Series CABD5/5

Set-3

प्रश्न-पत्र कोड
Q.P. Code **31/5/3**

रोल नं.
Roll No. 1 2 2 0 4 9 3 0

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 *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

	नोट		NOTE
(I)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **27** हैं ।	(I)	Please check that this question paper contains **27** 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 छात्र 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 students 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 – A, B, C, D and E.*

(iii) **Section A** – *Questions No.* **1** *to* **20** *are multiple choice questions. Each question carries* **1** *mark.*

(iv) **Section B** – *Questions No.* **21** *to* **26** *are very short answer type questions. Each question carries* **2** *marks. Answer to these questions should be in the range of 30 to 50 words.*

(v) **Section C** – *Questions No.* **27** *to* **33** *are short answer type questions. Each question carries* **3** *marks. Answer to these questions should in the range of 50 to 80 words.*

(vi) **Section D** – *Questions No.* **34** *to* **36** *are long answer type questions. Each question carries* **5** *marks. Answer to these questions should be in the range of 80 to 120 words.*

(vii) **Section E** – *Questions No.* **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

Select and write the most appropriate option out of the four options given for each of the questions no. 1 to 20.

$20 \times 1 = 20$

1. **Select from the following the conditions responsible for the rapid spread of bread mould on a slice of bread :**

(i) Formation of large number of spores

(ii) Presence of moisture and nutrients in bread

(iii) Low temperature

(iv) Presence of hyphae

(A) (i) and (ii)

(B) (ii) and (iv)

(C) (ii) and (iii)

(D) (iii) and (iv)

2. The ***incorrect*** statement about placenta is :

(A) It is a disc embedded in the uterine wall.

(B) It contains villi on the embryo's side of the tissue.

(C) It has a very small surface area for glucose and oxygen to pass from mother to the embryo.

(D) The embryo gets nutrition from the mother's blood through it.

3. An aqueous solution 'A' turns phenolphthalein solution pink. When another aqueous solution 'B' is added to the pink solution, the pink colour disappears. Now when a few drops of solution 'A' are added to this reaction, the mixture appears pink again. The respective changes in the nature of the solution are from :

(A) acidic → basic → basic

(B) basic → acidic → acidic

(C) acidic → basic → acidic

(D) basic → acidic → basic

4. The correct sequence of events when someone's hand touches a hot object unconsciously :

(A) Receptors in skin → Motor neuron → Relay neuron → Sensory neuron → Effector muscle in arm

(B) Receptors in skin → Relay neuron → Sensory neuron → Motor neuron → Effector muscle in arm

(C) Receptors in skin → Sensory neuron → Relay neuron → Motor neuron → Effector muscle in arm

(D) Receptors in skin → Sensory neuron → Effector muscle in arm → Motor neuron → Relay neuron

5. To balance the following chemical equation, the values of the coefficients x, y and z must be respectively :

$$x\ Zn(NO_3)_2 \xrightarrow{\Delta} y\ ZnO + z\ NO_2 + O_2$$

(A) 4, 2, 2
(B) 4, 4, 2
(C) 2, 2, 4
(D) 2, 4, 2

6. Which of the following is a redox reaction, but ***not*** a combination reaction ?

(A) $C + O_2 \rightarrow CO_2$
(B) $2\ H_2 + O_2 \rightarrow 2\ H_2O$
(C) $2\ Mg + O_2 \rightarrow 2\ MgO$
(D) $Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$

7. An aqueous solution of sodium chloride is prepared in distilled water. The pH of this solution is :

(A) 6
(B) 8
(C) 7
(D) 3

8. A metal 'X' is used in thermit process. When 'X' is heated with oxygen, it gives an oxide 'Y', which is amphoteric in nature. 'X' and 'Y' respectively are :

(A) Mn, MnO_2
(B) Al, Al_2O_3
(C) Fe, Fe_2O_3
(D) Mg, MgO

9. The process in which transport of soluble products of photosynthesis takes place in plants is known as :

(A) Transpiration
(B) Evaporation
(C) Conduction
(D) Translocation

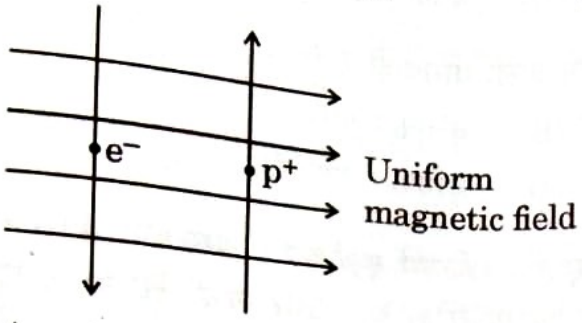
10. Sense organ in which olfactory receptors are present is :

(A) Nose
(B) Skin
(C) Tongue
(D) Inner ear

11. Which one of the following is ***not*** a natural ecosystem ?

(A) Pond ecosystem
(B) Grassland ecosystem
(C) Forest ecosystem
(D) Cropland ecosystem

12.



A uniform magnetic field exists in the plane of paper as shown in the diagram. In this field, an electron (e^-) and a positron (p^+) enter as shown. The electron and positron experience forces :

(A) both pointing into the plane of the paper.
(B) both pointing out of the plane of the paper.
(C) pointing into the plane of the paper and out of the plane of the paper respectively.
(D) pointing out of the plane of the paper and into the plane of the paper respectively.

13. How will the image formed by a convex lens be affected, if the upper half of the lens is wrapped with a black paper ?

(A) The size of the image formed will be one-half of the size of the image due to complete lens.
(B) The image of upper half of the object will not be formed.
(C) The brightness of the image will reduce.
(D) The lower half of the inverted image will not be formed.

14. The phenomena of light involved in the formation of rainbow are :

(A) Refraction, reflection and dispersion
(B) Refraction, dispersion and internal reflection
(C) Reflection, dispersion and internal reflection
(D) Refraction, dispersion, scattering and total internal reflection

15. The colour of light for which the refractive index of glass is minimum, is :

(A) Red (B) Yellow

(C) Green (D) Violet

16. The current carrying device which produces a magnetic field similar to that of a bar magnet is :

(A) A straight conductor (B) A circular loop

(C) A solenoid (D) A circular coil

For Questions number 17 to 20, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of the Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

17. *Assertion (A) :* Electrons move from lower potential to higher potential in a conductor.

Reason (R) : A dry cell maintains electric potential difference across the ends of a conductor.

18. *Assertion (A) :* Some vegetable oils are healthy.

Reason (R) : Vegetable oils generally have long unsaturated carbon chains.

19. *Assertion (A) :* Sex of the children will be determined by what they inherit from their mother.

Reason (R) : Women have XX sex chromosomes.

20. *Assertion (A) :* Green plants trap only 1% of the energy of sunlight that falls on their leaves.

Reason (R) : All green plants are the producers in a food chain.

SECTION B

Questions no. **21** *to* **26** *are very short answer type questions.*

21. (a) Sometimes while running, the athletes suffer from muscle cramps. Why ? How is the respiration in this case different from aerobic respiration ? 2

OR

(b) Write the other name given to lymph. State its two functions. 2

22. Write the formula and the molecular mass of the third homologue of alcohols. State how the boiling point of an alcohol changes as one moves from lower to higher homologues. 2

23. (a) Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved. 2

OR

(b) Write chemical equation for the chemical reaction which occurs when the aqueous solutions of barium chloride and sodium sulphate react together. Write the symbols of the ions present in the compound precipitated in the reaction. 2

24. Identify the organ in the human female reproductive system where the sperm encounters the egg cell. What will happen if it is blocked ? Name the technique by which it can be blocked. 2

25. "The linear magnification produced by a spherical mirror is +3." Based on this statement answer the following questions :

(a) What is the type of mirror ?

(b) Where is the object located ? 2

(c) List two properties of the image formed (other than the size/magnification). 2

26. The filament of an electric lamp draws a current of 0·5 A, which lights for 2 hours. Calculate the charge that flows through the circuit. 2

SECTION C

Questions no. **27** *to* **33** *are short answer type questions.*

27. Answer the following questions in the context of electrolysis of water : 3

(a) Why is this reaction/process called a decomposition reaction ?

(b) Giving reason state whether this reaction is exothermic or endothermic.

(c) Name the gases collected at the anode and cathode.

(d) What is the mass ratio of the gases collected at the anode and cathode ?

28. Differentiate between food chain and food web. In a food chain consisting of deer, grass and tiger, if the population of deer decreases, what will happen to the population of organisms belonging to the first and third trophic levels ? 3

29. Name a plant growth hormone synthesized at the shoot tip. Explain its effect on the growth of a plant in response to light. 3

30. Name the ore of mercury and state the form in which it is found in nature. Write the chemical equations along with the condition required for the reactions involved in the extraction of mercury from its ore. 3

31. Mendel crossed pure tall pea plants (TT) with pure short pea plants (tt) and obtained F_1 progeny. When the plants of F_1 progeny were self-pollinated, plants of F_2 progeny were obtained.

(a) What did the plants of F_1 progeny look like ? Give their gene combination.

(b) Why could the gene for shortness not be expressed in plants of F_1 progeny ?

(c) Write the ratio of the plants obtained in F_2 progeny and state the conclusion that can be drawn from this experiment. 3

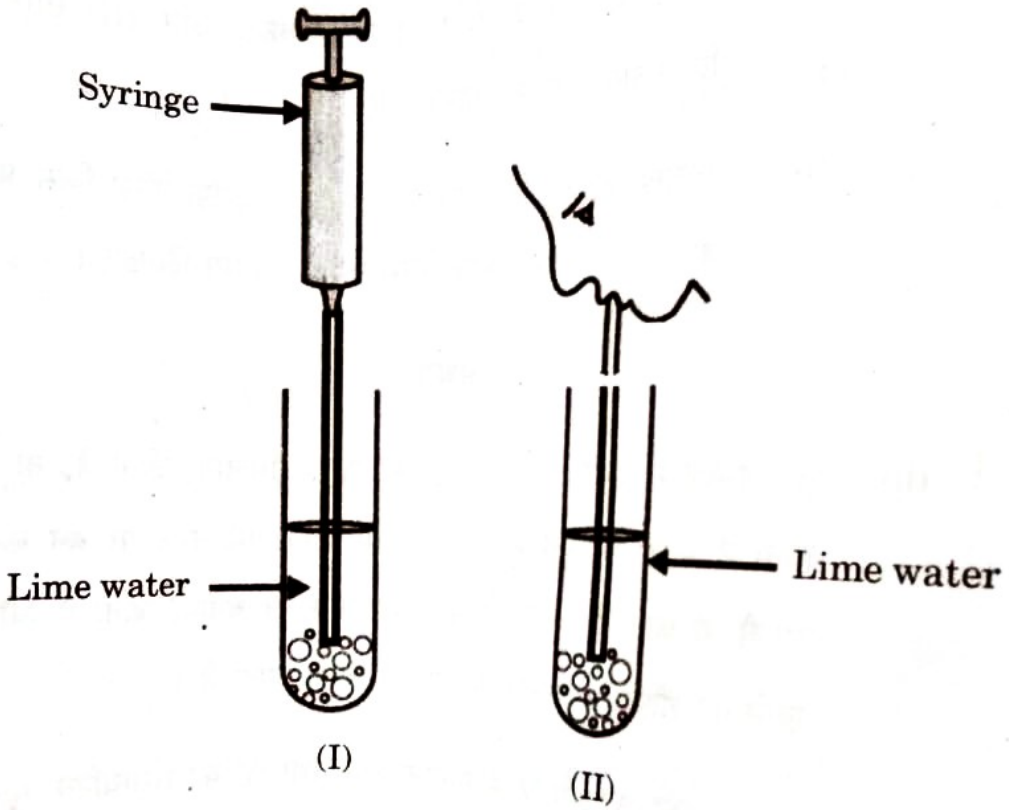
SECTION D

*uestions no. **34** to **36** are long answer type questions.*

4. (a) Design an experiment to demonstrate that carbon dioxide is essential for photosynthesis. Write the observation and conclusion of the experiment. **5**

OR

(b) (i)



In the experimental set-up shown above in diagram (I) atmospheric air is being passed into lime water with a syringe while in diagram (II) air is being exhaled into lime water. The time taken for the lime water to turn milky in both the test tubes is different. Give reason.

(ii) Draw the diagram of an open stomatal pore and label (I) Guard cells, and (II) Chloroplast on it. Mention two functions performed by stomata.

35. (a) A few crystals of ferrous sulphate were taken in a dry boiling tube and heated. Tiny water droplets were observed in the tube after some time.

(i) From where did these water droplets appear ? Explain.

(ii) What colour change will be observed during heating ?

(iii) How many molecules of water are attached per molecule of $FeSO_4$ crystal ? Write the molecular formula of crystalline forms of (I) Copper sulphate, and (II) Sodium carbonate.

(iv) State how is Plaster of Paris obtained from gypsum. Write two uses of Plaster of Paris. *5*

OR

(b) An acid 'X' present in tamarind when mixed with 'Y', produces a mixture 'Z'. 'Z' on addition to a dough when heated makes cakes soft and spongy. 'Y' is prepared from common salt and helps in faster cooking.

(i) Write the common names of 'X', 'Y' and 'Z', and the chemical formula of 'Y'.

(ii) How is 'Y' prepared and how does it help in making cakes soft and spongy ? Illustrate the reaction with suitable chemical equation.

(iii) Write the name and chemical formula of a mild base other than 'Y' used as an antacid. *5*

32. A 2000 W heater has a resistance of about 25 Ω, whereas a 100 W bulb has a resistance of 500 Ω. When 220 V is applied on these, then which of the two

(a) can carry large currents ?

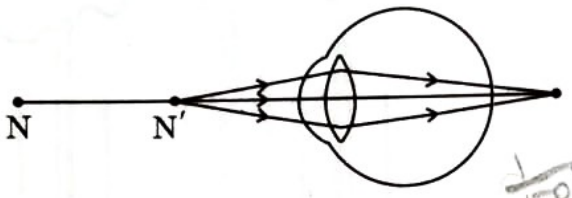
(b) may be used with an electrical circuit having 1·0 A rating ?

(c) will be fitted with a 15 A electric board and not with a 5 A electric board ?

3

Justify your answer in each case.

33. (a) Study the diagram given below and answer the questions that follow :



(i) Name the defect of vision depicted in this diagram stating the part of the eye responsible for this condition.

(ii) List two causes of this defect.

(iii) Name the type of lens used to correct this defect and state its role in this case.

3

OR

(b) What is dispersion of white light ? State its cause. Draw a diagram to show dispersion of a beam of white light by a glass prism.

3

(b) List two properties by virtue of which carbon can form a large number of compounds. *1*

(c) (i) Write the formula of the functional group present in (1) aldehydes, and (2) ketones. Write chemical equation for the reaction that occurs between ethanoic acid and ethanol in the presence of a catalyst. *2*

OR

(c) (ii) What are structural isomers ? Write the structures of two isomers of butane (C_4H_{10}). *2*

39. Pollination is an important process in sexual reproduction of plants. It is an essential process that facilitates fertilisation in plants. Pollinating agents can be wind, water, insects and birds. Several changes take place in the flower after the fertilization has taken place.

(a) Write the main difference between self-pollination and cross-pollination. *1*

(b) Name the part of the flower which attracts insects for pollination. What happens to this part after fertilisation ? *1*

(c) (i) Define fertilisation. What is the fate of ovules and the ovary in a flower after fertilisation ?

OR *2*

(c) (ii) In a germinating seed, which parts are known as future shoot and future root ? Mention the function of cotyledon. *2*