

Series : EFHG4



SET ~ 3

प्रश्न-पत्र कोड

Q.P. Code

31/4/3

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.

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 : 80
Maximum Marks : 80

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.** Which one of the following gets biomagnified at different levels in a food chain ?
(a) Carbon monoxide
(b) CFC's
(c) DDT
(d) Manure
- 2.** In the food chains given below. Select the most efficient food chain in terms of energy :
(a) Grass → Grasshopper → Frog → Snake
(b) Plants → Deer → Lion
(c) Plants → Man
(d) Phytoplankton → Zooplankton → Small Fish → Big Fish

1**1**

3. An element 'M' has 25% of the electrons filled in the third shell as in the second shell. The element 'M' is : 1
- (a) Sodium
 - (b) Magnesium
 - (c) Aluminium
 - (d) Calcium
4. 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
5. 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
6. 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
7. 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

8. 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
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. 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
11. 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

12. 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

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

- (a) flowers
- (b) buds
- (c) seeds
- (d) fruits

14. 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%

15. In a bisexual flower the male gametes are present in the : **1**

- (a) anther
- (b) ovary
- (c) stigma
- (d) filament

16. 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

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) :** 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

18. **Assertion (A) :** In large animals, oxygen can reach different parts of the animal's body easily.

Reason (R) : Respiratory pigments take up oxygen from the air and carry it to body tissues. 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) :** White light is dispersed by a glass prism into seven colours.

Reason (R) : The red light bends the least while the violet the most when a beam of white light passes through a glass prism. 1

SECTION – B

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

21. Name the compound used in black and white photography. State whether the reaction that occurs is exothermic or endothermic. Give justification for your answer. **2**

22. (A) Show the formation of calcium chloride by the transfer of electrons from one element to the other. Atomic Number of calcium and chlorine is 20 and 17 respectively. **2**

OR

(B) “Aluminium oxide is an amphoteric oxide.” Justify this statement giving chemical equation for the reactions involved. **2**

23. Name the tissues which form the vascular bundle. State their function in plants. **2**

24. (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**

25. Explain with the help of a flow chart that in human beings father is responsible for the sex (male or female) of the child. **2**

26. Draw the pattern of magnetic field lines due to a current carrying straight conductor. Mark on it the direction of current in the conductor and the direction of the magnetic field developed. Name the rule that helps us to determine the direction of magnetic field lines in this case. **2**

SECTION – C

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

27. If we want to obtain a virtual 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 produced by this mirror to justify your answer. **3**
28. Name and describe the most widely used method for refining impure metals ? **3**
29. What is the first step of cellular respiration? In which part of the cell does it occur ? Write the equation for the process of breakdown of glucose in a human cell : **3**
- (i) in the presence of oxygen
- (ii) due to lack of oxygen
30. (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**
- $$\text{Zn} + \text{H}_3\text{PO}_4 \rightarrow \text{Zn}_3(\text{PO}_4)_2 + \text{H}_2$$

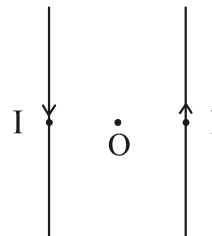
OR

- (B) Define a precipitation reaction. Give its example and also express the reaction that occurs in the form of a balanced chemical equation. **3**
31. What are decomposers? Give two examples. State how they maintain a balance in an ecosystem. **3**
32. Define the term “potential difference” between two points in an electric circuit carrying current. Name and define its S.I. unit. Also express it in terms of S.I. unit of work and charge. **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) 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.)

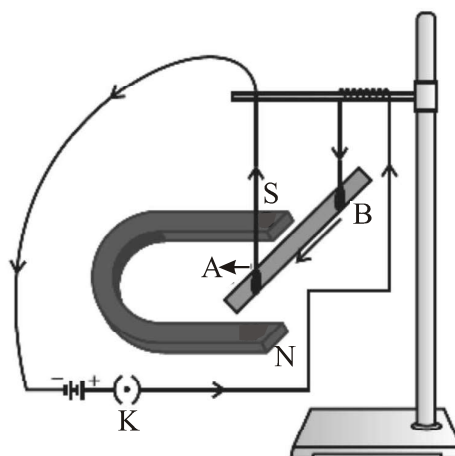


- (ii) In our houses we receive A.C. electric power of 220 V. In electric iron or electric heater cables having three wires with insulation of three different colours – red, black and green are used to draw current from the mains.
- (a) What are these three different wires called? Name them colourwise.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

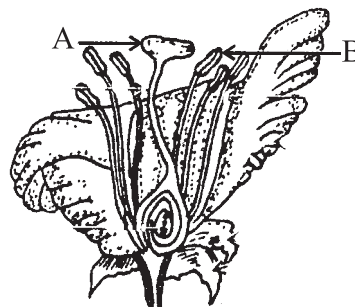
- (B) (i) By using the given experimental set-up. How can it be shown that :
- (a) a force is exerted on the current-carrying conductor AB when it is placed in a magnetic field.
 - (b) the direction of force can be reversed in two ways.



- (ii) When will the magnitude of the force be highest?
- (iii) State Fleming's left hand rule.

5

35. (A) Name the parts marked as 'A' and 'B' in the given diagram. Write in detail the changes that take place in a flower when the product of 'B' reaches 'A' till a fruit is formed.



5

OR

- (B) In human female reproductive system state the changes that take place once fertilisation has taken place. Write the role of placenta in this process. What happens when the egg is not fertilised ?
36. (A) A carbon compound 'A' on heating with excess conc. H_2SO_4 forms a compound 'B', which on addition of one mole of hydrogen gas in the presence of nickel catalyst forms a compound 'C'. 'C' on combustion in air forms 2 moles of carbon dioxide and 3 moles of water. Identify 'A', 'B' and 'C' and write their structures. Give chemical equations of the reactions involved. Also state the role of concentrated sulphuric acid in the formation of 'B' from 'A'.

5

OR

- (B) A carbon compound 'A' is widely used as a preservative in pickles and has a molecular formula $\text{C}_2\text{H}_4\text{O}_2$. This compound reacts with ethanol to form a sweet smelling compound 'B'.
- Identify the compound 'A' and write its structure.
 - Write the chemical equation for the reaction of 'A' with ethanol to form compound 'B'. State the role of presence of an acid in the reaction.
 - How can we get compound 'A' back from 'B' ?
 - How can 'A' be obtained from ethanol ?
 - Name the gas produced when compound 'A' reacts with washing soda.

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. 1
- (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. 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