Series D3CBA/1

Set-3

प्रश्न-पत्र कोड
Q.P. Code **31/1/3**

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 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*** *– Question Nos.* ***1*** *to* ***20*** *are multiple choice questions. Each question carries* ***1*** *mark.*

(iv) ***Section B*** *– Question Nos.* ***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*** *– Question Nos.* ***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*** *– Question Nos.* ***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*** *– Question Nos.* ***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 1-20. There is no negative mark for the incorrect response.

1. Select from the following a decomposition reaction in which source of energy for decomposition is light : 1

   (a) $2FeSO_4 \rightarrow Fe_2O_3 + SO_2 + SO_3$

   (b) $2H_2O \rightarrow 2H_2 + O_2$

   (c) $2AgBr \rightarrow 2Ag + Br_2$

   (d) $CaCO_3 \rightarrow CaO + CO_2$

2. When 2 mL of sodium hydroxide solution is added to few pieces of granulated zinc in a test tube and then warmed, the reaction that occurs can be written in the form of a balanced chemical equation as : 1

   (a) $NaOH + Zn \rightarrow NaZnO_2 + H_2O$

   (b) $2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$

   (c) $2NaOH + Zn \rightarrow NaZnO_2 + H_2$

   (d) $2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2O$

3. $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

The reaction given above is a redox reaction because in this case 1

(a) MnO_2 is oxidised and HCl is reduced.

(b) HCl is oxidised.

(c) MnO_2 is reduced.

(d) MnO_2 is reduced and HCl is oxidised.

4. Consider the following compounds :

$FeSO_4$, $CuSO_4$, $CaSO_4$, Na_2CO_3

The compound having maximum number of water of crystallisation in its crystalline form in one molecule is 1

(a) $FeSO_4$

(b) $CuSO_4$

(c) $CaSO_4$

(d) Na_2CO_3

5. In a nerve cell, the site where the electrical impulse is converted into a chemical signal is known as 1

(a) Axon

(b) Dendrites

(c) Neuromuscular junction

(d) Cell body

6. A metal and a non-metal that exists in liquid state at the room temperature are respectively : 1

(a) Bromine and Mercury

(b) Mercury and Iodine

(c) Mercury and Bromine

(d) Iodine and Mercury

7. At what distance from a convex lens should an object be placed to get an image of the same size as that of the object on a screen ? 1

(a) Beyond twice the focal length of the lens.

(b) At the principal focus of the lens.

(c) At twice the focal length of the lens.

(d) Between the optical centre of the lens and its principal focus.

8. Carbon compounds :

(i) are good conductors of electricity

(ii) are bad conductors of electricity

(iii) have strong forces of attraction between their molecules

(iv) have weak forces of attraction between their molecules

The correct statements are 1

(a) (i) and (ii)

(b) (ii) and (iii)

(c) (ii) and (iv)

(d) (i) and (iii)

9. Oxides of aluminium and zinc are 1

(a) acidic

(b) basic

(c) amphoteric

(d) neutral

10. Chromosomes :

(i) carry hereditary information from parents to the next generation

(ii) are thread like structures located inside the nucleus of an animal cell

(iii) always exist in pairs in human reproductive cells.

(iv) are involved in the process of cell division.

The correct statements are 1

(a) (i) and (ii)

(b) (iii) and (iv)

(c) (i), (ii) and (iv)

(d) (i) and (iv)

11. Consider the following statements :

(i) The sex of a child is determined by what it inherits from the mother.

(ii) The sex of a child is determined by what it inherits from the father.

(iii) The probability of having a male child is more than that of a female child.

(iv) The sex of a child is determined at the time of fertilisation when male and female gametes fuse to form a zygote. 1

The correct statements are

(a) (i) and (iii) 1

(b) (ii) and (iv)

(c) (iii) and (iv)

(d) (i), (iii) and (iv)

12. Which one of the following organ is **NOT** a part of human female reproductive system ? 1

(a) Ovary

(b) Uterus

(c) Vas deferens

(d) Fallopian tube

13. In which of the following organisms, multiple fission is a means of asexual reproduction ? 1

(a) Yeast

(b) Leishmania

(c) Paramoecium

(d) Plasmodium

14. In bifocal lenses used for the correction of presbyopia 1

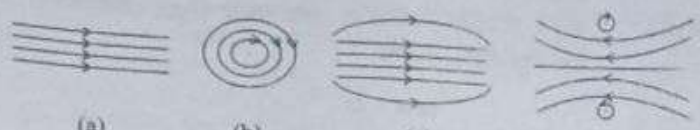
(a) the upper portion is of convex lens for the near vision and lower part is of concave lens for the distant vision.

(b) the upper portion is of convex lens for the distant vision and lower part is of concave lens for the near vision.

(c) the upper portion is of concave lens is for the near vision and lower part is of convex lens for the distant vision.

(d) the upper portion is of concave lens for the distant vision and lower part is of convex lens for the near vision.

15. The pattern of the magnetic field produced inside a current carrying solenoid is 1



(a) (b) (c) (d)

16. Identify the food chain in which the organisms of the second trophic level are missing 1

(a) Grass, goat, lion
(b) Zooplankton, Phytoplankton, small fish, large fish
(c) Tiger, grass, snake, frog
(d) Grasshopper, grass, snake, frog, eagle

For Q. Nos. **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) :** The rainbow is a natural spectrum of sunlight in the sky.
Reason (R) : Rainbow is formed in the sky when the sun is overhead and water droplets are also present in air. 1

18. **Assertion (A) :** Hydrogen gas is not evolved when zinc reacts with nitric acid.
Reason (R) : Nitric acid oxidises the hydrogen gas produced to water and itself gets reduced. 1

19. **Assertion (A) :** Accumulation of harmful chemicals is maximum in the organisms at the highest trophic level of a food chain.
Reason (R) : Harmful chemicals are sprayed on the crops to protect them from diseases and pests. 1

20. **Assertion (A) :** The rate of breathing in aquatic organisms is much faster than in terrestrial organisms.
Reason (R) : The amount of oxygen dissolved in water is very high as compared to the amount of oxygen in air. 1

SECTION – B

21. (A) (i) Write the significance of penpheral nervous system in human beings. 2

(ii) How is human brain protected from mechanical injuries and shocks ?

OR

(B) Name one directional growth movement each in response to chemicals and water in plants. Write an example for each of them. 2

22. (i) Give reason why herbivorous animals have longer small intestine than carnivorous animals ? 2

(ii) Although 'Pepsin' and 'Trypsin' are both protein digesting enzymes yet they differ from each other. Justify this statement by giving one difference between them.

23. Translate the following statement into a balanced chemical equation.
"When barium chloride reacts with aluminium sulphate, aluminium chloride and barium sulphate are formed."
State the type of this reaction giving reason to justify your answer. 2

24. (i) Two magnetic field lines do not intersect each other. Why ? 2

(ii) How is a uniform magnetic field in a given region represented ? Draw a diagram in support of your answer.

25. Draw the pattern of the magnetic field lines due to a straight current carrying conductor indicating the direction of current in the conductor and the direction of the corresponding magnetic field lines. 2

26. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position of the image formed by the mirror. 2

SECTION – C

27. **(A)** Plants → Deer → Lion

In the given food chain, what will be the impact of removing all the organisms of second trophic level on the first and third trophic level ? Will the impact be the same for the organisms of the third trophic level in the above food chain if they were present in a food web ? Justify. 3

OR

(B) A gas 'X' which is a deadly poison is found at the higher levels of atmosphere and performs an essential function.

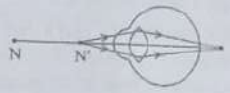
Name the gas and write the function performed by this gas in the atmosphere. Which chemical is linked to the decrease in the level of this gas ? What measures have been taken by an international organization to check the depletion of the layer containing this gas ? 3

28. Name and state the rule to determine the direction of a : 3

(i) magnetic field produced around a current carrying straight conductor.

(ii) force experienced by a current carrying straight conductor placed in a magnetic field which is perpendicular to it.

29. Study the diagram given below and answer the questions that follow : 3



(i) Name the defect of vision represented in the diagram. Give reason for your answer.

(ii) List two causes of this defect.

(iii) With the help of a diagram show how this defect of vision is corrected.

30. Define reflex action. With the help of a flow chart show the path of a reflex action such as sneezing. 3

31. (i) Which organisms have a three-chambered heart ? Why do they have three-chambered hearts ? 3

(ii) List two functions of lymph.

32. A compound which is prepared from gypsum has the property of hardening when water is mixed in right quantity with it. 3

(i) Write common name and the chemical name of this compound.

(ii) Give chemical equation for its preparation.

(iii) List its two uses.

33. (i) Define a decomposition reaction. Write chemical equation for the reaction that occurs when lead nitrate is heated strongly in a boiling tube. 3

(ii) In electrolytic decomposition of water two gases are liberated at the electrodes. Give the mass ratio of the gas liberated at the cathode and at the anode.

SECTION – D

34. (A) (i) State whether the currents and potential difference in all the bulbs will be same or different when in a circuit three bulbs of : 5

(a) same wattage are connected in series.

(b) same wattage are connected in parallel.

(c) different wattage are connected in series.

(d) different wattage are connected in parallel.

(ii) Two identical resistors of 24 Ω each are connected to a battery of 6 V. Calculate the ratio of the power consumed by the resulting combinations with (a) minimum resistance and (b) maximum resistance.

OR

(B) Draw a schematic diagram of a circuit consisting of a battery of six 2V cells, a 6 Ω resistor, a 12 Ω resistor and a 18 Ω resistor and a plug key all connected in series. Calculate the following (when key is closed) : 5

(i) Electric current flowing in the circuit.

(ii) Potential difference across 18 Ω resistor.

(iii) Electric power consumed in 18 Ω resistor.

35. (A) (i) Define a homologous series of carbon compounds. 5

(ii) Why is the melting and boiling points of C_4H_8 higher than that of C_3H_6 or C_2H_4 ?

(iii) Why do we **NOT** see any gradation in chemical properties of a homologous series compounds ?

(iv) Write the name and structures of (i) aldehyde and (ii) ketone with molecular form C_3H_6O.

OR

(B) (i) Write the name and structure of an organic compound 'X' having two carbon atoms in its molecule and its name is suffixed with '– ol'. 5

(ii) What happens when 'X' is heated with excess concentrated sulphuric acid at 443 K ? Write chemical equation for the reaction stating the conditions for the reaction. Also state the role played by concentrated sulphuric acid in the reaction.

(iii) Name and draw the electron dot structure of hydrocarbon produced in the above reaction.

36. (A) (i) Name three techniques/devices used by human females to avoid pregnancy. Mention the side effects caused by each. 5

(ii) What will happen if in a human female (a) fertilisation takes place, (b) an egg is not fertilised ?

OR

(B) (i) Draw a diagram showing spore formation in Rhizopus and label the (a) reproductive and (b) non-reproductive parts. Why does Rhizopus not multiply on a dry slice of bread ? 5

(ii) Name and explain the process by which reproduction takes place in Hydra.

SECTION - E

Q. No. 37-39 are source-based/case-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts :

37. Mendel worked out the rules of heredity by working on garden pea using a number of visible contrasting characters. He conducted several experiments by making a cross with one or two pairs of contrasting characters of pea plant. On the basis of his observations he gave some interpretations which helped to study the mechanism of inheritance.

(i) When Mendel crossed pea plants with pure tall and pure short characteristics to produce F_1 progeny, which two observations were made by him in F_1 plants ? 1

(ii) Write one difference between dominant and recessive trait. 1

(iii) (A) In a cross with two pairs of contrasting characters

RRYY × rryy

(Round Yellow) (Wrinkled Green)

Mendel observed 4 types of combinations in F_2 generation. By which method did he obtain F_2 generation ? Write the ratio of the parental combinations obtained and what conclusions were drawn from this experiment. 2

OR

(iii) (B) Justify the statement :

"It is possible that a trait is inherited but may not be expressed." 2

38. Study the data given below showing the focal length of three concave mirrors A, B and C and the respective distances of objects placed in front of the mirrors :

Case	Mirror	Focal Length (cm)	Object Distance (cm)
1	A	20	45
2	B	15	30
3	C	30	20

(i) In which one of the above cases the mirror will form a diminished image of the object ? Justify your answer 1

(ii) List two properties of the image formed in case 2. 1

(iii) (A) What is the nature and size of the image formed by mirror C ? Draw ray diagram to justify your answer 2

P.T.O.

OR

(iii) (B) An object is placed at a distance of 18 cm from the pole of a concave mirror of focal length 12 cm. Find the position of the image formed in this case. 2

39. The metals produced by various reduction processes are not very pure. They contain impurities, which must be removed to obtain pure metals. The most widely used method for refining impure metals is electrolytic refining.

(i) What is the cathode and anode made of in the refining of copper by this process ? 1

(ii) Name the solution used in the above process and write its formula. 1

(iii) (A) How copper gets refined when electric current is passed in the electrolytic cell ? 2

OR

(iii) (B) You have two beakers 'A' and 'B' containing copper sulphate solution. What would you observe after about 2 hours if you dip a strip of zinc in beaker 'A' and a strip of silver in beaker 'B' ? Give reason for your observations in each case. 2