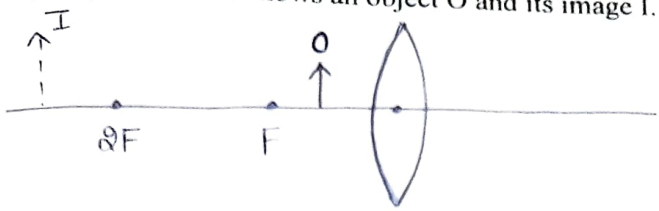
Q29. a) State the role played by the following in the process of digestion (3)
i) Enzyme trypsin ii) Enzyme lipase

b) List two functions of finger like projections present in the small intestine.

Q30. i) Name the following part in the human respiratory system. (3)
a) Part where air is filtered by fine hairs and mucus.
b) Part which terminates in balloon like structures.
c) Balloon – like structures where exchange of gases takes place
d) Part which separates chest cavity from abdominal cavity

ii) What happens to the rate of breathing during vigorous exercise and why?

Q31. The diagram given below shows an object O and its image I. **(3)**

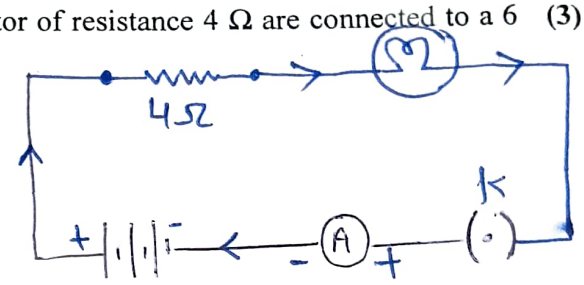


Without actually drawing the ray diagram, state the following :

a) Type of lens (Converging/Diverging)
b) Name two optical instruments where such an image is obtained.
c) List three characteristics of the image formed if this lens is replaced by a concave mirror of focal length 'f' and an object is placed at a distance 'f/2' in front of the mirror.

Q32. An electric lamp of resistance 20 Ω and a conductor of resistance 4 Ω are connected to a 6 V battery as shown in the circuit. Calculate: **(3)**

a) the current through the circuit,
b) the potential difference across the
(i) electric lamp (ii) conductor



Q33. Draw an appropriate schematic diagram showing common domestic circuits and discuss the importance of fuse. Why is it that a burnt out fuse should be replaced by another fuse of identical rating? **(3)**

Section - D

Q34. a) During extraction of metals, electrolytic refining is used to obtain pure metals. What would you take as the anode, the cathode and the electrolyte. **(5)**
b) What are amphoteric oxides? Give two examples of amphoteric oxide.

OR

I) Give reasons
a) Platinum, gold & silver are used to make jewellery.
b) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.
c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.

II) a) Distinguish between 'roasting and calcination'.
c) Write a chemical reaction to illustrate the use of aluminium for joining railway lines.

Q35. a) How is the surgical removal of unwanted pregnancies misused? **(5)**
b) Explain the role of oral contraceptive pills in preventing conception.
c) In the following figure showing a germinating gram seed, name the parts labelled as A, B & C
d) Why is part 'A' considered to be important during germination?
e) Which part would be the future root & future shoot? Name them.

Q36. It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm. **(5)**

(a) What should be the range of distance of an object placed in front of the mirror?
(b) Will the image be smaller or larger than the object? Draw ray diagram to show the formation of image in this case.
(c) Where will the image of this object be, if it is placed 24 cm in front of the mirror? Draw the ray diagram for the situation also to justify your answer.
Show the positions of pole, principal focus and the centre of curvature in the above ray diagrams.

OR

Analyse the following observation table showing variation of image distance (v) with object distance (u) in case of a convex lens and answer the questions that follow, without doing any calculations:

S.No.	Object distance u (cm)	Image distance v (cm)
1.	- 90	+ 18
2.	- 60	+ 20
3.	- 30	+30
4.	- 20	+ 60
5.	- 18	+ 90
6.	- 10	+ 100

(a) What is the focal length of the convex lens? Give reason in support of your answer.

(b) Write the serial number of that observation which is not correct. How did you arrive at this conclusion?

(c) Take an appropriate scale to draw ray diagram for the observation at S.No. 4 and find the approximate value of magnification.

A-7

Section – E

Read the above passage and answer the following questions : **(4)**

When various members of a class of organic compounds, like alkanes, alkenes, alcohols, which can be represented by a general formula and have same functional group are arranged in order of increasing molecular weights, they are found to differ from each other by a fixed group of atoms. They are said to form a homologous series. All members of a particular homologous series can be represented by the same general formula. For example, alkanes can be represented by the general formula C_nH_{2n+2}. Similarly, alkenes and alkynes series of homologues can be represented by the general formulae C_nH_{2n} and C_nH_{2n-2} respectively.

a) What is the difference in the molecular formula of any two consecutive members of a homologous series of organic compounds?

b) Which two of the following organic compounds belong to the same homologous series?

CH_4, C_4H_6, C_3H_6, C_5H_8

c) Write the next homologue of each of the following:

a) C_2H_4 b) C_4H_6

Q38. **Read the above passage and answer the following questions :** **(4)**

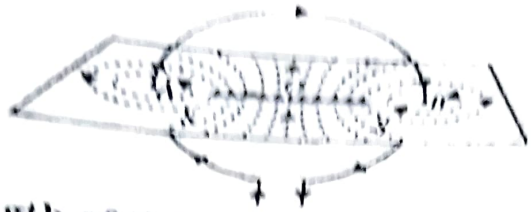
Mohan in his kitchen garden crossed pure-breed tall pea plants with pure-breed dwarf pea plants, and obtained pea plants of F1 – generation. Then he performed two types of experiments. In the first, he self –crossed the plants of F1 – generation (experiment A) and in the second, he crossed the plants of F1 – generation with the pure-breed dwarf parent plants (experiment B)

a) What would be the phenotypic ratio of plants in the F1 – generation?

b) How would the genotypic ratio differ in the experiment 'B'?

c) What would be the phenotypic and genotypic ratio of F2 – generation in experiment 'A'?

When a current is passed through the circular loop of wire, a magnetic field lines near the coil are nearly circular and concentric. At the centre of the circular loop, the magnetic field lines are straight.



The strength of the magnetic field produced by a current-carrying circular coil (or circular wire) depends on (i) current flowing through the coil, (ii) radius of the circular coil, (iii) number of turns of wire in the circular coil. The direction of the field lines can be found by applying right-hand thumb rule.

(i) A long horizontal power line is carrying a current of 100 A in the east-west direction. What is the direction of magnetic field at a point 1.0 m below it?

(a) North-South (b) East-West
(c) South-East (d) North-West

(ii) State the pattern of magnetic field lines for current carrying circular conductor.

(a) Magnetic field lines will be concentric circles to any point of the circular loop
(b) At centre, the field lines appear straight
(c) Both (a) and (b)
(d) None of these

(iii) The magnetic field produced due to a circular wire at its centre is

(a) at 45° to the plane of the wire
(b) at 60° to the plane of the wire
(c) in the plane of the wire
(d) perpendicular to the plane of the wire

(iv) According to right-hand thumb rule direction of the curl of fingers of the right hand gives the

(a) electric field lines
(b) magnetic field lines
(c) direction of magnetic field
(d) direction of current

OR

(v) In case of circular loop carrying current, the strength of magnetic field is

(a) constant everywhere
(b) stronger inside the loop than outside the loop
(c) weaker inside the loop than outside the loop
(d) none of these