Series : EFHG4

SET~2

रोल नं.
Roll No.

प्रश्न–पत्र कोड
Q.P. Code **31/4/2**

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.

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 यथास्थान पर प्रश्न का क्रमांक अवश्य लिखें।**	(IV) **Please write down the Serial Number of the question in the answer-book at the given place 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.

विज्ञान
SCIENCE

निर्धारित समय : 3 घण्टे
Time allowed : 3 hours

अधिकतम अंक :
Maximum Marks :

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 type 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 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 to 20. There is no negative marking for wrong answer. Each question carries 1 mark.

1. To get an image of magnification –1 on a screen using a lens of focal length 20 cm, the object distance must be : 1

   (a) Less than 20 cm

   (b) 30 cm

   (c) 40 cm

   (d) 80 cm

2. When a pure-tall pea plant is crossed with a pure-dwarf pea plant, the percentage of tall pea plants in F_1 and F_2 generation pea plants will be respectively : 1

   (a) 100% ; 25%

   (b) 100% ; 50%

   (c) 100% ; 75%

   (d) 100% ; 100%

3. Plants like rose and banana have lost the capacity to produce : 1

(a) flowers

(b) buds

(c) seeds

(d) fruits

4. In which one of the following situations a chemical reaction does **not** occur? 1

(a) Milk is left open at room temperature during summer

(b) Grapes get fermented

(c) An iron nail is left exposed to humid atmosphere

(d) Melting of glaciers

5. The property by virtue of which a solid material can be drawn into thin wires is called : 1

(a) malleability

(b) ductility

(c) rigidity

(d) resistivity

6. In order to prepare dry hydrogen chloride gas in humid atmosphere the gas produced is passed through a guard tube (drying tube) which contains : 1

(a) Calcium chloride

(b) Calcium oxide

(c) Calcium hydroxide

(d) Calcium carbonate

7. Select from the following a hydrocarbon having one C–C bond and one C≡C bond : 1

(a) Benzene

(b) Cyclohexane

(c) Butyne

(d) Propyne

8. Which one of the following has half the number of chromosomes and half the amount of DNA as compared to the non-reproductive body cells? 1

(a) Male germ cell
(b) Female germ cell
(c) Zygote
(d) Both, male and female germ cells

9. The essential element taken up from the soil by the plants to synthesize proteins is : 1

(a) Phosphorus
(b) Nitrogen
(c) Iron
(d) Magnesium

10. Select **TRUE** statements about lymph from the following : 1

A. Lymph vessels carry lymph through the body and finally open into larger arteries.
B. Lymph contains some amount of plasma, proteins and blood cells.
C. Lymph contains some amount of plasma, proteins and red blood cells.
D. Lymph vessels carry lymph through the body and finally open into larger veins.

The true statements are :

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

11. Which one of the following gets biomagnified at different levels in a food chain ? 1

(a) Carbon monoxide
(b) CFC's
(c) DDT
(d) Manure

12. In the food chains given below. Select the most efficient food chain in terms of energy : 1

(a) Grass → Grasshopper → Frog → Snake

(b) Plants → Deer → Lion

(c) Plants → Man

(d) Phytoplankton → Zooplankton → Small Fish → Big Fish

13. An optical device 'X' is placed obliquely in the path of a narrow parallel beam of light. If the emergent beam gets displaced laterally, the device 'X' is : 1

(a) plane mirror

(b) convex lens

(c) glass slab

(d) glass prism

14. A piece of wire of resistance 'R' is cut lengthwise into three identical parts. These parts are then connected in parallel. If the equivalent resistance of this combination is R′, then the value of R/R′ is : 1

(a) 1/9

(b) 1/3

(c) 3

(d) 9

15. The minimum number of identical bulbs of rating 4V; 6W, that can work safely with desired brightness, when connected in series with a 240 V mains supply is : 1

(a) 20

(b) 40

(c) 60

(d) 80

16. An electric bulb is rated 220 V; 11W. The resistance of its filament when it glows with a power supply of 220 V is : 1

(a) 4400 Ω

(b) 440 Ω

(c) 400 Ω

(d) 20 Ω

Question Nos. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option (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 Assertion (A).

(b) Both, Assertion (A) and Reason (R) are true, and Reason (R) is **not** the correct explanation of 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) :** All exothermic reactions are accompanied with evolution of heat and light.

Reason (R) : Combination reactions may or may not be exothermic. 1

18. **Assertion (A) :** When ciliary muscles contract, eye lens becomes thin.

Reason (R) : Ciliary muscles control the power of the eye lens. 1

19. **Assertion (A) :** Concentrated nitric acid is diluted by adding water slowly to acid with constant stirring.

Reason (R) : Concentrated nitric acid is easily soluble in water. 1

20. **Assertion (A) :** In reptiles, the temperature at which the fertilized eggs are kept decides the sex of the offsprings.

Reason (R) : Sex is not genetically determined in some animals. 1

SECTION – B

Question Nos. 21 to 26 are very short answer type questions. Each question carries 2 marks.

21. While burning a magnesium ribbon in air, list two safety measures which should be followed. Also state two observations of this activity. 2

22. **(A)** Draw a ray diagram to show the refraction of a ray of light passing through an equilateral glass prism. Mark the angle through which the emergent ray bends from the direction of the incident ray and also name it. 2

OR

(B) Name the type of lenses required by the persons for the correction of their defect of vision called presbyopia. Write the structure of the lenses commonly used for the correction of this defect giving reason for such designs. 2

23. "In human alimentary canal the small intestine is designed to absorb the digested food." Justify this statement. 2

24. Pure-tall (TT) pea plants are crossed with pure-dwarf (tt) pea plants. The pea plants obtained in F_1 generation are then self pollinated to produce F_2 generation. 2

(i) What do the plants of F_1 generation look-like? Justify your answer.

(ii) What is the ratio of pure-tall plants to pure-dwarf plants in F_2 generation ?

25. (A) Show the formation of magnesium chloride by electron transfer. Write the name of the cation and anion present in the compound formed. (Atomic Number of Mg = 12, Cl = 17) 2

OR

(B) How is zinc extracted from its ore? Name the processes involved in the extraction and write chemical equations for the reactions that occur during these processes. 2

26. State the role of an electric fuse, used in series with an electrical appliance. Why should in an electric circuit a fuse with defined rating not be replaced by one with a larger rating? 2

SECTION – C

Question Nos. 27 to 33 are short answer type questions. Each question carries 3 marks.

27. What are decomposers? Give two examples. State how they maintain a balance in an ecosystem. 3

28. Samples of four metals A, B, C and D were added one by one to the following solutions. The results obtained were tabulated as follows :

Solution / Metal	Iron Sulphate	Copper Sulphate	Zinc Sulphate	Aluminium Sulphate
A	–	Displacement	No reaction	No reaction
B	Displacement	Displacement	Displacement	–
C	Displacement	?	–	No reaction
D	No reaction	No reaction	No reaction	No reaction

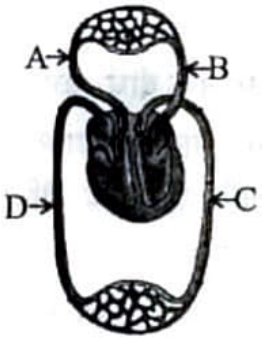
Use the table above to answer the following questions about metals A, B, C and D : 3

(i) Which is the least reactive metal?

(ii) What would be observed if C is added to a solution of copper sulphate?

(iii) Arrange the metals A, B, C and D in the order of their decreasing reactivity.

29. (i) Study the diagram and name the parts marked as A, B, C and D.



(ii) Write the function of A and C. 3

30. The electrical resistivity of three materials A, B and C at 20°C is given below : 3

Material	Resistivity (Ω m)
A	10^{17}
B	44×10^{-6}
C	1.62×10^{-8}

(i) Classify these materials as conductor, alloy and insulator.

(ii) Give one example of each of these materials and state one use of each material in the design of an electrical appliance say an electric stove or an electric iron.

31. If we want to obtain a real and magnified image of an object by using a concave mirror of focal length 18 cm. Where should the object be placed? Use mirror formula to determine the object distance for an image of magnification – 2 by this mirror to justify your answer. 3

32. (A) Why do we balance a chemical equation? Name and state the law that suggests the balancing of a chemical equation? Balance the following chemical equation : 3

$Zn + H_3PO_4 \rightarrow Zn_3(PO_4)_2 + H_2$

OR

(B) Define a precipitation reaction. Give its example and also express the reaction that occurs in the form of a balanced chemical equation. 3

33. State two limitations of electrical impulses in multicellular organisms. Why is chemical communication better than electrical impulses as a means of communication between cells in multicellular organisms? 3

SECTION – D

Question Nos. 34 to 36 are long answer type questions. Each question carries 5 marks.

34. (A) (i) What are structural isomers ? Draw structural isomers of butane (C_4H_{10}). Give reason why propane has no structural isomers ?

(ii) What happens when butane is burnt in air ? Write chemical equation for the reaction. Differentiate between the flames obtained when butane and butyne both are burnt in air in the similar conditions. 5

OR

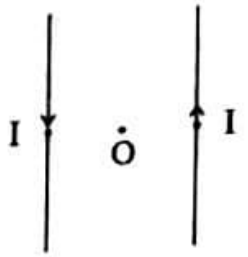
(B) (i) Give reason why carbon can neither form C^{4+} cations nor C^{4-} anions but forms covalent compounds.

(ii) What is meant by functional group in carbon compounds ? Write in tabular form the structural formula and the functional group present in the following compounds :

(a) Ethanol

(b) Ethanoic acid 5

35. **(A)** (i) Draw the pattern of the magnetic field lines for the two parallel straight conductors carrying current of same magnitude 'I' in opposite directions as shown. Show the direction of magnetic field at a point O which is equidistant from the two conductors. (Consider that the conductors are inserted normal to the plane of a rectangular cardboard.)



(ii) In our houses we receive A.C. electric power of 220 V. In electric iron or electric heater cables having three wires with insulation of three different colours – red, black and green are used to draw current from the mains.

(a) What are these three different wires called? Name them colourwise.

(b) What is the potential difference between the red wire and the black wire?

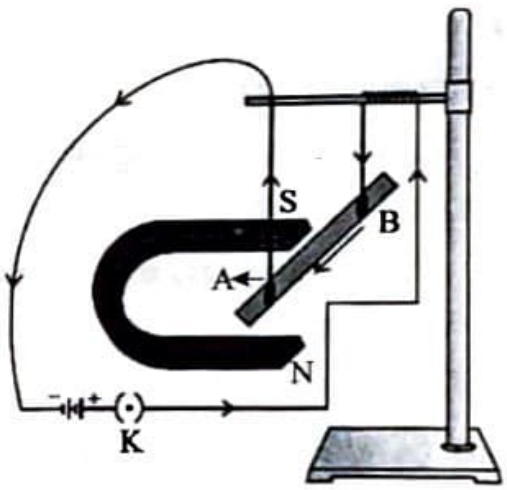
(c) What is the role of the wire with green insulation in case of accidental leakage of electric current to the metallic body of an electrical appliance? **5**

OR

(B) (i) By using the given experimental set-up. How can it be shown that :

(a) a force is exerted on the current-carrying conductor AB when it is placed in a magnetic field.

(b) the direction of force can be reversed in two ways.



(ii) When will the magnitude of the force be highest?

(iii) State Fleming's left hand rule. **5**

36. **(A)** (i) What is regeneration? Give one example of an organism that shows this process and one organism that does not. Why does regeneration not occur in the latter?

(ii) Water in a pond appears dark green and contains filamentous structures. Name these structures and the method by which they reproduce. Explain the process. 5

OR

(B) (i) Name the part performing following functions in human male reproductive system :

(a) Carries sperm

(b) Production of male gametes

(c) Whose secretion makes the transport of sperms easier

(d) Provide suitable temperature for sperm formation

(ii) Write any two characteristics of sperms.

(iii) What are surgical contraceptive methods? Give the side effect caused by this procedure. 5

SECTION – E

Question Nos. 37 to 39 are Source-based/Case-based questions.

37. The students in a class took a thick sheet of cardboard and made a small hole in its centre. Sunlight was allowed to fall on this small hole and they obtained a narrow beam of white light. A glass prism was taken and this white light was allowed to fall on one of its faces. The prism was turned slowly until the light that comes out of the opposite face of the prism appeared on the nearby screen. They studied this beautiful band of light and concluded that it is a spectrum of white light.

(i) Give any one more instance in which this type of spectrum is observed. 1

(ii) What happens to white light in the above case? 1

(iii) (A) List two conditions necessary to observe a rainbow. 2

OR

(iii) (B) Draw a ray diagram to show the formation of a rainbow. Mark on it, points (a), (b) and (c) as given below : 2

(a) Where dispersion of light occurs.

(b) Where light gets reflected internally.

(c) Where final refraction occurs.

38. Common salt is a very important chemical compound for our daily life. It's chemical name is sodium chloride and it is used as a raw material in the manufacture of caustic soda, washing soda, baking soda etc. It is also used in the preservation of pickles, butter, meat etc.

(i) Name the acid and the base from which common salt can be obtained.

(ii) State the nature (acidic/basic/neutral) of sodium chloride. Give reason for the justification for your answer. 1

(iii) (A) What happens when electric current is passed through an aqueous solution of sodium chloride (called brine)? Name the products obtained along with the corresponding places in the electrolytic cell where each of these products is obtained. 1 2

OR

(iii) (B) How is washing soda obtained from sodium chloride? Give chemical equation of the reactions involved in the process. 2

39. In life there are certain changes in the environment called 'stimuli' to which we respond appropriately. Touching a flame suddenly is a dangerous situation for us. One way is to think consciously about the possibility of burning and then moving the hand. But our body has been designed in such a way that we save ourself from such situations immediately.

(i) Name the action by which we protect ourself in the situation mentioned above and define it. 1

(ii) Write the role of (a) motor and (b) relay neuron. 1

(iii) (A) What are the two types of nervous system in human body? Name the components of each of them. 2

OR

(iii) (B) Which part of the human brain is responsible for : 2

(a) thinking

(b) picking up a pencil

(c) controlling blood pressure

(d) controlling hunger