



**SCIENCE**

**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 copper articles turn green when kept for long due to [1]

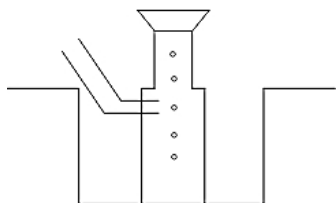


- a) Corrosion b) Rusting
- c) Precipitation d) Rancidity
2. Which of the following statements about the given reaction is/are incorrect? [1]
- $$\text{Fe}_2\text{O}_3 + 2\text{Al} \xrightarrow{\text{Ignited}} 2\text{Fe} + \text{Al}_2\text{O}_3$$
- I. The mixture of  $\text{Fe}_2\text{O}_3$  and Al is ignited by inserting a magnesium ribbon and then burning it.
- II. The reaction is used for welding the broken parts of iron machinery, railway tracks, etc.
- III. The whole process is called aluminothermy.
- IV. The reaction is highly endothermic.
- a) IV only b) I and IV only
- c) I and III only d) II and III only

3. The table below has information regarding pH and the nature (acidic/basic) of four different solutions. Which one of the options in the table is correct? [1]

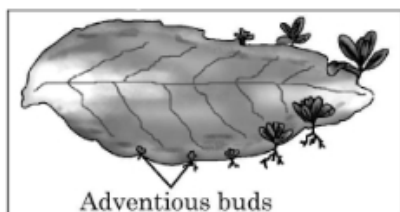
Option	Solution	Colour of pH paper	Approximate pH value	Nature of solution
(a)	Lemon juice	Orange	3	Acidic
(b)	Milk of magnesia	Blue	10	Basic
(c)	Gastric juice	Red	6	Acidic
(d)	Pure water	Yellow	7	Neutral

- a) Option (d)  
 b) Option (a)  
 c) Option (b)  
 d) Option (c)
4. Which of the following is not an allotropic form of carbon? [1]
- a) Diamond  
 b) Fluorine  
 c) Graphite  
 d) Fullerene
5. A metal is heated with dil  $H_2SO_4$ . The gas evolved is collected by the method shown in the figure. Answer the following questions based on it: [1]



The gas \_\_\_\_\_ than air and it is \_\_\_\_\_ in water.

- a) heavier, insoluble  
 b) lighter, soluble  
 c) heavier, soluble  
 d) lighter, insoluble
6. Fountain experiment demonstrates: [1]
- a) Manufacturing of  $NH_3$   
 b) The solubility of  $NH_3$  in  $H_2O$   
 c) The solubility of  $NH_3$   
 d) The solubility of  $SO_2$  in water
7. Sodium stearate is chemically a: [1]
- a) Baking soda  
 b) Bleaching powder  
 c) Detergent  
 d) Soap
8. The process by which blood is cleared of metabolic wastes in case of kidney failure is called: [1]
- a) dialysis  
 b) filtration  
 c) transplantation  
 d) artificial kidney
9. The genetic constitution of an organism is called [1]
- a) Genome  
 b) Trait  
 c) Genotype  
 d) Phenotype
10. In the given diagram the leaf shown belongs to which plant? [1]



- a) Hibiscus  
b) Money plant  
c) Mustard  
d) Bryophyllum

11. It a round green seeded pea plant (RRYY) is crossed with wrinkled yellow seeded pea plant (rr yy) the seeds to be produced in  $F_1$  generation will be: [1]

- a) round and green  
b) wrinkled and green  
c) Wrinkled and yellow  
d) round and yellow

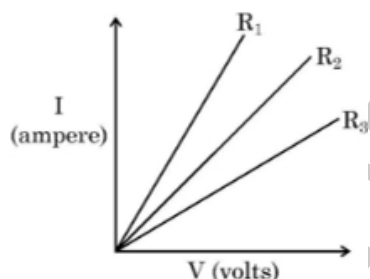
12. An organism which breaks down the food material outside the body and then absorbs it is [1]

- a) an animal parasite, Tapeworm  
b) a fungi, Rhizopus  
c) a bacteria, Rhizobium  
d) a plant parasite, Cuscuta

13. What is the current rating of domestic circuits used for appliances like an electric bulb, tube light, and fans? [1]

- a) 15 ampere  
b) 2 ampere  
c) 5 ampere  
d) 10 ampere

14. Study the I-V graph for three resistors of resistances  $R_1$ ,  $R_2$  and  $R_3$  and select the correct statement from the following: [1]

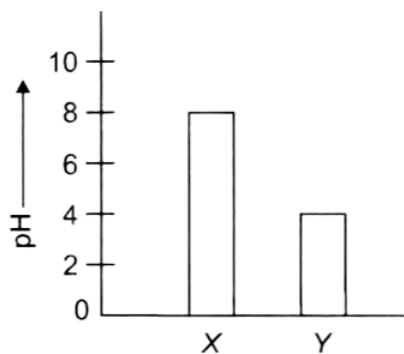


- a)  $R_2 > R_3 > R_1$   
b)  $R_1 > R_2 > R_3$   
c)  $R_1 = R_2 = R_3$   
d)  $R_3 > R_2 > R_1$

15. Micro-organisms belong to the group of: [1]

- a) Decomposers  
b) Consumers  
c) Composers  
d) Producers

16. The pH level of precipitation at two places X and Y was found to be as shown in the graph. Which of the following can you deduce from it? [1]



- a) Marble statues at place X can be seen yellowing.
- b) At place Y, renewable energy sources are fastly replacing the use of conventional energy sources.
- c) Plants at place Y can be seen to have burnt yellow looking leaves.
- d) At place X there is higher consumption of fossil fuels.

17. **Assertion (A):** A chemical reaction becomes faster at higher temperatures. [1]

**Reason (R):** At higher temperatures, molecular motion becomes more rapid.

- 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):** During fertilization, the only head of the spermatozoa enters the egg. [1]

**Reason (R):** If several spermatozoa hit the egg at the same time, all can enter the egg.

- 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 current-carrying conductor experiences a force in a magnetic field. [1]

**Reason (R):** The force acting on a current-carrying conductor in a magnetic field is due to interaction between magnetic field produced by the current-carrying conductor and external magnetic field in which the conductor is placed.

- 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):** Trophic levels are formed by only plants. [1]

**Reason (R):** Food chains and webs are formed due to linked organisms on the basis of their nutrition.

- 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. What is a covalent bond? What type of bond exists in (i)  $\text{CCl}_4$  (ii)  $\text{CaCl}_2$ ? [2]

22. What is Regeneration? Explain the process of regeneration in Planaria. [2]

23. What precaution should be taken while preparing a good temporary mount of leaf peel to observe stomata? [2]

OR

Dark reaction of photosynthesis does not need light. Do plants undergo dark reaction at night explain.

24. With respect to air the refractive index of ice is 1.31 and that of rock salt is 1.54. Calculate the refractive index of rock salt with respect to ice? [2]
25. Why plants are called as producers? [2]

OR

Kulhads (disposable cups made of clay) and disposable paper cups both are used as an alternative for disposable plastic cups. Which one of these two can be considered as a better alternative to plastic cups and why?

26. Why does the sky appear dark instead of blue to astronaut? [2]

### Section C

27. A cleaned aluminium foil was placed in an aqueous solution of zinc sulphate. When the aluminium foil was taken out of the zinc sulphate solution after 15 minutes, its surface was found to be coated with a silvery grey deposit. From the given observation, what can be concluded? [3]
28. Sample pieces of five metals A, B, C, D and E were added to the tabulated solutions separately. The results observed are shown in the table: [3]

Metal	$FeSO_4$	$CuSO_4$	$ZnSO_4$	$AgNO_3$	$Al_2(SO_4)_3$
A	No Change	No Change	No Change	Coating on metal	No Change
B	Grey Deposit on metal	Brown Coating on metal	No Change	Coating on metal	No Change
C	No Change	No Change	No Change	No Change	No Change
D	No Change	-----	No Change	Coating on metal	No Change
E	-----	Brown Coating	New Coating	New Coating	No Change

Based on the observations recorded in the table, answer the following:

- (1) Which is the most reactive metal?
- (2) Which is the least reactive metal?
- (3) What would be observed if metal D were added to a solution of copper (II) sulphate?
- (4) What would be observed if metal E were added to a solution of iron (II) sulphate?
- (5) Arrange the metals A, B, C, D and E in decreasing order of their reactivity?

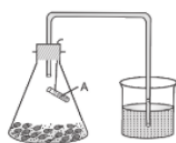
OR

State three reasons for the following facts:

- i. Sulphur is a non-metal.
- ii. Magnesium is a metal.

One of the reasons must be supported with a chemical equation.

29. The diagram given below is the experiment set-up of show that carbon dioxide is given out during respiration. In this set-up what does test tube marked (A) contain? What are its role in the experiment [3]



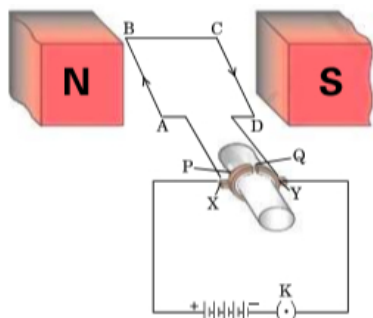
30. A pea plant with purple flowers were crossed with white flowers producing 40 plants with only purple flowers. On selfing, these plants produced 470 plants with purple flowers and 162 with white flowers. What genetic [3]

mechanism account for these results.

31. A pencil when dipped in water in a glass tumbler appears to be bent at the interface of air and water. Will the pencil to be bent to the same extent, if instead of water we use liquids like, kerosene or turpentine? Support your answer with reasons. [3]

32. How can three resistors of resistance  $2\Omega$ ,  $3\Omega$  and  $6\Omega$  be connected to give a total resistance of (a)  $4\Omega$ ; (b)  $1\Omega$ ? [3]

33. In the figure given below, a simple electric motor is shown: [3]



As shown in the figure, the current in the coil ABCD flows from A to B in the arm AB and C to D in the arm CD.

- State the directions in which the arms AB and CD will experience a force.
- Identify the part of the electric motor that reverses the flow of current in the coil ABCD and write its name.
- After the reversal of the flow of current in the coil ABCD, state the directions in which the arms AB and CD will experience a force.
- Name the rule which is applied to determine the direction of force on a current carrying conductor placed in a magnetic field.

#### Section D

34. a. What is meant by a functional group? Explain with an example. [5]

b. Write three common functional groups present in organic compounds. Give their symbols/formulae.

c. Name the functional groups present in the following compounds:

- $\text{CH}_3\text{COOH}$ ,
- $\text{CH}_3\text{CH}_2\text{CHO}$ ,
- $\text{C}_2\text{H}_5\text{OH}$ ,
- $\text{CH}_3\text{COCH}_2\text{CH}_3$ .

d. Name the functional group which always occurs in the middle of a carbon chain.

e. Draw the structures for the following compounds:

- Ethanal
- Propanal
- Butanal
- Pentanal

OR

What is the difference between soaps and detergents? State in brief the cleansing action of soaps in removing an oily spot from a fabric. Why are soaps not very effective when a fabric is washed in hard water? How is this problem resolved?

35. Draw a well labeled diagram of male reproductive system and describe its parts. [5]

OR

What constitutes the central and peripheral nervous systems? How are the components of central nervous system protected? Which signals will get disrupted in case of a spinal cord injury?

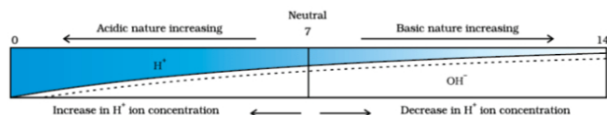
36. A 2.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10 cm. The distance of the object from the lens is 15 cm. Find the nature, position, and size of the image. Also, find its magnification. [5]

OR

What are the rules to form image of an object by concave lens? Form the images of an object when it is moved from infinity to the lens.

### Section E

37. A scale for measuring hydronium ion in a solution is called the pH scale. The pH of a neutral solution is 7. A value of less than 7 on the pH scale represents an acidic solution. As the pH value, increases from 7 to 14 it represents OH<sup>-</sup> ion concentration in solution i.e a basic solution. [4]



- What is the pH range of the Human Body? (1)
- The strength of acid and bases depends on which factor? (1)
- If the pH of soil X is 7.5 while that of soil Y is 4.5, then which soil should be treated with powdered chalk to adjust its pH? (2)

OR

Tooth decay starts when the pH of the mouth is lower than which pH? (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.

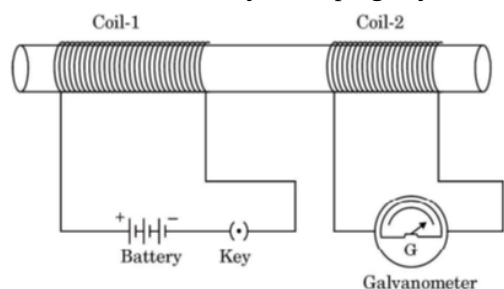
- Why is pancreas a dual gland? (1)
- Name the hormone which is secreted by males and females during adolescence. (1)
- What happens if Insulin is not secreted in the proper amount? (2)

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]

Take two different coils of copper wire having large number of turns, say 50 and 100 turns respectively. Insert them over a non-conducting roll as shown in the given figure. Connect the Coil-1, having large number of turns, in series with a battery and a plug key. Also connect the other Coil-2 with a galvanometer.



- Explain the reason for the current which is responsible for the deflection in the galvanometer. (1)

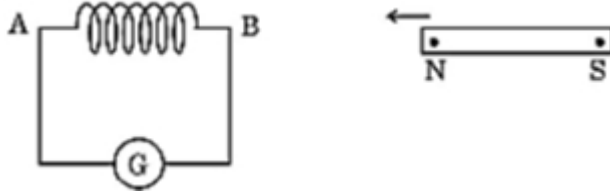
ii. Define the phenomenon involved in this case. (1)

iii. State what is observed in the galvanometer, when (2)

1. the key is closed.
2. the key is opened.

**OR**

A coil AB of copper wire is connected to a galvanometer as shown in the figure. What is observed when N-pole of a strong bar magnet is



- a. pushed into the coil?
- b. held stationary inside the coil?

State the reason for each observation. (2)

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