

रोल नं.
Roll No.

--	--	--	--	--	--	--	--



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 :

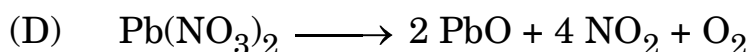
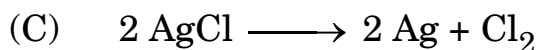
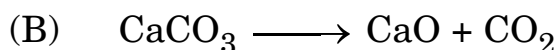
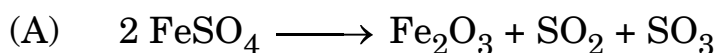
- (i) *This question paper comprises **39** questions. **All** questions are compulsory.*
- (ii) *This question paper is divided into **five** sections – **A, B, C, D** and **E**.*
- (iii) ***Section A** – Questions No. **1** to **20** are multiple choice questions. Each question carries **1** mark.*
- (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 be 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**.*

20×1=20

1. Which of the following is **not** a thermal decomposition reaction ?



2. 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
3. Sense organ in which olfactory receptors are present is :
- (A) Nose
(B) Skin
(C) Tongue
(D) Inner ear
4. 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.
5. 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) $Fe_2O_3 + 3 CO \rightarrow 2 Fe + 3 CO_2$
6. The salt present in tooth enamel is :
- (A) Calcium phosphate (B) Magnesium phosphate
(C) Sodium phosphate (D) Aluminium phosphate
7. Identify an involuntary action from the following :
- (A) Riding a bicycle
(B) Picking up a pencil
(C) Regular beating of heart
(D) Walking in a straight line

8. 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

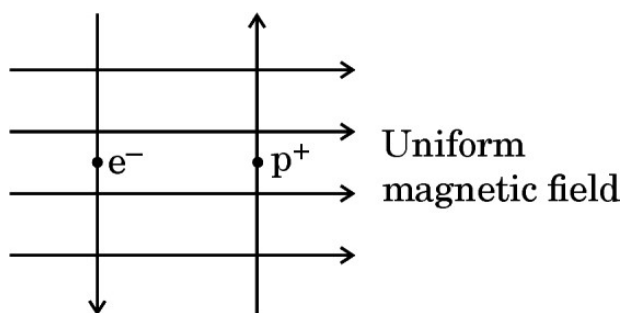
9. A metal 'X' is used in thermit process. When 'X' is heated with oxygen, it gives an oxide 'Y', which is amphoteric in nature. 'X' and 'Y' respectively are :

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

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

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

11.



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.

12. 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

- 13.** 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)
- 14.** 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.
- 15.** 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
- 16.** The colour of light for which the refractive index of glass is minimum, is :
- (A) Red
- (B) Yellow
- (C) Green
- (D) Violet

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) :* Ozone layer protects the surface of the Earth from harmful UV radiations.

Reason (R) : Chlorofluorocarbons (CFCs) are responsible for depletion of ozone layer.

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) :* 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.

SECTION B

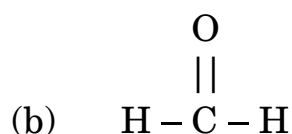
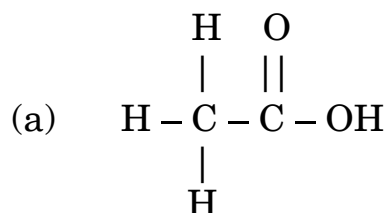
Questions no. **21** to **26** are very short answer type questions.

- 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.** Identify the functional group present in the following compounds and also name them : 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

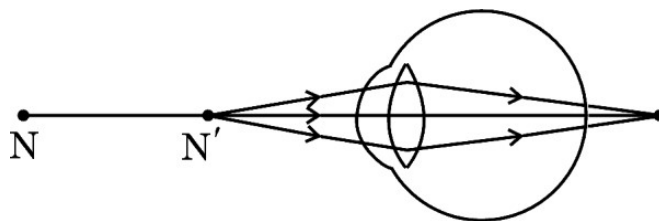
- 24.** Explain how the original number of chromosomes present in the parents are restored in the progeny. Name the cell division by which chromosome number is maintained in the progeny. 2

25. Define power of a lens. Find power of a lens whose focal length is 50 cm. 2
26. An electric source can supply a charge of 750 coulomb. If the current drawn by a device is 15 mA, find the time in which the electric source will be discharged completely. 2

SECTION C

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

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

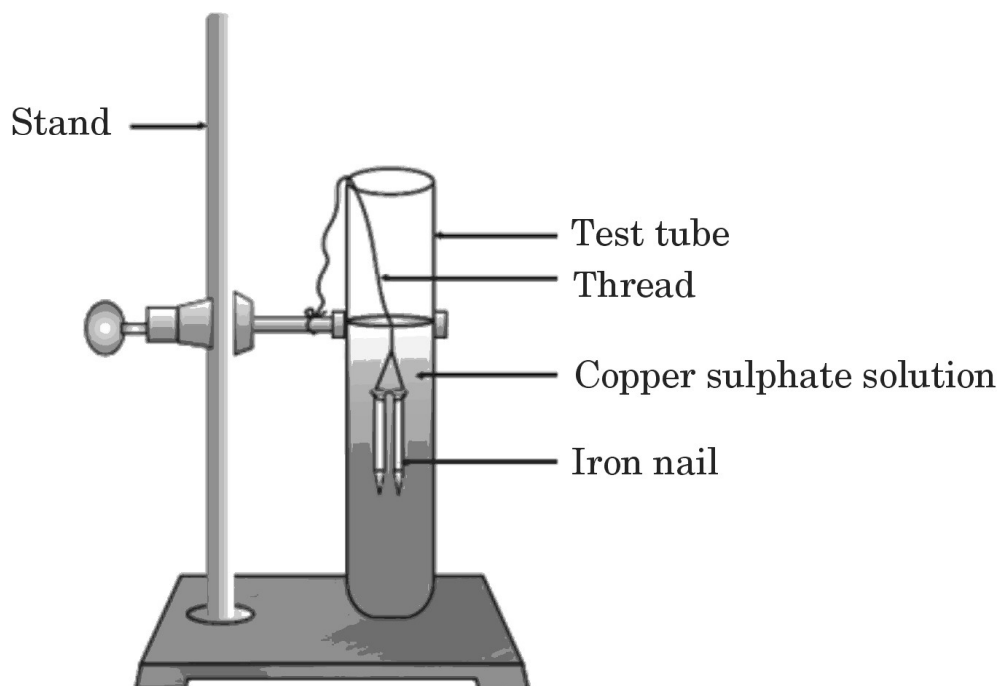


- (i) Name the defect of vision depicted in this diagram stating the part of the eye responsible for this condition.
- (ii) List two causes of this defect.
- (iii) Name the type of lens used to correct this defect and state its role in this case. 3

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
28. Suggest an activity to differentiate between the chemical properties (acidic or basic character) of the product obtained on burning a metal (magnesium) and a non-metal (sulphur). 3

29.



Study the experimental set-up shown in the diagram and write chemical equation for the chemical reaction involved. Name and define the type of reaction. List two other metals which can be used in place of iron to show the same type of reaction with copper sulphate solution.

3

30. A plant with violet flowers (VV) was crossed with a plant with white flowers (vv).

- What colour of flowers was obtained in the plants of F_1 generation and why ?
- Write the percentage of plants with white flowers in F_2 generation plants, if F_1 plants were self-pollinated. Give reason why this trait was not expressed in F_1 generation.
- In what ratio did we get the plants with (VV) and (Vv) gene combination in the F_2 generation ?

3

31. Taking the example of any two animal hormones along with their gland of secretion, explain how these hormones help (i) in growth and development and (ii) regulate metabolism, in the body.

3

- 32.** “Earth wire is a safety measure in domestic electric circuits.” Justify this statement explaining its role in case of accidental leakage of electric appliances. 3
- 33.** 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

SECTION D

Questions no. 34 to 36 are long answer type questions.

- 34.** (a) Explain chlor-alkali process and write balanced chemical equations for the reactions that occur. Name the gases obtained at the anode and cathode respectively. Mention two uses each of the two gases obtained in the above process. 5

OR

- (b) Common salt is a very important raw material as many compounds of industrial use can be prepared from it. Explain, giving chemical equations, the method of preparation of washing soda from sodium chloride. List four industrial/domestic uses of washing soda. 5
- 35.** (a) (i) The potential difference across the two ends of a circuit component is decreased to one-third of its initial value, while its resistance remains constant. What change will be observed in the current flowing through it ? Name and state the law which helps us to answer this question.
- (ii) Draw a schematic diagram of a circuit consisting of a battery of four 1.5 V cells, a 5 Ω resistor, a 10 Ω resistor and a 15 Ω resistor and a plug key, all connected in series. Now find (I) the electric current passing through the circuit, and (II) potential difference across the 10 Ω resistor when the plug key is closed. 5

OR

- (b) (i) When is the potential difference between two points said to be 1 volt ?
- (ii) A copper wire has a diameter of 0.2 mm and resistivity of $1.6 \times 10^{-8} \Omega \text{ m}$. What will be the length of this wire to make its resistance 14Ω ? How much does the resistance change, if the diameter of the wire is doubled ?

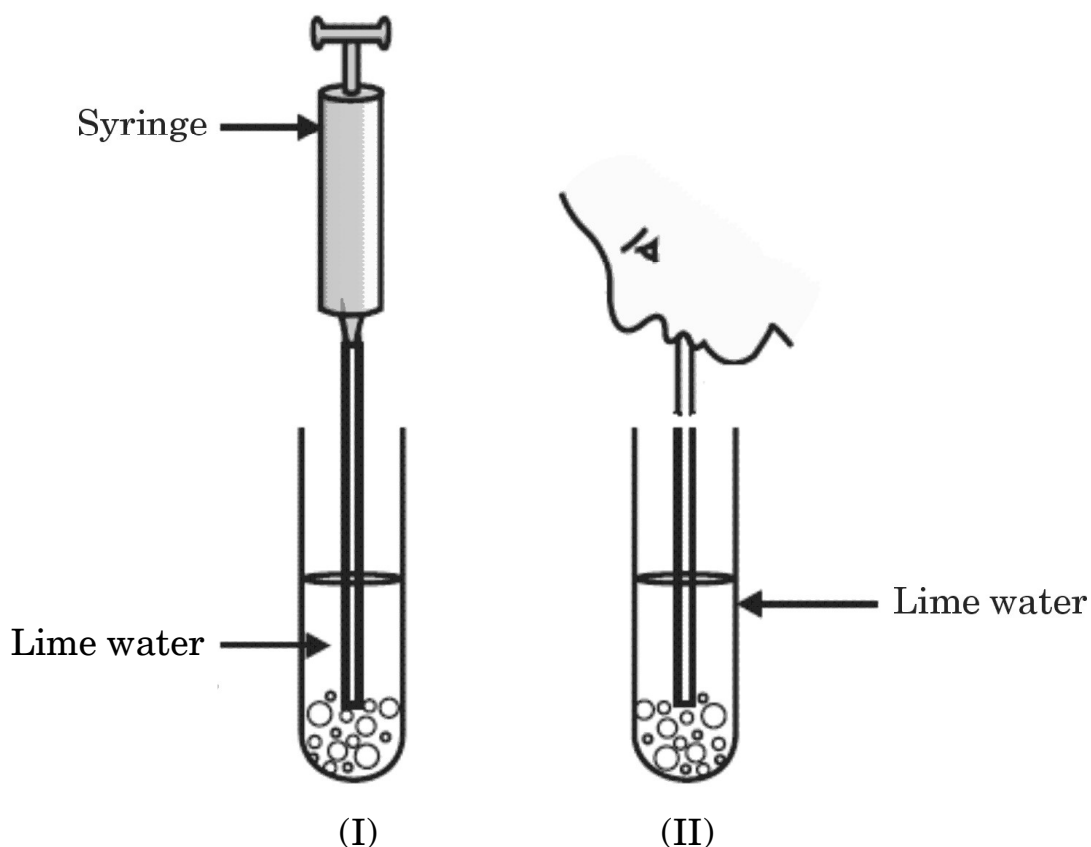
5

36. (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.

5

SECTION E

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

37. A highly polished surface such as a mirror reflects most of the light falling on it. In our daily life we use two types of mirrors — plane and spherical. The reflecting surface of a spherical mirrors may be curved inwards or outwards. In concave mirrors, reflection takes place from the inner surface, while in convex mirrors reflection takes place from the outer surface.

- (a) Define the principal axis of a concave mirror. 1
- (b) A ray of light is incident on a concave mirror, parallel to its principal axis. If this ray after reflection from the mirror passes through the principal axis from a point at a distance of 10 cm from the pole of the mirror, find the radius of curvature of the mirror. 1
- (c) (i) An object is placed at a distance of 10 cm from the pole of a convex mirror of focal length 15 cm. Find the position of the image. 2

OR

- (c) (ii) A mirror forms a virtual, erect and diminished image of an object. Identify the type of this mirror. Draw a ray diagram to show the image formation in this case. 2

- 38.** Carbon is a versatile element that forms the basis of all living organisms and many of the things we use. A large variety of compounds is formed because of its tetravalency. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine and many other elements.

Answer the following questions :

- (a) What are hydrocarbons ? 1
- (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 ? 2

OR

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