

Series A2DDC/2

Set-3

प्रश्न-पत्र कोड  
Q.P. Code

31/2/3

रोल नं.

Roll No.

1 1 1 6 0 5 0 5



परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के  
मुख-पृष्ठ पर अवश्य लिखें।  
Candidates must write the Q.P. Code  
on the title page of the answer-book.

## विज्ञान SCIENCE

निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80

नोट	NOTE
(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 23 हैं।	(I) Please check that this question paper contains 23 printed pages.
(II) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 39 प्रश्न हैं।	(II) Please check that this question paper contains 39 questions.
(III) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।	(III) Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें।	(IV) Please write down the serial number of the question in the answer-book before attempting it.
(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।	(V) 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

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## SECTION - A

(20 × 1 = 20)

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

1. An iron nail is placed in a solution of copper sulphate. The nail is taken out after 15 minutes. The nail will be found to be covered with : 1
- (A) blue deposit (B) brown deposit  
(C) grey deposit (D) green deposit
2. Consider the following cases : 1
- (a)  $\text{CaSO}_4 + \text{Al} \longrightarrow$  (b)  $\text{CuSO}_4 + \text{Ca} \longrightarrow$   
(c)  $\text{FeSO}_4 + \text{Cu} \longrightarrow$  (d)  $\text{ZnSO}_4 + \text{Mg} \longrightarrow$
- The cases in which new products will form are -
- (A) (a) and (b) (B) (b) and (c)  
(C) (c) and (d) (D) (b) and (d)
3. Which of the following reactions is an endothermic reaction ? 1
- (A) Burning of coal  
(B) Decomposition of vegetable matter into compost  
(C) Process of respiration  
(D) Decomposition of calcium carbonate to form quick lime and carbon dioxide.
4. The oxide which can react with HCl as well as KOH to give corresponding salt and water is 1
- (A) CuO (B)  $\text{Al}_2\text{O}_3$   
(C)  $\text{Na}_2\text{O}$  (D)  $\text{K}_2\text{O}$
5. Juice of tamarind turns blue litmus to red. It is because of the presence of an acid called : 1
- (A) methanoic acid (B) acetic acid  
(C) tartaric acid (D) oxalic acid



6. Consider the following statements about homologous series of carbon compounds :

1

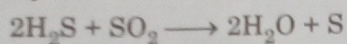
- (a) All succeeding members differ by  $-CH_2$  unit.
- (b) Melting point and boiling point increases with increasing molecular mass.
- (c) The difference in molecular masses between two successive members is 16 u.
- (d)  $C_2H_2$  and  $C_3H_4$  are **NOT** the successive members of alkyne series.

The correct statements are -

- (A) (a) and (b)
- (B) (b) and (c)
- (C) (a) and (c)
- (D) (c) and (d)

7. Identify the correct statement about the following reaction :

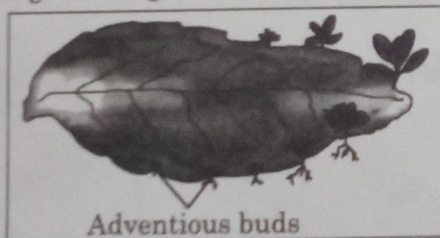
1



- (A)  $H_2S$  is oxidising agent and  $SO_2$  is reducing agent.
- (B)  $H_2S$  is reduced to sulphur.
- (C)  $SO_2$  is oxidising agent and  $H_2S$  is reducing agent.
- (D)  $SO_2$  is oxidised to sulphur.

8. In the given diagram the leaf shown belongs to which plant ?

1



- (A) Hibiscus
- (B) Money plant
- (C) Mustard
- (D) Bryophyllum

9. Select out of the following a gland which does **NOT** occur as a pair in the human body :

1

- (A) Pituitary
- (B) Ovary
- (C) Testis
- (D) Adrenal



10. In human respiratory system, when a person breathes in, the position of ribs and diaphragm will be : 1

- (A) lifted ribs and curve/dome shaped diaphragm.
- (B) lifted ribs and flattened diaphragm.
- (C) relaxed ribs and flattened diaphragm.
- (D) relaxed ribs and curve/dome shaped diaphragm.

11. Which of the following statement(s) is (are) true about human heart ? 1

- (a) Right atrium receives oxygenated blood from lungs through pulmonary artery. ✗
- (b) Left atrium transfers oxygenated blood to left ventricle which sends it to various parts of the body. ✓
- (c) Right atrium receives deoxygenated blood through vena cava from upper and lower body. ✓
- (d) Left atrium transfers oxygenated blood to aorta which sends it to different parts of the body. ✗

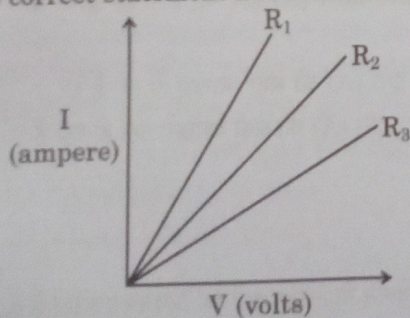
- (A) (a) (B) (a) and (d)
- (C) (b) and (c) (D) (b) and (d)

12. A cross made between two pea plants produces 50% tall and 50% short pea plants. The gene combination of the parental pea plants must be 1

- (A) Tt and Tt (B) TT and Tt
- (C) Tt and tt (D) TT and tt

$Tt \times Tt$   
 $Tt$  tall  $tt$  short

13. 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)  $R_1 = R_2 = R_3$  (B)  $R_1 > R_2 > R_3$
- (C)  $R_3 > R_2 > R_1$  (D)  $R_2 > R_3 > R_1$



14. The maximum resistance of a network of five identical resistors of  $\frac{1}{5} \Omega$  each can be -

- (A)  $1 \Omega$  (B)  $0.5 \Omega$   
(C)  $0.25 \Omega$  (D)  $0.1 \Omega$

15. The speed of light in vacuum is  $3 \times 10^8$  m/s. If the speed of light in a medium is  $2.25 \times 10^8$  m/s, the absolute refractive index of the medium is :

- (A)  $\frac{7}{6}$  (B)  $\frac{5}{4}$   
(C)  $\frac{4}{3}$  (D)  $\frac{3}{2}$

16. Study the following statements :

- (a) A fuse in a circuit prevents damage to the circuit due to overloading.  
(b) Total resistance in a circuit increases due to overloading.  
(c) During short circuiting the current in the circuit abruptly increases.  
(d) In order that each appliance has same current, they are connected in parallel to each other.

The correct statements are

- (A) (a) and (b) (B) (b) and (d)  
(C) (a) and (c) (D) (a), (c) and (d)

**Q. Nos. 17 to 20 are Assertion - Reason based questions :**

These questions 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, 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.

17. **Assertion (A) :** Carbon reduces the oxides of Sodium and Magnesium.

**Reason (R) :** Sodium and Magnesium have more affinity for Oxygen than Carbon.

(D)



18. **Assertion (A)** : The deflection of a compass needle placed near a current carrying wire decreases when the magnitude of an electric current in the wire is increased. ✓

**Reason (R)** : Strength of the magnetic field at a point due to a current carrying conductor increases on increasing the current in the conductor. (D) 1

19. **Assertion (A)** : The colour of clear sky appears blue. (C) 1

**Reason (R)** : Light of blue colour has longer wavelength as compared to the light of red colour so it is scattered more in the upper atmosphere. ✓

20. **Assertion (A)** : Human female has a perfect pair of sex chromosome. ✓ (b) 1

**Reason (R)** : Sex chromosome contributed by the human male in the zygote decides the sex of a child. ✓

#### SECTION - B

Q. Nos. 21 to 26 are very short answer questions.

21. (a) Give one example of each of the following : 2

(i) Chemical reaction showing evolution of gas.

(ii) Change in the colour of the substance during a chemical reaction.

OR

21. (b) Translate the following statements into chemical equations and then balance them : 2

(i) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

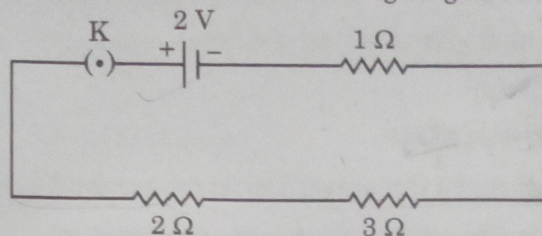
(ii) Silver bromide on exposure to sunlight decomposes into silver and bromine.

22. Name the blood vessel which brings blood to the kidneys. Why is nephron called a basic filtration unit of kidney ? Write the role of tubular part of nephron in urine formation. 2

23. Mendel crossed a RR YY round and yellow seeded pea plant with a rryy wrinkled and green seeded pea plant. What did the plants of  $F_1$  generation look like in terms of shape and colour of seed ? On self-pollinating  $F_1$  generation plants, plants with four types of combinations of characters were seen in  $F_2$  generation. Write the combinations along with their ratios. 2



24. Use Ohm's law to determine the potential difference across the  $3\ \Omega$  resistor in the circuit shown in the following diagram when key is closed : 2



25. (a) A person suffering from an eye defect uses lenses of power  $-1\ \text{D}$ . Name the defect of vision and list its two causes. State the nature (converging/diverging) of the corrective lens. 2

OR

- (b) What is presbyopia? Name the type of lenses used for the correction of this defect. State the nature (converging/diverging) of the upper part of such lenses. 2
26. Name the term used for the materials which **cannot** be broken down by biological processes. Give two ways by which they harm various components of an ecosystem. 2

### SECTION - C

Q. Nos. 27 to 33 are short answer questions.

27. (a) Sodium metal is stored under kerosene oil. Why? 3  
(b) Some metal oxides are soluble in water. What are the aqueous solutions of these oxides called? Write one example of such a solution.  
(c) At ordinary temperature the surface of metals such as magnesium, aluminium, zinc etc. is covered with a thin layer. What is the composition of this layer? State its importance.
28. It is observed that Calcium on reaction with water floats on its surface. Explain why it happens. Also write a balanced chemical equation for the reaction that occurs. What happens when the aqueous solution of the product of this reaction reacts with Carbon dioxide gas? Write a balanced chemical equation for the reaction. 3



- 3
29. (a) List any two contraceptive methods practised only by women. Mention how these methods work. 3
- (b) Write the two roles performed by testes in human males.

- 3
30. (a) Give reasons for the following : 3
- (i) Alveoli in lungs are richly supplied with blood capillaries.
- (ii) Respiratory pigment in the blood takes up oxygen and not carbon dioxide.
- (iii) During anaerobic respiration, a 3-carbon molecule is formed as an end product instead of  $\text{CO}_2$  in human beings.

OR

- 3
30. (b) (i) Name the movements that occur all along the gut in human digestive system. How do they help in digestion ? 3
- (ii) Where is bile juice stored in human body ? List two roles of bile juice.

- 3
31. (a) Define the term power of accommodation of human eye. Write the name of the part of eye which plays a major role in the process of accommodation and explain what happens when human eye focuses (i) nearby objects and (ii) distant objects. 3

OR

- 3
- (b) Draw a ray diagram to show the formation of a rainbow in the sky. On this diagram mark A – where dispersion of light occurs, B – where internal reflection of light occurs and C – where refraction of light occurs. List two necessary conditions to observe a rainbow. 3

- 3
32. Define the term solenoid. Draw the pattern of magnetic field lines around a current carrying solenoid. State how this magnetic field can be used to magnetise a piece of magnetic material, like soft iron. 3
- 3
33. Use of pesticides to protect our crops affect organisms at various trophic levels especially human beings. Name the phenomenon involved and explain how does it happen. 3



SECTION - D

Q. Nos. 34 to 36 are long answer questions.

34. (a) (i) Distinguish between hormonal co-ordination in plants and animals. 5  
(ii) Which part of the brain is responsible for –  
(1) intelligence  
(2) riding a bicycle  
(3) vomiting  
(4) controlling hunger  
(iii) How is brain and spinal-cord protected against mechanical injuries ?

OR

34. (b) (i) What are tropic movements ? Give an example of a plant hormone which (1) inhibits growth and (2) promotes cell division. 5  
(ii) Explain directional movement of a tendril in pea plant in response to touch. Name the hormone responsible for this movement.

35. (a) Upper half of a convex lens is covered with a black paper. Draw a ray diagram to show the formation of image of an object placed at a distance of  $2F$  from such a lens. Mention the position and nature of the image formed. State the observable difference in the image obtained if the lens is uncovered. Give reason to justify your answer. 5  
(b) An object is placed at a distance of 30 cm from the optical centre of a concave lens of focal length 15 cm. Use lens formula to determine the distance of the image from the optical centre of the lens.

36. (a) (i) Give reason why carbon can neither form  $C^{4+}$  cations nor  $C^{4-}$  anions but form covalent compounds. 5  
(ii) What is homologous series of carbon compound ? Write the molecular formula of any two consecutive members of homologous series of aldehydes.  
(iii) Draw the structure of the molecule of cyclohexane ( $C_6H_{12}$ ).

OR

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36. (b) (i) Name a commercially important carbon compound having functional group  $-OH$  and write its molecular formula.

(ii) Write chemical equation to show its reaction with :

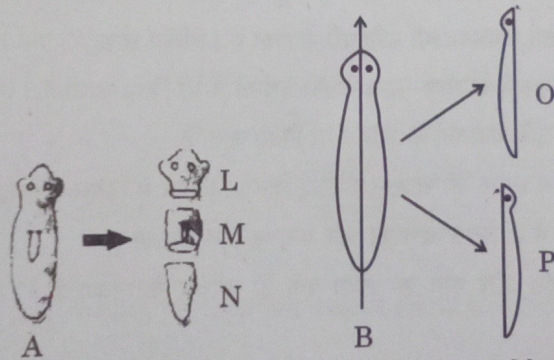
- (1) Sodium metal
- (2) Excess conc. sulphuric acid
- (3) Ethanoic acid in the presence of an acid catalyst
- (4) Acidified potassium dichromate

Also write the name of the product formed in each case.

### SECTION - E

Q. Nos. 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. Asexual reproduction involves a single parent to produce offsprings without the formation of gametes. It occurs by the following ways : Fission, Budding, Fragmentation, Spore formation and Regeneration. In one of the methods like regeneration, Planaria A is cut horizontally into three pieces - L, M and N and Planaria B is cut vertically into two equal halves - O and P.



- (a) Which of the cut pieces of the two Planaria could regenerate to form a complete organism?
- (b) Give an example of another organism which follows the same mode of reproduction as Planaria.
- (c) What is the meaning of 'development' in regeneration?

OR

- (c) Differentiate between regeneration and fragmentation.



38. When electric current flows in a purely resistive circuit electrical energy gets fully converted into heat energy. The amount of heat produced (H) in the circuit is found to be directly proportional to (i) the square of current ( $I^2$ ) (ii) the resistance (R) of the conductor and (iii) the time (t) for which current flows. In other words  $H = I^2Rt$ . Electrical devices such as electric fuse, electric heater, electric iron etc. are all based on this effect called heating effect of electric current.

- (a) List two properties of heating elements. 4  
(b) List two properties of electric fuse. 1  
(c) Name the principle on which an electric fuse works. Explain how a fuse wire is capable of saving electrical appliances from getting damaged due to accidentally produced high currents. 1 2

OR

- (c) The power of an electric heater is 1100 W. If the potential difference between the two terminals of the heater is 220 V, find the current flowing in the circuit. What will happen to an electric fuse of rating 5 A connected in this circuit? 2

39. Salts play a very important role in our daily life. Sodium chloride which is known as common salt is used almost in every kitchen. Baking soda is also a salt used in faster cooking as well as in baking industry. The family of salts is classified on the basis of cations and anions present in them. 4

- (a) Identify the acid and base from which Sodium chloride is formed. 1  
(b) Find the cation and the anion present in Calcium sulphate. 1  
(c) "Sodium chloride and washing soda both belong to the same family of salts." Justify this statement. 2

OR

- (c) Define the term pH scale. Name the salt obtained by the reaction of Potassium hydroxide and Sulphuric acid and give the pH value of its aqueous solution. 2