

Series A2DDC/2

Set-2

प्रश्न-पत्र कोड
Q.P. Code

31/2/2

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)

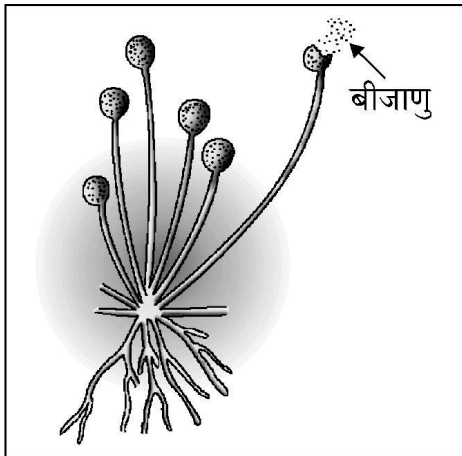
Select and write one most appropriate option out of the four options given for each of the questions 1 to 20 :

1. 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)
2. The number of shells required to write the electronic configuration of Potassium (At. No. 19) 1
- (A) 1 (B) 2
(C) 3 (D) 4
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. Which of the following is an alloy of copper and tin ? 1
- (A) Nichrome (B) Brass
(C) Constantan (D) Bronze

6. Tooth decay begins at the pH of : 1
(A) 5.1 (B) 5.8
(C) 6.5 (D) 8.0
7. 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.
8. 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.
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. 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)

11. नीचे दिए गए आरेख में किस जीव को निरूपित किया गया है ?

1



- (A) स्पाइरोगायरा
(C) यीस्ट

- (B) प्लैनेरिया
(D) राइज़ोपस

12. दो मटर के पौधों के बीच संकरण कराने पर 50% लम्बे पौधे तथा 50% बौने पौधे प्राप्त हुए। जनक पौधों का जीन संयोजन क्या था ?

1

- (A) Tt और Tt
(C) Tt और tt

- (B) TT और Tt
(D) TT और tt

13. किसी धारावाही परिनालिका द्वारा उत्पन्न चुम्बकीय क्षेत्र की तीव्रता निम्नलिखित में से किस पर निर्भर नहीं करती है ?

1

- (A) परिनालिका में फेरों की संख्या
(B) परिनालिका से प्रवाहित धारा की दिशा
(C) परिनालिका की त्रिज्या
(D) परिनालिका के क्रोड का पदार्थ

14. विद्युत प्रतिरोधकता का S.I. मात्रक है –

1

- (A) ओम प्रति मीटर³
(C) ओम . मीटर

- (B) ओम प्रति मीटर²
(D) ओम . मीटर³

15. पाँच प्रतिरोधकों जिनमें प्रत्येक का प्रतिरोध 10Ω है के उपयोग से निम्नतम कितना प्रतिरोध बनाया जा सकता है ?

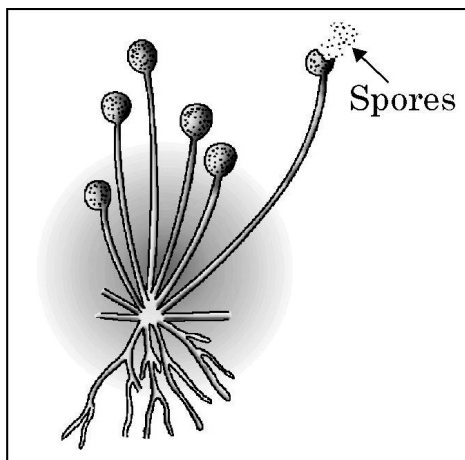
1

- (A) $\frac{1}{50} \Omega$
(C) 2Ω

- (B) $\frac{1}{5} \Omega$
(D) 1Ω

11. Which one of the following organism is represented by this diagram ?

1



- (A) Spirogyra
(C) Yeast

- (B) Planaria
(D) Rhizopus

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
(C) Tt and tt

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

13. 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

14. S.I. unit of electrical resistivity is

1

- (A) ohm per metre³
(C) ohm . metre
- (B) ohm per metre²
(D) ohm . metre³

15. The minimum resistance which can be made using five resistors each of resistance 10 Ω is :

1

- (A) $\frac{1}{50} \Omega$
(C) 2 Ω
- (B) $\frac{1}{5} \Omega$
(D) 1 Ω

16. 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) |

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) :** 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.

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) :** Metals in the middle of activity series are found in nature as sulphides or carbonates. 1

Reason (R) : The sulphide ores are calcinated whereas carbonate ores are roasted to extract metals from them.

SECTION – B

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

21. (a) Define a decomposition reaction. Write an equation to show thermal decomposition of ferrous sulphate crystals. 2

OR

- (b) What is meant by a balanced chemical equation ? Why is it necessary for the equation to be balanced ? 2

22. Two test tubes A and B are taken, each containing one mL of starch solution. Add 1 mL of saliva to test tube 'A' only and leave both the test tubes undisturbed for a few minutes. Now add a few drops of dilute iodine solution to both the test tubes. 2

- (a) Which one of the two test tubes shows change in colour ? Write the changed colour observed in this test tube.
(b) What can we conclude from this activity ?

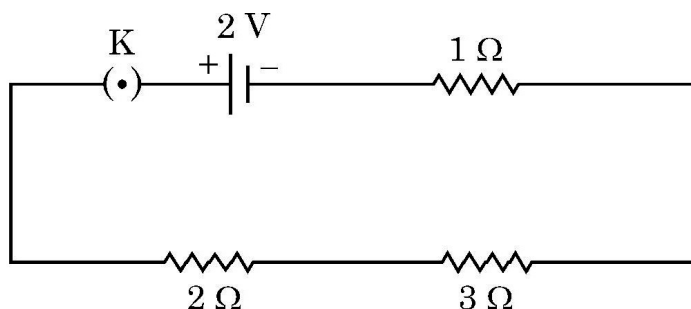
23. Name two types of germ cells present in human beings. List two structural differences between the two. 2

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. (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.

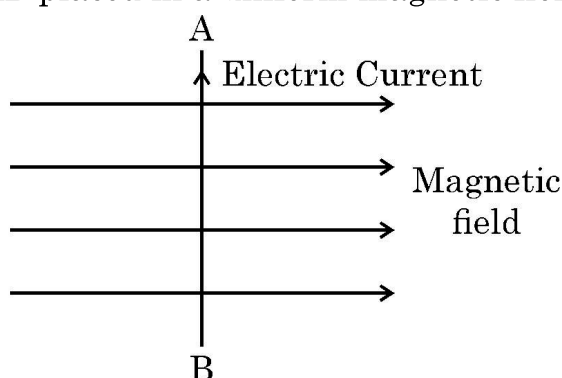
OR

27. (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.
28. (a) In angiosperms why fertilisation cannot take place in flowers if pollination does not take place ? Where is zygote located in a flower after fertilisation ? What does it develop into ? 3
- (b) Write the names of those parts of a flower which serve the same function as the following do in animals :
- (i) testis (ii) ovary
29. (a) State any two observations when an electric current is passed through acidulated water, in a container having each electrode covered by test tubes filled with water. 3
- (b) Write the ratio of the mass of the gas collected at the cathode to the mass of the gas collected at the anode.
30. 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
31. (a) An object is placed in front of a concave mirror of focal length 12 cm. If distance of the object from the pole of the mirror is 8 cm, then use mirror formula to determine the position of the image formed. Draw a labelled ray diagram to justify your answer in this case. 3

OR

31. (b) (i) The image of an object formed by a mirror is real, inverted and is of magnification-1. If the image is at a distance of 30 cm from the mirror, where is the object placed ? Give reason to justify your answer. 3
- (ii) Where would the image be if the object is moved 15 cm towards the mirror ? Draw ray diagram for the new position of the object to justify your answer.

32. (a) State Fleming's left hand rule. Apply this rule to determine the direction of force experienced by a straight current carrying conductor AB placed in a uniform magnetic field as shown. 3



- (b) What will happen to an electron which enters in the same field in the same direction in which the current is flowing in the conductor AB ? Give reason to justify your answer.
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. No. 34 to 36 are long answer questions.

34. (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.

35. (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

35. (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.

36. (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

36. (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.

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. 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 an electric fuse, electric heater, electric iron etc. are all based on this effect called heating effect of electric current. 4
- (a) List two properties of heating elements. 1
- (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. 2

OR

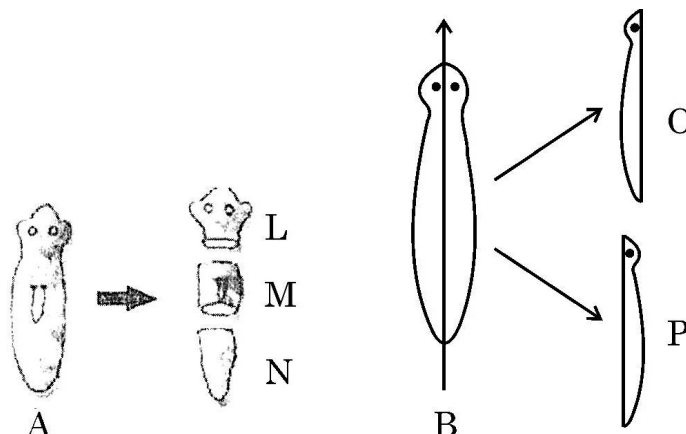
- (c) The power of an electric heater is 1100 W. If the potential difference between the two terminals of the heater is 220 V, find the current flowing in the circuit. What will happen to an electric fuse of rating 5 A connected in this circuit ? 2
38. Salts play a very important role in our daily life.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

39. 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.

4



- (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 ?

1

1

2

OR

- (c) Differentiate between regeneration and fragmentation.

2

