



Roll No. 

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Candidates must write the code on the title page of the answer-book.

- Please check that this question paper contains **14** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-sheet by the candidate.
- Please check that this question paper contains **39** questions.
- **Please write down the Serial Number of the question before attempting it..**

## SCIENCE (Theory)

*Time allowed : 3 hours*

*Maximum Marks : 70*

### **General Instructions :**

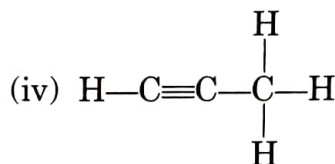
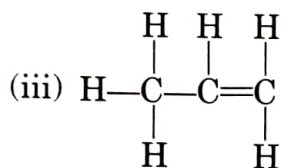
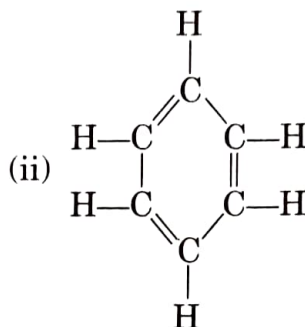
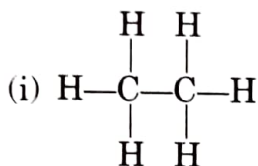
- (i) *This question paper consists of **39** questions in **5** sections.*
- (ii) *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
- (iii) ***Section A** consists of **20** Objective type questions carrying **1** mark each.*
- (iv) ***Section B** consists of **6** Very Short questions carrying **2** 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 **3** 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 **5** 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 **4** marks each with sub-parts.*

## SECTION - A

Select and write one most appropriate option out of the four options given for each of the questions 1-20:

1. Which of the following is/are unsaturated hydrocarbons?

1



(a) Only (i)

(b) Both (i) and (iii)

(c) Only (iv)

(d) (ii), (iii) and (iv)

2. Which of the following is not a biodegradable substance?

1

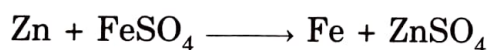
(a) Leather

(b) Peelings of fruits and vegetables

(c) Plastic bags

(b) Excreta of human beings

3. In the reaction of zinc with iron (II) sulphate solution:



Which option in the given table correctly represents the substance oxidised, substance reduced and oxidising agent?

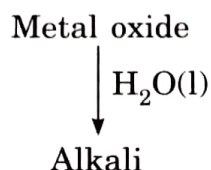
1

	Substance oxidised	Substance reduced	Oxidising agent
(a)	$\text{FeSO}_4$	$\text{Zn}$	$\text{FeSO}_4$
(b)	$\text{Zn}$	$\text{FeSO}_4$	$\text{FeSO}_4$
(c)	$\text{FeSO}_4$	$\text{Zn}$	$\text{Zn}$
(d)	$\text{Zn}$	$\text{FeSO}_4$	$\text{Zn}$

4. A concave mirror produces four times magnified real image of the object placed at 12 cm in front of the mirror. Where is the image located? 1

- (a) +3 cm (b) +12 cm  
(c) -24 cm (d) -48 cm

5.

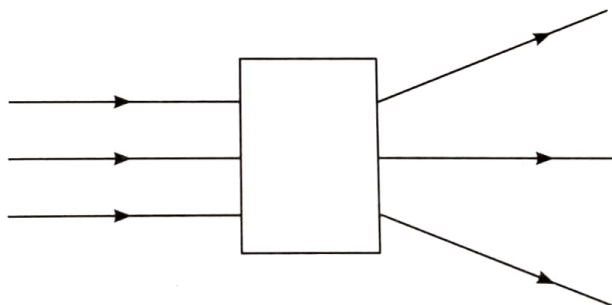


Which of the following combinations are correct? 1

	Metal oxide	Alkali formed
(i)	$\text{Na}_2\text{O}$	Yes
(ii)	$\text{K}_2\text{O}$	No
(iii)	$\text{MgO}$	Yes
(iv)	$\text{CuO}$	No

- (a) (i) and (ii) (b) (ii) and (iii)  
(c) (iii) and (iv) (d) (i) and (iv)

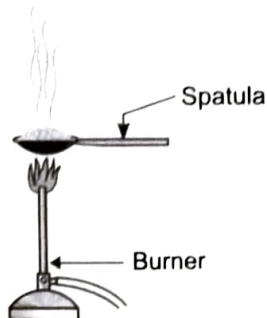
6. A beam of light is incident through the holes on one side of a box and emerges out through the holes on its opposite side as shown in the following figure.



Which of the following is present in the box? 1

- (a) A convex lens (b) A concave lens  
(c) A glass slab (d) A glass prism

7. Rajesh took samples of some salts from the science laboratory and heated one by one on a metal spatula directly on the flame as shown in the given figure.

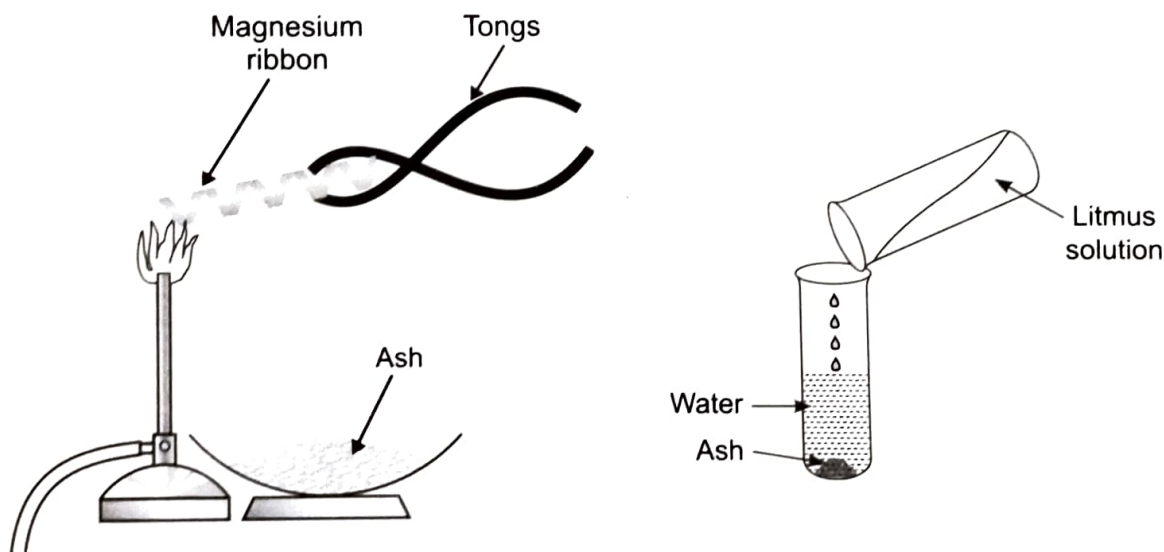


Which of the following samples does not impart colour to the flame?

**1**

- (a) Silica ( $\text{SiO}_2$ )                      (b) Sodium chloride ( $\text{NaCl}$ )  
(c) Potassium iodide ( $\text{KI}$ )            (d) Barium chloride ( $\text{BaCl}_2$ )

8. Akshaya burnt the magnesium ribbon as shown in the given figure and collected the ash in watch glass. Later he dissolved the ash in water and tested the resultant solution with both red and blue litmus solution.

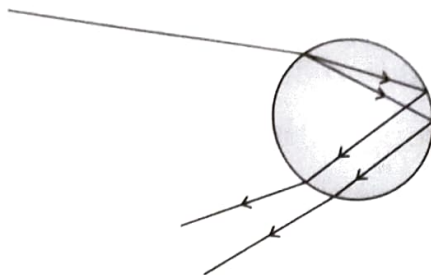


Which of the following statements is correct?

**1**

- Red litmus solution turns blue.
- Blue litmus solution turns red.
- Red litmus solution first changes blue, then changes to red again.
- There is no change in either of the test tubes.

9. Study the given diagram showing the rainbow in the sky.



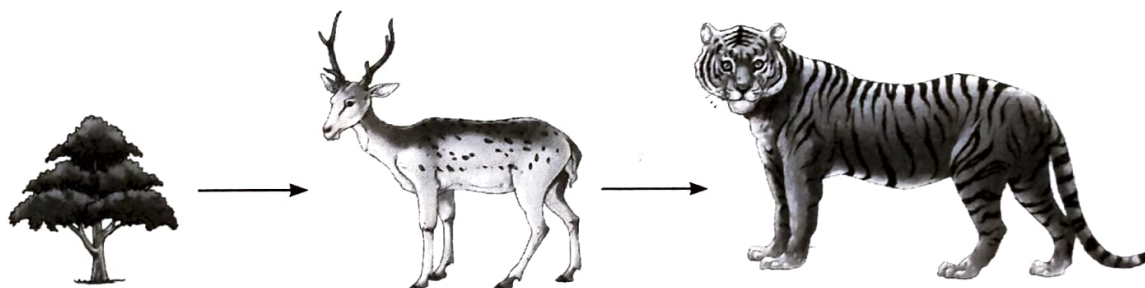
Which of the following option is not correct?

1

- (a) A rain drop acts as a prism.
- (b) A rainbow is a natural spectrum.
- (c) A rainbow is always formed in the direction to that of the Sun.
- (d) We can see rainbow on a sunny day when we look at the sky through a waterfall.

10. In the given food chain in forest, if energy available to the trees is 100 kJ, what will be energy available to tiger?

1



- (a) 100 kJ
- (b) 10 kJ
- (c) 1 kJ
- (d) 300 kJ

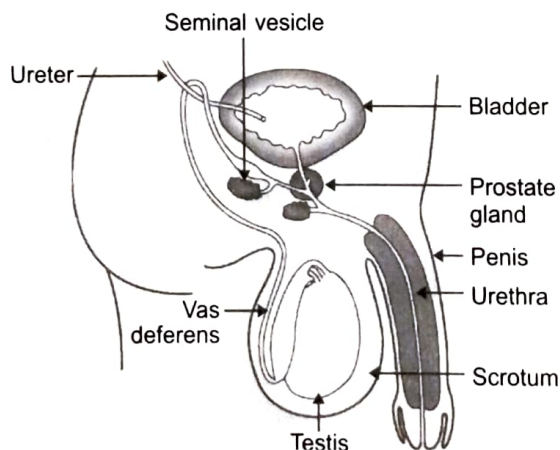
11. Fuse wire is prepared from a material having

- (i) high resistivity
  - (ii) low melting point
  - (iii) low resistivity
  - (iv) high melting point
- (a) only (i)
  - (b) (i) and (ii)
  - (c) (i) and (iv)
  - (d) (ii) and (iii)

1



12. An astronaut lands his spacecraft on the surface of moon and observes the sky. He finds the colour of the sky as dark because 1
- (a) all the colours get scattered on the moon.  
 (b) there is no atmosphere on the moon.  
 (c) ultraviolet radiations are absorbed by the moon.  
 (d) refraction of light takes place on the moon.
13. What are the ions present in compound  $\text{AlCl}_3$ ? 1
- (a)  $\text{Al}^{3+}$  and  $\text{Cl}^-$  (b)  $\text{Al}^+$  and  $\text{Cl}^{3-}$   
 (c)  $\text{Al}^{3+}$  and  $\text{Cl}^{2-}$  (d)  $\text{Al}$  and  $\text{Cl}_2$
14. The brown eyed father and black eyed mother has all black eyed children. What could be the genetic make up of both the parents? (Take B for brown and b for black trait). 1
- (a)  $\text{Bb} \times \text{Bb}$  (b)  $\text{BB} \times \text{Bb}$  (c)  $\text{BB} \times \text{bb}$  (d)  $\text{Bb} \times \text{bb}$
15. Which one of the following situations is not a chemical change? 1
- (a) Cooking of food (b) Freezing of water  
 (c) Fermentation of grapes (d) Rusting of iron tawa
16. Look at the diagram of human male reproductive system and identify the part which is cut and sutured to prevent the fusion of sperm and ovum. 1



- (a) Testis (b) Penis  
 (c) Vas deferens (d) Urethra

**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:**

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

**17. Assertion (A):** Two bulbs A and B are rated as 18 W, 220 V and 40 W, 220 V respectively. Resistance of bulbs A is more than that of bulb B.

**Reason (R):** For a given potential difference, the power consumed is inversely proportional to its resistance. 1

**18. Assertion (A):** One enzyme can work for all substances and break down all these substances.

**Reason (R):** Specific enzymes are needed for breakdown of specific substances. 1

**19. Assertion (A):** In fishes, there is a mixing of oxygenated and deoxygenated blood.

**Reason (R):** Fishes have double circulation. 1

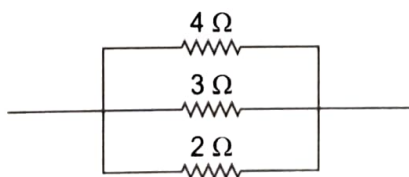
**20. Assertion (A):** Soap gives a red colour with blue litmus solution.

**Reason (R):** Soap is basic in nature. 1

### SECTION – B

**Q. no. 21 to 26 are very short answer questions.**

**21. See the given figure carefully and calculate the equivalent resistance. 2**



**22.** (a) What happens when pollen grains fall on suitable stigma of a carpel of a flower?

(b) How will you differentiate between pollen grains and ovule? **2**

**23.** (a) How does the focal length of the eye lens change when we shift looking from a nearby object to a distant object?

(b) What is the least distance of distinct vision? **2**

**OR**

(a) What is power of accommodation?

(b) What happens to the image distance from the eye lens in the normal eye when we increase the distance of an object from the eye?

**24.** Normally marble table top in the kitchens is not used. Explain why? What will happen if vinegar or tamarind juice falls on the marble table top? **2**

**OR**

Salt A commonly used in making cakes on heating gets converted into another salt B. Salt B is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water, turns it milky. Identify A, B and C. Write the chemical reaction also.

**25.** Why is translocation essential for plants? Where do the substances in plants reach as a result of translocation? **2**

**26.** In human beings, the sex chromosome in males are XY and in females are XX.

(a) Does a male child inherit X chromosome from his father or mother?

(b) How many types of gametes can a female produce? **2**

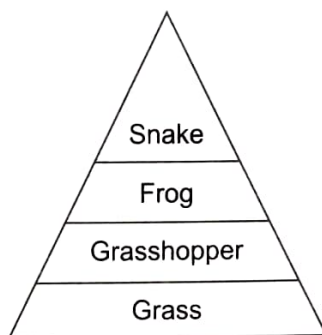


## SECTION - C

**Q.no. 27 to 33 are Short answer questions.**

- 27.** Mahak studies the diagram showing the various trophic levels comprising various organisms in each trophic levels in a food chain. She is curious to know what will happen to the members of different trophic levels in the food chain, if all the frogs of that area are removed?

**3**



- 28.** Give reasons:

- (a) Absorption of digested food mainly occurs in small intestine.
- (b) Ventricles have thicker walls than atria.
- (c) The rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms.

**3**

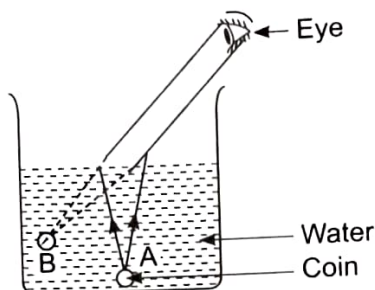
**OR**

Explain the process of nutrition in *Amoeba*. How is nutrition in *Paramoecium* different from nutrition in *Amoeba*?

- 29.** (a) An element M forms two oxides  $MO$  and  $MO_2$ . The oxide  $MO$  is neutral whereas the oxide  $MO_2$  is acidic in nature. Identify the element M.
- (b) Give one example of a metal which
- (i) is a liquid at room temperature.
  - (ii) has very low melting point and can melt with the heat of your palm.
  - (iii) can be easily cut with a knife.
  - (iv) is a poor conductor of heat.

**3**

30. (a) Sahaj placed a coin at the bottom of the beaker filled with water shown in the given figure and tried to pickup in one go. But he could not do it. Why does this happen? Give one example which shows the similar phenomenon.



- (b) Name the type of mirror used in the following situations.

- (i) Solar furnace
- (ii) Headlights of a car



31. Meenal's grandfather is unable to read newspaper placed nearer than 50 cm from his eyes.

- (a) Name the defect of vision Meenal's grandfather is suffering from.
- (b) Draw a ray diagram to show the defect in the above case.
- (c) Draw a ray diagram to show how this defect can be corrected by using a lens of appropriate focal length.

32. On heating white powder of lead nitrate in a boiling tube, lead oxide, oxygen and brown gas G is formed.

- (a) Write a balanced chemical equation of the reaction and identify the type of reaction.
- (b) Identify the brown gas G evolved.

**OR**

A solution of a substance X is used for testing carbon dioxide.

- (a) Identify X.
- (b) How is X obtained? Write chemical equation.
- (c) What will be the reaction of X with carbon dioxide?

33. (a) Name the internal energy reserve in plants.  
(b) Write chemical equation for photosynthesis.  
(c) What will happen if mucus is not secreted by gastric glands? 3

### SECTION - D

**Q.no. 34 to 36 are Long answer questions.**

34. (a) Why is sexual reproduction considered advantageous over asexual reproduction?  
(b) Testes in human beings perform dual functions. Explain.  
(c) Draw neat diagram of a germinating seed and label the part which  
(i) stores food  
(ii) forms root  
(iii) forms shoot 5

### OR

- (a) Trace the path of ovum formation to its implantation after fertilization in human females.  
(b) Name an organism in which binary fission occurs in a definite orientation. Draw a labelled diagram showing binary fission in that organism.
35. (a) Identify the heteroatoms present in the following compounds.  
(i)  $\text{CH}_3\text{—CH}_2\text{—O—CH}_3$   
(ii)  $\text{CH}_3\text{—CH}_2\text{—CH}_2\text{Cl}$   
(b) How can ethanol and ethanoic acid be differentiated on the basis of their physical and chemical properties?  
(c) What is meant by saponification? Write a chemical reaction showing saponification. 5

**OR**

Show the reaction of formation of an unsaturated hydrocarbon from saturated hydrocarbon containing alcohol group. What is the role of concentrated sulphuric acid used in this reaction? Draw the diagram showing esterification reaction.

- 36.** (a) Three people died and fifteen were injured in a fire which broke out in one of the pandals set up for Durga Puja celebrations in Indore due to short circuiting. What are the possible reasons that lead to short circuiting?



- (b) How is short circuiting different from overloading?
- (c) What precautions must be taken while setting up domestic electric supply lines?

**5**

### **SECTION - E**

**Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.**

- 37.** Spinal cord is a cylindrical structure. It begins in continuation with the medulla oblongata of brain and extends downwards upto early part of lumbar region. Internally the spinal cord possesses a narrow fluid-filled cavity called central canal. Spinal cord is enclosed in vertebral column or backbone which protects it. Like brain, it is too surrounded by meninges.



(a) What are the functions performed by spinal cord? How many pairs of spinal nerves arise from spinal cord?

(b) Write one difference between:

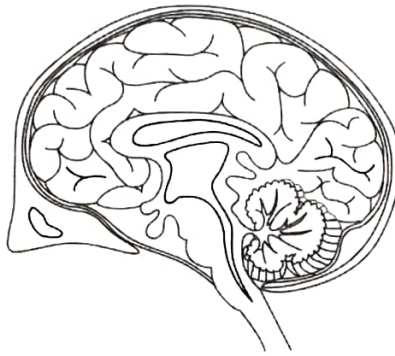
(i) sensory nerve and motor nerve

(ii) reflex action and walking

4

**OR**

(b) Redraw the below diagram in your answer sheet and label the following parts:



(i) Cerebellum

(ii) Pituitary gland

(iii) Pons

(iv) Medulla

**38.** In a simple electric circuit, the current through a conductor depends upon its resistance and the potential difference across its ends. In various electrical appliances, we often use resistors in various combination. In our household, the various appliances are connected in parallel.

(a) Why all the electrical appliances are connected in parallel in a domestic circuit?

(b) Draw a schematic diagram of a circuit consisting of a battery of three cells of 2 V each, a 5  $\Omega$  resistor, an 8  $\Omega$  resistor and a 12  $\Omega$  resistor, a voltmeter and a plug key, all connected in series. What would be the reading of ammeter and voltmeter of 12  $\Omega$  resistor only?

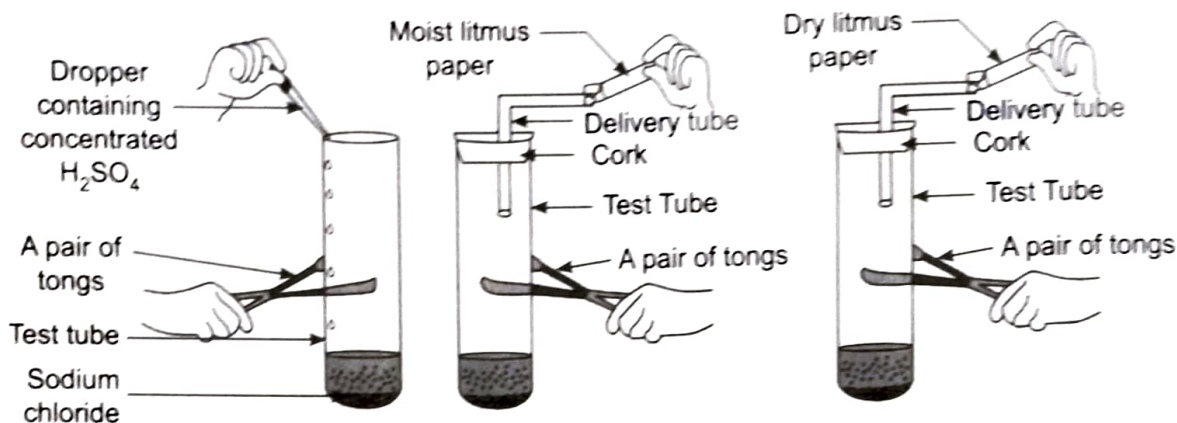
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OR

- (b) Why does not the cord of an electric heater glow while the heating element does? Calculate the heat produced in one minute if an electric iron of resistance  $20\ \Omega$  takes a current of 5 A.

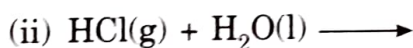
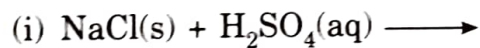
39. Nitin took 1 g of solid sodium chloride in a clean and dry test tube and set-up the apparatus as shown in the figure. Then he added some concentrated sulphuric acid to the test tube and tested the gas evolved successively with moist and dry litmus paper.



- (a) In which case does the litmus paper change colour will be observed by Nitin? What can you infer about the acidic character of
- dry HCl gas and
  - HCl solution?

- (b) What does this experiment suggest?

Complete the given chemical equations.



4

OR

- (b) What will be the action of the following substances on litmus paper?

(i) Lemon juice

(ii) Curd

(ii) Soap solution

(ii) Coke or Pepsi