S R Study Material

SAMPLE PAPER 4 2024-25

Class 10 - Science

Time Allowed: 3 hours **Maximum Marks: 80**

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. Section A consists of 20 objective-type questions carrying 1 mark each.
4. 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.
5. 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.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. The food items like cheese that is shown in the given below image become unfit for eating. This happens due to: **[1]**

a) Corrosion
b) Rusting
c) Dusting
d) Rancidity

2. A student wrote three statements about rancidity : **[1]**

i. When fats and oils are reduced, they become rancid.
ii. Chips manufacturers usually flush chips bags with oxygen to prevent rancidity.
iii. Rancidity is prevented by adding substances called antioxidants to food.

a) Statement (i), (ii) and (iii)
b) Statement (i) and (iii) only
c) Statement (i) only
d) Statement (iii) only

3. When steam is passed over red hot iron **[1]**

a) No reaction takes place.
b) H_2 and Fe_3O_4 are formed.

c) H_2 and Fe_2O_3 are formed.

d) O_2 and $Fe(OH)_3$ are formed.

4. What is denatured spirit? **[1]**

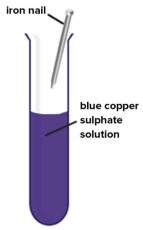
a) Ethanol + Methanol (2.5%)

b) Ethanol only

c) Methanol only

d) Ethanol + Methanol (5%)

5. An iron nail is suspended in $CuSO_4$ solution and kept for a while. The solution: **[1]**



a) Turns green and no coating will be formed on the nail.

b) Turns green and a coating will be formed on the nail

c) Remains blue and a coating is found on the nail

d) Remain blue and no coating will be formed on the nail.

6. Before keeping any eatables in the jar, Riya always keeps anhydrous $CaCl_2$ in the bottle to: **[1]**

a) All of these

b) To absorb moisture

c) Kill germs

d) To clean the bottle

7. The odour of ethanoic acid resembles which one of the following**:** **[1]**

a) Kerosene

b) Pungent

c) Rose

d) Vinegar

8. Under the high power objective of a microscope, an epidermal peel of a leaf shows **[1]**

a) stomata surrounded by several guard cells each

b) stomata surrounded by several epidermal cells

c) stomata surrounding by a pair of guard cells each

d) stomata surrounding many guard cells

9. The statement that correctly describes the characteristic(s) of a gene is: **[1]**

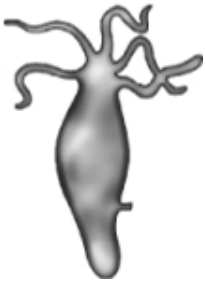
a) A gene is not the information source for making proteins in the cell.

b) In individuals of a given species, a specific gene is located on a particular chromosome.

c) All the inherited traits in human beings are not controlled by genes.

d) Each chromosome has only one gene located all along its length.

10. Identify the mode of asexual reproduction in the following organism: **[1]**



a) Multiple fission

b) Fragmentation

c) Budding
d) Binary fission

11. A cross between pea plant with white flowers (vv) and pea plant with violet flowers (VV) resulted in F_2 progeny in which ratio of violet (VV) and white (vv) flowers will be: **[1]**

a) 1 : 1
b) 1 : 3
c) 2 : 1
d) 3 : 1

12. Before setting up an experiment to show that seeds release carbon dioxide during respiration, the seeds should be **[1]**

a) boiled to make them soft
b) kept moist till they germinate
c) soaked in vinegar
d) dried completely

13. The magnetic field at a point due to current carrying conductor is directly proportional to **[1]**

A. Current flowing through the conductor.
B. Distance of the conductor.
C. Resistance of the conductor.

a) A and C
b) A and B
c) Only B
d) Only A

14. If the current flowing through a fixed resistor is halved, the heat produced in it will become: **[1]**

a) one-fourth
b) double
c) four times
d) one-half

15. Which of the following is the function(s) of the ecosystem? **[1]**

A. Energy flow
B. Nutrients flow
C. Gaseous flow

a) B and C
b) A and C
c) A and B
d) All of these

16. The driving force of an ecosystem is: **[1]**

a) Biomass
b) Producers
c) Solar energy
d) Carbohydrates in plants

17. **Assertion (A):** Rusting of iron metal is the most common form of corrosion. **[1]**
Reason (R): The effect of rusting of iron can be reversed if they are left open in sunlight.

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

18. **Assertion (A):** Scrotum is present outside the abdominal cavity. **[1]**
Reason (R): It stores sperms that require a lower temperature than the normal body temperature.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** A direction current flows through a metallic rod, produced a magnetic field only outside the rod. **[1]**
Reason (R): There is no flow of charge carriers inside the rod.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** Paper cups are better option than plastic cups for serving tea. **[1]**
Reason (R): Paper cups are biodegradable and can even be disposed of by burning.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

21. Give names of the following**:** **[2]**
(a) An aldehyde derived from ethane
(b) Ketone derived from butane
(c) Compound obtained by the oxidation of ethanol by chromic anhydride

22. Suggest any two contraceptive methods to control the size of human population and explain them. **[2]**

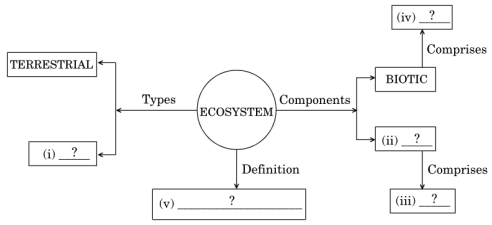
23. In the experiment To prepare a temporary mount of a leaf peel to show stomata, glycerine and safranin are used. **[2]**
When and why are these two liquids used? Explain.

OR

Write characteristics of enzymes.

24. What is the relationship between the refractive index of two media? **[2]**

25. Complete the following flow chart based on ecosystem and its components. **[2]**



OR

What are the problems caused by the non-biodegradable wastes that we generate?

26. We are able to see everything with one eye, then why do we have two eyes ? **[2]**

Section C

27. State three reasons for the following facts: **[3]**
i. Sulphur is a non-metal.
ii. Magnesium is a metal.
One of the reasons must be supported with a chemical equation.

28. In a chemistry laboratory, students were instructed to set up three experiments, details of which are given below: **[3]**

Experiment No.	**Set up details**
1.	2 iron nails in a cork capped test tube + Tap water immersing the nails +

2.	2 iron nails in a cork capped test tube + Boiled water immersing the nails + Oil on top of water layer.
3.	2 iron nails In a cork capped test tube + Cotton wool on top of the iron nails + Granules of calcium chloride on cotton wool.

Indicate the changes observed in the nails kept in all the three setups, with reasons.

OR

A zinc plate was kept in a glass container having copper sulphate solution. On examining it was found that the blue colour of the solution is fading slowly. After a few days when the zinc plate was taken out of the solution, a number of small holes were noticed in it. State the reason and give chemical equation of the reaction involved.

29. Can you, design any other experiment set-up for testing that CO_2 is produced during respiration? **[3]**

30. In pea plant, round seed is dominant over the wrinkled. If a cross is carried out between these two plants, give answer to the following questions. **[3]**

i. Mention the genes for the traits of parents.

ii. State the trait of F_1 hybrids.

iii. Write the ratio of F_2 progeny obtained from this cross. What is the name of the cross?

31. a. Define focal length of a divergent lens. **[3]**

b. A divergent lens of focal length 30 cm forms the image of an object of size 6 cm on the same side as the object at a distance of 15 cm from its optical centre. Use lens formula to determine the distance of the object from the lens and the size of the image formed.

c. Draw a ray diagram to show the formation of image in the above situation.

32. The values of current I flowing through a resistor for the corresponding values of potential difference V across it are given below: **[3]**

V(volts)	1.5	3.0	6.0	9.0
I(amperes)	0.5	1.0	2.0	3.0

a. Plot a graph between V and I.

b. Why should this graph pass through the origin?

c. Name and state the law which is represented by the graph.

33. i. A wire of resistance 2 has been connected to a source of 50 V as its two ends. What is the current flowing through the wire? **[3]**

ii. An electric kettle rated at 220 V, 2.2 kW works for 3h. Calculate the energy consumed and the current drawn.

Section D

34. i. Give a chemical test to distinguish between saturated and unsaturated hydrocarbon. **[5]**

ii. Name the products formed when ethane burns in air. Write the balanced chemical equation for the reaction showing the types of energies liberated.

iii. Why is reaction between methane and chlorine in the presence of sunlight considered a substitution reaction?

OR

What are structural isomers? List any four characteristics of isomers. Draw the possible structures of butane.

35. Draw a well labeled diagram of female reproductive system and mention its parts. **[5]**

OR

a. Why is the use of iodised salt advisable? Name the disease caused due to deficiency of iodine in our diet and state its one symptom.

b. How do nerve impulses travel in the body? Explain.

36. How are the images formed in convex mirror when object is moved from infinity to the mirror? **[5]**

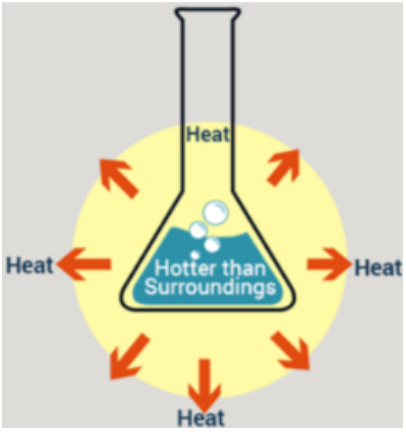
OR

Find the size, nature and position of image formed when an object of size 1 is placed at a distance of 15 cm from a concave mirror of focal length 10 cm.

Section E

37. **Read the following text carefully and answer the questions that follow:** **[4]**

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



i. What is the exothermic reaction? (1)

ii. Write an example of an exothermic reaction. (1)

iii. How will you obtain sulphuric acid from an acidic oxide? (2)

OR

While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid? (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

You must have noticed many dramatic changes in your appearance as well as that of your friends as you approached 10-12 years of age. These changes associated with puberty are because of the secretion of testosterone in males and oestrogen in females. Do you know anyone in your family or friends who has been advised by the doctor to take less sugar in their diet because they are suffering from diabetes? As a treatment, they might be taking injections of insulin. This is a hormone that is produced by the pancreas.

i. Why is pancreas a dual gland? (1)

ii. Name the hormone which is secreted by males and females during adolescence. (1)

iii. What happens if Insulin is not secreted in the proper amount? (2)

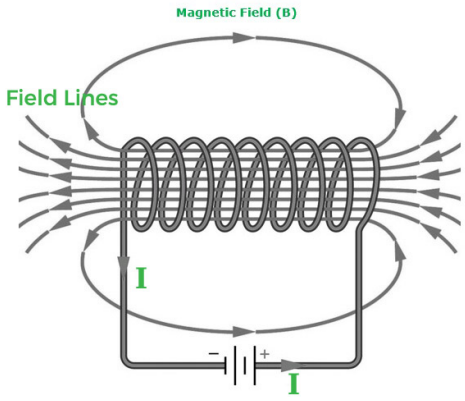
OR

From which cells of pancreatic islets insulin and glucagon hormone are secreted? (2)

39. **Read the following text carefully and answer the questions that follow:** **[4]**

An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter

is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetize a piece of a magnetic material like soft iron when placed inside the solenoid. The strength of the magnetic field produced by a current-carrying solenoid is directly proportional to the number of turns and strength of the current in the solenoid.



i. What would be the strength of the magnetic field inside a long current-carrying straight solenoid? (1)

ii. Which end is north and which end is south pole when current flows through a solenoid? (1)

iii. A long solenoid carrying a current produces a magnetic field B along its axis. If the current is double and the number of turns per cm is halved, then what will be the new value of the magnetic field? (2)

OR

A soft iron bar is enclosed by a coil of insulated copper wire as shown in the figure. When the plug of the key is closed, then where would the face B of the iron bar be marked? (2)