

Series A2DDC/2

Set-1

प्रश्न-पत्र कोड
Q.P. Code

31/2/1

रोल नं.

Roll No.

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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.

General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) *This question paper comprises **39** questions. **All** questions are compulsory.*
- (ii) *This question paper is divided into **FIVE** sections viz. Section **A, B, C, D** and **E**.*
- (iii) *In Section **A** - question number **1** to **20** are Multiple Choice Questions (MCQs) carrying **1** mark each.*
- (iv) *In Section **B** - question number **21** to **26** are Very Short Answer (VSA) type questions carrying **2** marks each. Answer to these questions should be in the range of **30** to **50** words.*
- (v) *In Section **C** - question number **27** to **33** are Short Answer (SA) type questions carrying **3** marks each. Answer to these questions should be in the range of **50** to **80** words.*
- (vi) *In Section **D** - question number **34** to **36** are Long Answer (LA) type questions carrying **5** marks each. Answer to these questions should be in the range of **80** to **120** words.*
- (vii) *In Section **E** - question number **37** to **39** are of **3** source-based / case-based units of assessment carrying **4** marks each with sub-parts.*
- (viii) *There is no overall choice. However, an internal choice has been provided in some Sections. Only one of the alternatives has to be attempted in such questions.*

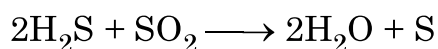
SECTION – A**(20 × 1 = 20)**

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

1. Solid Calcium oxide reacts vigorously with water to form Calcium hydroxide accompanied by the liberation of heat. From the information given above it may be concluded that this reaction 1
- (A) is endothermic and pH of the solution formed is more than 7.
(B) is exothermic and pH of the solution formed is 7.
(C) is endothermic and pH of the solution formed is 7.
(D) is exothermic and pH of the solution formed is more than 7.
2. 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
3. Select from the following a process in which a combination reaction is involved : 1
- (A) Black and White photography (B) Burning of coal
(C) Burning of methane (D) Digestion of food
4. The oxide which can react with HCl as well as KOH to give corresponding salt and water is 1
- (A) CuO (B) Al_2O_3
(C) Na_2O (D) K_2O
5. Consider the following cases : 1
- (a) $CaSO_4 + Al \longrightarrow$ (b) $CuSO_4 + Ca \longrightarrow$
(c) $FeSO_4 + Cu \longrightarrow$ (d) $ZnSO_4 + Mg \longrightarrow$
- 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)

6. 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.

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

1

- (a) All succeeding members differ by $-\text{CH}_2$ 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)

8. 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)

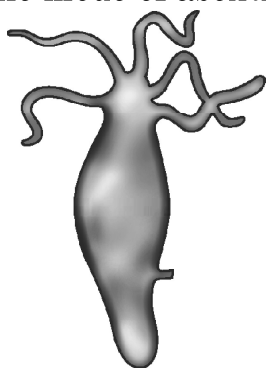
9. Select out of the following a gland which does **NOT** occur as a pair in the human body : 1

- (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. Identify the mode of asexual reproduction in the following organism : 1



- (A) Fragmentation (B) Multiple fission
(C) Budding (D) Binary fission

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

13. Consider the following statements in the context of human eye : 1

- (a) The diameter of the eye ball is about 2.3 cm.
(b) Iris is a dark muscular diaphragm that controls the size of the pupil.
(c) Most of the refraction for the light rays entering the eye occurs at the crystalline lens.
(d) While focusing on the objects at different distances the distance between the crystalline lens and the retina is adjusted by ciliary muscles.

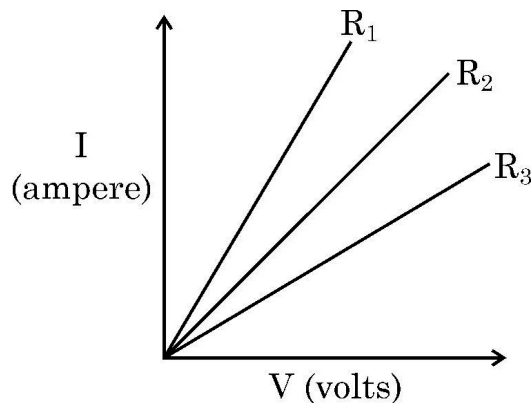
The correct statements are –

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

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

(A) 1Ω (B) 0.5Ω
(C) 0.25Ω (D) 0.1Ω

15. 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) $R_2 > R_3 > R_1$

16. Strength of magnetic field produced by a current carrying solenoid **DOES NOT** depend upon : 1

(A) number of turns in the solenoid
(B) direction of the current flowing through it
(C) radius of solenoid
(D) material of core of the solenoid

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)** : Different metals have different reactivities with water and dilute acids. 1
Reason (R) : Extraction of a metal from its ore depends on its position in the reactivity series.
18. **Assertion (A)** : Human female has a perfect pair of sex chromosome. 1
Reason (R) : Sex chromosome contributed by the human male in the zygote decides the sex of a child.
19. **Assertion (A)** : Myopic eye cannot see distant objects distinctly. 1
Reason (R) : For the correction of myopia converging lenses of appropriate power are prescribed by eye-surgeons.
20. **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. 1
Reason (R) : Strength of the magnetic field at a point due to a current carrying conductor increases on increasing the current in the conductor.

SECTION – B

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

21. (a) “No precipitation reaction can occur without exchange of ions between the two reactants.” Justify this statement giving a balanced chemical equation for the reaction. 2
- OR**
- (b) Giving one example of each, differentiate between a displacement reaction and a double displacement reaction. 2
22. Photosynthesis takes place in the leaves and the food prepared by it reaches other parts of the plants. Name the process involved and explain it. 2

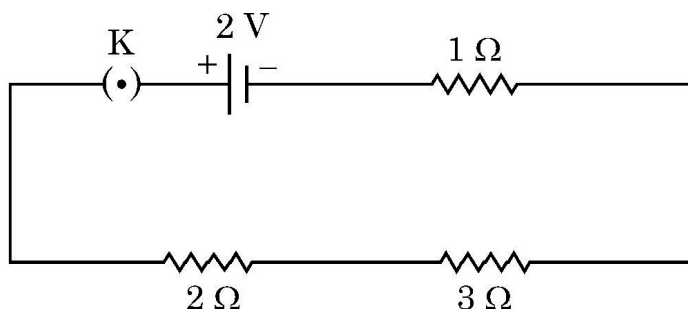
23. "Stability of DNA in a species is ensured during sexual reproduction." Justify the statement. 2

24. (a) State two laws of refraction of light. 2

OR

- (b) Define the term absolute refractive index of a medium. A ray of light enters from vacuum to glass of absolute refractive index 1.5. Find the speed of light in glass. The speed of light in vacuum is 3×10^8 m/s. 2

25. Use Ohm's law to determine the potential difference across the 3Ω resistor in the circuit shown in the following diagram when key is closed : 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. 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
28. Draw a labelled diagram to show electrolytic refining of copper. State what happens when electric current is passed through the electrolyte taken in this case. 3

29. (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 CO_2 in human beings.

OR

29. (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.
30. Explain the events that take place once a sperm reaches the oviduct till it becomes a foetus. Write the role of placenta in pregnancy. 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

- (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
32. Draw a diagram to show the pattern of magnetic field lines on a horizontal sheet of paper due to a straight conductor passing through its centre and carrying current vertically upwards. Mark on it (i) the direction of current in the conductor and (ii) the corresponding magnetic field lines. State right hand thumb rule and check whether the directions marked by you are in accordance with this rule or not. 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) 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

34. (b) (i) Name a commercially important carbon compound having functional group $-OH$ and write its molecular formula. 5
- (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.

35. (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

35. (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.

36. (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.

SECTION – E

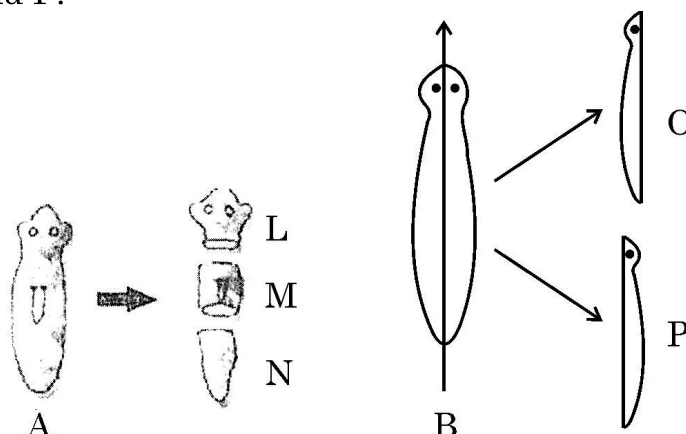
Q. Nos. 37 to 39 are case based / data based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. 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**

38. 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.



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

OR

- Differentiate between regeneration and fragmentation.

39. 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 an electric fuse, electric heater, electric iron etc. are all based on this effect called heating effect of electric current.

- List two properties of heating elements.
- List two properties of electric fuse.
- 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.

OR

- 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 ?

