



Series : EFGH/S

SET~3

प्रश्न-पत्र कोड
Q.P. Code **31/S/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 27 हैं।	(I) Please check that this question paper contains 27 printed pages.
(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।	(II) 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.
(III) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 39 प्रश्न हैं।	(III) Please check that this question paper contains 39 questions.
(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान 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 परीक्षार्थी 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 candidates 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

31/S/3

1

[P.T.O.]



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**. There is no negative marking for incorrect response.

20×1=20

- 1.** Select from the following decomposition reactions in which the source of energy for decomposition is heat :

- (i) $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$
- (ii) $2\text{H}_2\text{O} \longrightarrow 2\text{H}_2 + \text{O}_2$
- (iii) $2\text{AgBr} \longrightarrow 2\text{Ag} + \text{Br}_2$
- (iv) $2\text{FeSO}_4 \longrightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$

- | | |
|--------------------|--------------------|
| (A) (i) and (ii) | (B) (ii) and (iii) |
| (C) (iii) and (iv) | (D) (i) and (iv) |



2. The number of covalent bond(s) present in a nitrogen molecule is/are :
(Atomic number of nitrogen is 7)
- (A) 1
 - (B) 3
 - (C) 5
 - (D) 7
3. Consider the reactions of dil. hydrochloric acid with the following metals :
Aluminium, Copper, Iron, Magnesium and Zinc
The correct observation is :
- (A) Most vigorous reaction with aluminium and no reaction with iron
 - (B) Most vigorous reaction with magnesium and no reaction with iron
 - (C) Most vigorous reaction with magnesium and no reaction with copper
 - (D) Most vigorous reaction with zinc and no reaction with copper
4. From the following, select a process in which combination reaction occurs :
- (A) Black and white photography
 - (B) Burning of carbon (coal)
 - (C) Burning of methane
 - (D) Refining of copper
5. Oxides of aluminium and zinc are :
- | | |
|------------|----------------|
| (A) Acidic | (B) Amphoteric |
| (C) Basic | (D) Neutral |
6. Application of Absciscic acid on plants promotes :
- (A) Development of fruits
 - (B) Wilting of leaves
 - (C) Elongation of stem
 - (D) Formation of flowers



7. The valves in the human heart ensure that :
- (i) Oxygen-rich blood flows from left atrium to left ventricle only.
 - (ii) Deoxygenated blood flows from left atrium to left ventricle only.
 - (iii) Oxygen-rich blood flows from right atrium to right ventricle only.
 - (iv) Deoxygenated blood flows from right atrium to right ventricle only.
- (A) (i) and (iii)
(B) (ii) and (iv)
(C) (i) and (iv)
(D) (ii) and (iii)
8. The part of the hindbrain present immediately above the medulla is :
- (A) Cerebellum
(B) Pons
(C) Cerebrum
(D) Spinal cord
9. In garden pea, violet colour flower is the dominant trait over white colour flower which is the recessive trait. When parent plant with violet coloured flowers (Vv) is crossed with a parent plant with white flowers, the possible percentage of occurrence of traits in the F₁ progeny would be :
- (A) 100% violet
(B) 50% violet, 50% white
(C) 25% violet, 75% white
(D) 75% violet, 25% white
10. The end product of meiosis in a reproductive cell in plants is :
- (A) Zygote
(B) Pollen grains
(C) Sperms
(D) Egg



11. The organism occupying the fourth trophic level in a food chain operating in grassland is :
- (A) Green plants
 - (B) Frog
 - (C) Grasshopper
 - (D) Snake
12. The strength of the magnetic field inside a current carrying long straight solenoid is :
- (A) maximum at its centre.
 - (B) minimum at its centre.
 - (C) maximum at the ends and minimum at its centre.
 - (D) uniform throughout its length.
13. An optical device which always produces images of $m = +1$ is :
- (A) Plane mirror
 - (B) Convex mirror
 - (C) Concave mirror
 - (D) Convex lens
14. Which one of the following factors affects the electrical resistivity of a conductor ?
- (A) Temperature
 - (B) Length
 - (C) Shape
 - (D) Thickness
15. Concave mirror finds its application in which of the following cases ?
- (A) A solar furnace
 - (B) A rear-view mirror in vehicles
 - (C) To view full size erect image of distant tall buildings
 - (D) To produce divergent beam of light



16. In an ecosystem, 10% of energy available for transfer from one trophic level to the next in a food chain is in the form of :

- (A) heat energy (B) chemical energy
(C) mechanical energy (D) light energy

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 Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but 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 our homes we receive supply of electric power through a main supply. One of the wires in this supply, usually with red insulation, is called *live wire* and another wire with green insulation is called *neutral wire*.

Reason (R) : In our country, the potential difference between the live wire and the neutral wire is 220 volts.

18. *Assertion (A)* : Decomposition of vegetable matter into compost is an exothermic reaction.

Reason (R) : Decomposition reactions need energy to break down the reactants.

19. *Assertion (A)* : Due to scattering of sunlight, the clear sky predominantly appears blue.

Reason (R) : The wavelength of blue light is nearly 1.8 times the wavelength of red light.

20. *Assertion (A)* : Transpirational pull helps in the absorption and upward movement of water and dissolved minerals in plants.

Reason (R) : The effect of root pressure in transport of water is more significant at night.



SECTION B

Questions no. 21 to 26 are Very Short Answer Type questions.

21. Draw a ray diagram to show the path of a ray of light which falls obliquely on one of the faces of an equilateral triangular prism made of glass and mark on it the angle of incidence ($\angle i$) and the angle of deviation ($\angle D$). 2

22. Translate the following statements into balanced chemical equations : 2

- (a) Aluminium reacts with copper chloride to form aluminium chloride and copper.
- (b) Zinc reacts with sodium hydroxide to give sodium zincate and hydrogen gas.

23. (a) (i) What is an alloy ?
- (ii) Write the composition of solder and the property which makes it suitable for welding electric wires. 2

OR

- (b) During electrolytic refining of silver : 2
- (i) What are the electrodes – cathode and anode made up of ?
- (ii) What is anode mud ? Why is it called so ?

24. Explain how circulation of blood takes place in fishes. 2

25. An object is placed 18 cm in front of a concave mirror of focal length 12 cm. Use mirror formula to determine the position of the image formed in this case. 2

26. (a) Explain how tendrils help a pea plant climb up other plants or fences. 2

OR

- (b) List two major limitations of the use of electrical impulses as a means of communication between the cells in most multicellular animals. 2



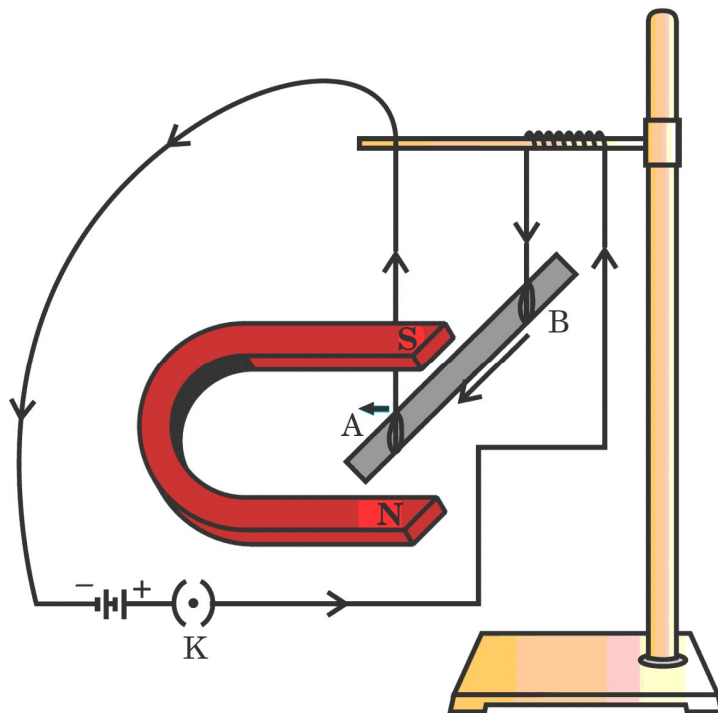
SECTION C

Questions no. 27 to 33 are Short Answer Type questions.

27. Using flow chart, show the steps involved in the method of extraction of a metal of medium reactivity from its ore. 3
28. (a) Write the name and chemical formula of a sodium compound which is sometimes added for faster cooking. How is it produced from sodium chloride as one of the raw materials ? Give chemical equation for the reaction involved.
- (b) The compound mentioned in (a) above is also an ingredient of antacids. Why ? 2+1
29. (a) Explain the process of translocation of food and other substances in the phloem of plants. 3
- OR**
- (b) Differentiate between xylem and phloem on the basis of the following : 3
- (i) Direction of transport of the substances
- (ii) Major driving forces involved in the transport
- (iii) Nature of the substance(s) transported
30. Explain how urine is produced in kidneys. 3
31. (a) Write mathematical expression for Joule's law of heating.
- (b) Calculate the amount of heat generated while transferring 72000 coulomb of charge in two hours through a potential difference of 220 V. 1+2
32. (a) Define the term biological magnification.
- (b) In the given aquatic food chain, which trophic level will have highest effect of biological magnification and why ? 1+2
- Phytoplankton → Zooplankton → Fishes → Human



33. As shown in the figure a small aluminum rod AB is suspended horizontally between the poles of a strong horseshoe magnet. This rod is also connected with a battery and a key. Study the arrangement shown.



- (a) State Fleming's left-hand rule.
- (b) Apply Fleming's left-hand rule to determine :
- What is observed when a current is passed from B to A in the rod ?
 - What is observed when a current is passed from A to B in the rod ?
 - What is observed when the rod AB is aligned parallel to the magnetic field and current is passed through it from B to A ? Justify your answer in this case.

1+2



SECTION D

Questions no. 34 to 36 are Long Answer Type questions.

34. (a) (i) Differentiate between self-pollination and cross-pollination.
- (ii) Explain the events taking place in a flower after a pollen lands on a suitable stigma, till fruit-formation. 2+3

OR

- (b) (i) What is the site of fertilisation of egg in a female reproductive tract ?
- (ii) Fertilised egg on implantation in uterus lining continues to grow and develop to become a foetus. Explain how it gets nourishment and removes metabolic wastes during this period. 2+3

35. (a) (i) Define the term power of accommodation of human eye. What happens to the image distance in the eyes when the distance of an object is increased gradually from about 5 m to 500 m from our eyes ? Name and explain the role of the part of human eye responsible for it in this case.
- (ii) A person is unable to see distinctly the objects placed beyond 2 m from his eyes. Name the defect of vision the person is suffering from. List two possible causes of this defect and write the type of lenses used for the correction of this defect. 3+2

OR

- (b) (i) Name and explain the phenomenon of light responsible to make the path of a beam of light visible when it enters a smoke/dust-filled room through a small hole. Also state the dependence of the colour of the light we receive on the size of the particles of the medium through which the light passes.



- (ii) A person suffering from presbyopia needs spectacles having bifocal lenses. If the power of two lenses used in his spectacles is $+ 2.0$ D and $- 0.5$ D, which one of the two lenses is for the correction of his distant vision and what is its focal length ?

3+2

36. (a) (i) Give the relation between hydrogen ion concentration of an aqueous solution and its pH.
- (ii) Concentrated acids should not be diluted by adding water to acid. Why ?
- (iii) Why do same molar concentrations of hydrochloric acid and acetic acid not produce same amounts of hydrogen ions ?

2+2+1

OR

- (b) Give reason :
- (i) Crystals of washing soda change to white powder on exposure to air.
- (ii) Plaster of Paris should be stored in moisture-proof containers.
- (iii) Baking soda can be used on bee sting area to get relief.
- (iv) Distilled water does not conduct electricity.
- (v) Farmers treat the soil of their fields with quick lime.

5×1=5



SECTION E

The following questions are Source-based/Case-based questions. Read the case carefully and answer the questions that follow.

37. The process of determining the sex of a newborn is purely genetic. But still many people in some societies believe that only the woman (mother) is responsible for determination of the sex of the child and blame her. In fact, the sex of the child is genetically determined. But there are some animals where sex is not genetically determined.

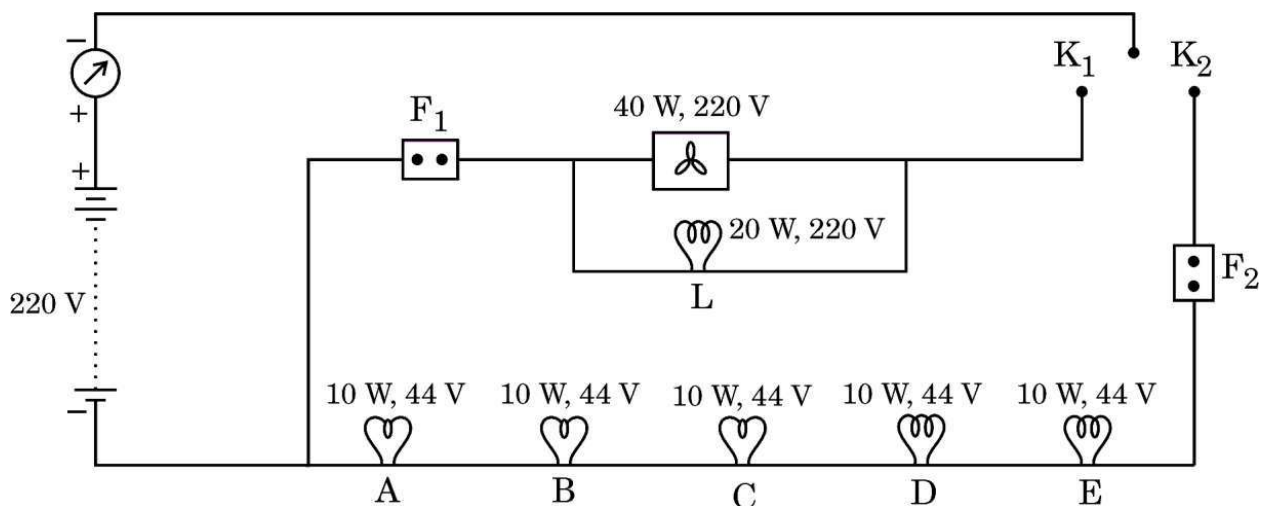
- (a) Define sex chromosomes. 1
- (b) Mention one example of animals where sex is not genetically determined. How is sex determined in these animals ? Explain. 1
- (c) (i) Does the genetic combination of the mother play a significant role in determining the sex of newborn ? Explain. 2

OR

- (c) (ii) How is equal genetic contribution of male and female parents ensured in progeny ? 2



38. In a domestic circuit, six LED bulbs and a ceiling fan are arranged as per the circuit shown in the figure. The source voltage is 220 volts and the power rating of each device is marked in the circuit diagram. Two fuses F_1 and F_2 are also provided in the circuit. Based on the circuit diagram, answer the following questions :



- (a) State what happens when 1
- (i) only key K_1 is closed,
- (ii) and key K_2 is also closed.
- (b) Find the current drawn by the bulb L. 1
- (c) (i) Calculate the resistance of the bulb A. Find the total resistance offered by the circuit to the flow of current when only key K_2 is closed. 2

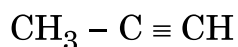
OR

- (c) (ii) What would happen to the glow of the bulbs in the circuit when K_1 and K_2 both are closed and the fuse F_1 melts suddenly ? Give reason to justify your answer. 2



39. All compounds of carbon which contain only carbon and hydrogen are called hydrocarbons. Among these, saturated hydrocarbons are called 'alkanes', unsaturated compounds with one or more double bonds are called 'alkenes' and compounds containing one or more triple bonds are called 'alkynes'.

(a) Identify the following compound and write its name. 1



(b) How do saturated and unsaturated carbon compounds differ in terms of the flame produced by them on burning ? 1

(c) (i) Which type of hydrocarbons undergo addition reactions ?
Show with an example. 2

OR

(c) (ii) What are structural isomers ? Draw two structural isomers of butane (C_4H_{10}). 2