QUESTION PAPER

SCIENCE

Max. Marks: 80 **Time Allowed: 3 hours**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. There is **no negative** marking in the question paper. Total Marks **80**.
4. Duration of test is **3.00 hours**.
5. **Section A** consists of 20 objective type questions carrying 1 mark each.
6. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
7. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words
8. **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.
9. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION-A

This section contains 20 questions.

1. An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change ?

(1) Baking powder

(2) Lime water

(3) Ammonium hydroxide solution

(4) Hydrochloric acid

2. Which of the following is not a redox reaction?

(1) $H_2S + Cl_2 \rightarrow 2HCl + S$

(2) $2Al + 6HCl \rightarrow 2AlCl_3 + 3H_2$

(3) $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$

(4) $ZnO + C \rightarrow Zn + CO$

3. Which of the following statement is incorrect ?

(1) Calamine and siderite are carbonates.

(2) Zinc blend and iron pyrites are sulphides.

(3) Malachite and azurites are ores of copper.

(4) Argentite and cuprite are oxides.

4. The molecular formula of the third member of the homolgous series of ketones is

(1) C_4H_8O (2) C_3H_6O

(3) $C_5H_{10}O$ (4) $C_6H_{12}O$

5. When a vegetable oil is treated wtih hydrogen in the presence of nickel catalyst it forms a fat. This is an example of

(1) Anodising reaction

(2) Substitution reaction

(3) Addition reaction

(4) Displacement reaction

6. Calamine ore can be converted to zinc oxide by the process of

(1) Dehydration (2) Roasting

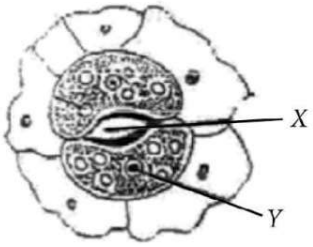
(3) Calcination (4) Sulphonation

7. The colour of methyl orange indicator in a solution is yellow. The pH of this solution is likely to be

(1) More than 7 (2) Equal to 7

(3) Zero (4) Less than 7

8. Four students A, B, C and D make the records given below, for the parts marked X and Y in this diagram

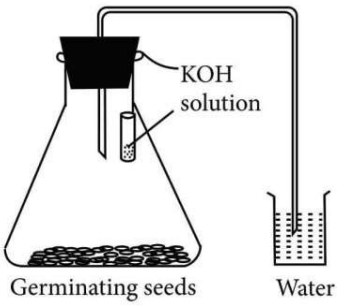


Student	X	Y
A	Stoma	Guard cell
B	Guard cell	Stoma
C	Epidermal cell	Stoma
D	Stoma	Epidermal cell

The correct record, out of these is that of student

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

9. In the following set-up which shows that 'carbon dioxide is given out during respiration'. The KOH kept in the flask



(1) makes the air in the flask alkaline.

(2) creates partial vacuum in the flask

(3) absorbs moisture present in the flask

(4) provides oxygen for respiration to the germinating seeds

10. What will be the number of chromosomes present in the gamete produced by the plants if the palisade cells of a species of the plant contain 28 chromosomes in all

(1) 56 (2) 28 (3) 14 (4) 4

11. The correct order of sequence in a reflex arc is

(1) Receptor → sensory neuron → relay neuron → motor neuron → muscle

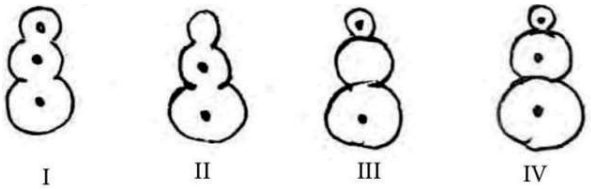
(2) Receptor → motor neuron → sensory neuron → muscle

(3) Sensory neuron → receptor → motor neuron → muscle

(4) Muscle → receptor cells → motor neuron → muscle

12. A prepared slide of budding in yeast was shown to the students of a class. Different students made different sketches on the basis of their memory. Out of these, four diagrams are shown below

The correct diagrams is / are :



(1) I (2) II

(3) IV (4) II and III

13. Concave and convex lenses are placed touching each other. The ratio of magnitudes of their powers is 2 : 3. The focal length of the system is 30 cm. Then the focal lengths of individual lenses are

(1) –75 cm, 50 cm (2) –15 cm, 10 cm

(3) 75 cm, 50 cm (4) 75 cm, –50 cm

14. The tungsten filament of two electric bulbs are of same length. If one of them gives 25 W power and the other 60 W power then

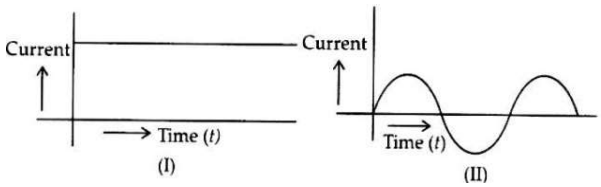
(1) Both the filaments are of same resistance.

(2) 25 W bulb has thicker filament.

(3) 60 W bulb has thicker filament.

(4) Both the filaments have same cross-sectional area.

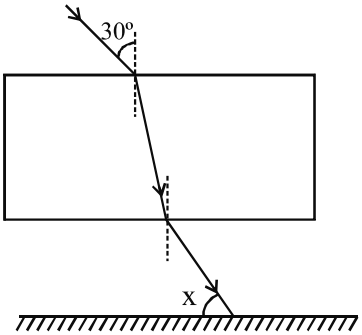
15. You are given the following current-time graph from two different sources. Identify the type of current by its waveforms



(1) (I) A.C. (II) D.C. (2) (I) D.C. (II) A.C.

(3) both A.C. (4) Both D.C.

16. In the given figure, a ray of light falls obliquely on a glass slab and after refraction from slab falls on a plane mirror at angle x.



The value of x is :

(1) 30° (2) 60° (3) 45° (4) 70°

Q. No 17 to 20 are Assertion - Reasoning based questions.

These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true and R is not the correct explanation of A

(3) A is true but R is false

(4) A is False but R is true

17. **Assertion (A) :** Litmus is obtained from nettle plant.

Reason (R) : An acidic solution turns blue litmus to red.

18. **Assertion (A) :** alveoli contains an extensive network of blood vessels.

Reason (R) : Alveoli is the sets where exchange of gases occurs.

19. **Assertion (A) :** Inheritance is the basis of heredity.

Reason (R) : Inheritance is the process by which characters are passed on from parent to progeny.

20. **Assertion (A) :** The energy of a charged particle moving in a uniform magnetic field does not change.

Reason (R) : In a uniform magnetic field no force acts on the charge particle.

SECTION-B

This section contains 06 questions.

21. Differentiate between oxidation and reduction reaction.

OR

State the various characteristics of chemical reaction.

22. Write one function of each of the following component of the transport system in human being

(a) Blood vessels (b) Blood platelets

(c) Lymph (d) Heart

23. What are 'nastic' and 'trophic' movements? Give one example of each.

24. What happens to glucose that enters the nephron along with filtrate ?

25. A person needs a lens of pwoer –3.5 dioptres for distant viewing. His doctor prescribes a correction of +0.5 dioptre in the near vision section of his bifocals. This is measured relative to the main part of the lens.

(a) What is the focal length of his distant viewing part of the lens ?

(b) What is the focal length of the near vision section of the lens ?

OR

(a) What is the power of the eye glasses worn by a person whose far point is 5m ?

(b) Locate the virtual image of an object 2m in front of the eye glasses.

26. Why is government of India imposing a ban on the use of polythene bags ? Suggest two alternatives to these bags and explain how this ban is likely to improve the environment ?

SECTION-C

This section contains 07 questions.

27. What do you mean by homologous series ? Write the characteristics of homologous series.

28. What happens when silver nitate solution is added to sodium chloride solution ?

(a) Write the equation for the reaction which takes place.

(b) Name the type of reaction involved.

29. (a) 'The breathing cycle is rhythmic whereas exchange of gases is a continuous process.' Justify the statement.

(b) What happens if the conducting tubes of the circulatory system develop a leak ? State in brief how could this be avoided ?

OR

Explain the process of nutrition in amoeba with the help of diagram.

30. 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.

(iii) Rule which gives the polarity of any face of the circular current loop. **[1+1+1=3]**

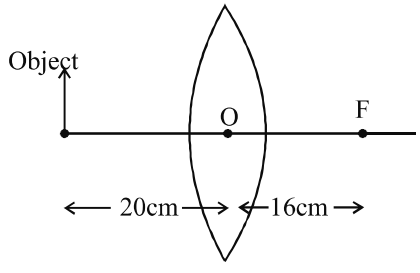
31. For a heater rated at 4 kW and 220V, calculate

(a) the current **[1+1+1=3]**

(b) the resistance of the heater

(c) the cost, if 1 kW hour is priced at 50 paise.

32. In the given figure, a 4 cm high object is placed at a distance of 20 cm from a convex lens. The focal length of the lens is 16 cm. Find the



(a) Position of the image

(b) Size of the image

(c) Nature of the image **[1+1+1=3]**

OR

A concave mirrror is used for image formation for different positions of an object. What inferences can be drawn about the following when an object is placed at a distance of 10 cm from the pole of a concave mirror of focal length 15 cm ?

[½+½+½+1½=3]

(i) Position of the image.

(ii) Size of the image

(iii) Nature of the image.

Draw a labelled ray diagram to justify your inferences.

33. You have been selected to talk on "ozone layer and its protection" in the school assembly on 'Environment Day'.

(a) Why should ozone layer be protected to save the environment?

(b) List any two ways that you would stress in your talk to bring in awarenes amongst your fellow friends that would also help in protection of ozone layer as well as the environment.

SECTION-D

This section contains 03 questions.

34. (a) When ethanoic acid reacts wtih sodium hydrogen carbonate, then a salt X is formed and a gas Y is evolved. Name the salt X and gas Y. Write the equation of the reaction involved.

(b) Give any two uses of ethanoic acid .

OR

A neutral organic compound X of molecular formula C_2H_6O on oxidation with acidified potassium dichromate gives on acidic compound Y. Compound X reacts with Y on warming in the presence of conc. H_2SO_4 to give a sweet smelling substance Z. What are X, Y and Z ?

35. (a) Write the function of the following parts in human female reproductive system -

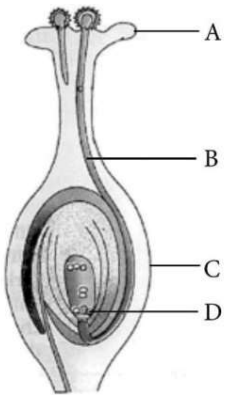
(i) Ovary (ii) Oviduct

(iii) Uterus

(b) Describe the structure and function of placenta.

OR

(a) Identify A, B, C and D in the given diagram and write their name.



(b) What is pollination ? State its significance.

(c) Explain the process of fertilisation in flower. Name the parts of the flower that develop after fertilizaton into

(i) Seed (ii) Fruit

36. (i) Draw labelled diagram to prove that while light is made up of seven colours.

(ii) Which colour light bends least and which one the most while passing out from the prism ? Also state the reason for the same.

(iii) State the cause of dispersion of white light passing through a glass prism. **[2+2+1=5]**

SECTION-E

This section contains 03 questions.

37. Case Study :

Metal oxides are basic in nature but some metal oxides such as aluminium oxide, zinc oxide etc. shows both acidic as well as basic behaviour. Such metal oxides which reacts with both acids as well as bases to produce salts and water are known as amphoteric oxides.

Most metal oxides are insoluble in water but some of these dissolve in water to form alkalis.

(i) Write a chemical reaction of aluminium when burnt in air.

(ii) Give an example of amhoteric oxide along with reaction with the following

(i) HCl (ii) NaOH

(iii) Name two oxides which are soluble in water and form alkalis.

(iv) Write the equation of sodium oxide with water.

OR

Silver articles become black after some time when exposed to air. This is because it reacts with sulphur in the air to form a coating of silver sulphide.

Copper reacts with moist carbon dioxide in the air and slowly loses its shiny brown surface and gains a green coat. This green substance is copper carbonate.

Iron when exposed to moist air for a long time acquires a coating of a brown flaky substance called rust.

(i) Write a chemical reaction occur during the rusting of iron.

(ii) Give three methods to prevent the corrosion of metals.

(iii) What is meant by galvanisaton ?

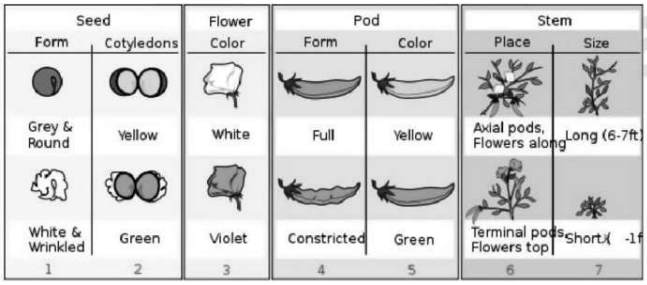
(iv) What is amalgam?

38. Mendel was educated in a monastery and went on to study science and mathematics at the University of Vienna. Failure in the examinations for a teaching certificate did not suppress his zeal for scientific quest. He went back to his monastery and started growing peas. Many others had studied the inheritance of traits in peas and other organisms earlier, but Mendel blended his knowledge of science and mathematics and was the first one to keep count of individuals exhibiting a particular trait in each generation. This helped him to arrive at the laws of inheritance.

Based on the above information, answer the following questions.

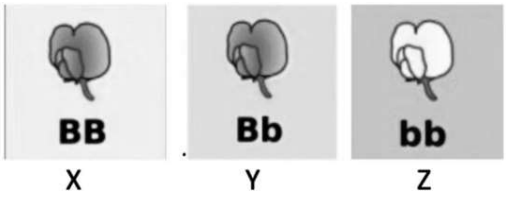
(a) Why did Mendel select a pea plant for his experiments?

(b) Study the picture below that represents traits studied by Mendel in garden pea.



Identify the dominant traits in pod colour and stem flower place.

(c) The given picture represent the alleles for flower colour in pea plant.



Flower 'Y' has same colour as that of flower 'X'. Why ?

OR

(c) Express with the help of a cross, how mendel arrived on law of dominance ?

39. When two or more resistors and connected end to end to each other. Then they are said to be connected in series.

The equivalent resistance is equal to the sum of the all individual resistances.

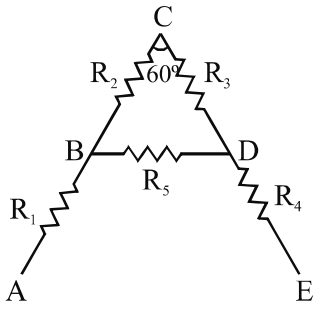
The equivalent resistance is thus greater than the resistances of either resistor. This is also known as **maximum effective resistace.**

When two or more resistors are connected simultaneously between two points to each other, then they are said to be connected in parallel combination.

The reciprocal of equivalent resistance is equal to the sum of the reciprocal of indivdidual resistances.

The equivalent resistance is less than the resistance of either resistor. This is also known as **minimum effective resistace.**

A letter 'A' is consists of a uniform wire of each resistance 1.0 Ω cm^{-1}. The sides of the letter are each 20 cm long and the cross-piece in the middle is 10 cm long while the apex angle is 60°. The arrangement is as shown in the figure.



(i) Find the effective resistance between B and D

(ii) Find the effective resistance between A and E

(iii) How many 176 Ω resistors (in parallel) are required to carry 5 A on a 220 V line ?

OR

(iii) In a particular television tube, a beam of electrons is emitted. The bean current is 80 μA. How many electrons strike the screen of TV every second ? Also find the total charge striking the screen in 2 minutes ?