

Series : GFHE5



SET ~ 2



प्रश्न-पत्र कोड
Q.P. Code

31/5/2

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 31 हैं।	(I) Please check that this question paper contains 31 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 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

General Instructions :

Read the following instructions very carefully and strictly follow them :

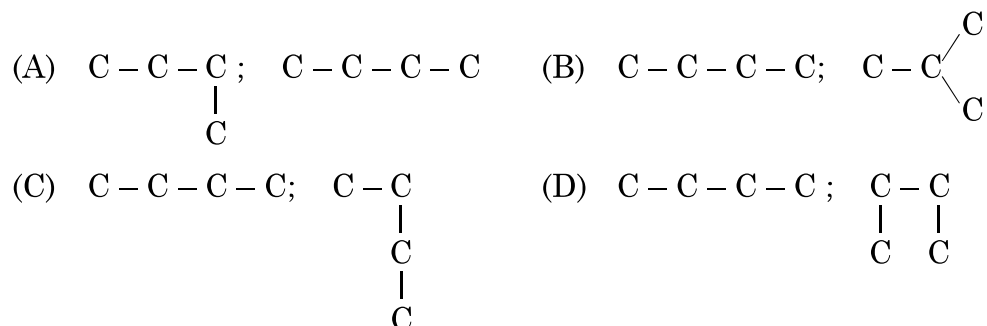
- (i) This question paper comprises 39 questions. All questions are compulsory.*
- (ii) This Question paper is divided into five sections – A, B, C, D and E.*
- (iii) Section A – Question Nos. 1 to 20 are Multiple Choice Questions. Each question carries 1 mark.*
- (iv) Section B – Question Nos. 21 to 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

In this section, Question Nos. 1 to 20 are Multiple Choice Questions.

All questions are compulsory.

1. If we make carbon skeleton with four carbon atoms, the two different possible skeletons will be



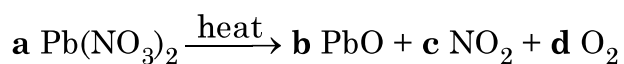
2. During electrolytic refining of copper, the anode, the cathode and the electrolyte used respectively are

- (A) Impure copper, pure copper, acidified copper sulphate solution
(B) Pure copper, impure copper, sulphuric acid
(C) Pure copper, impure copper, acidified copper sulphate solution
(D) Impure copper, pure copper, distilled water

- The chlorine produced during the electrolysis of brine solution is used in the manufacture of :

- (A) Ammonia (B) Disinfectants
(C) Plaster of Paris (D) Soaps and detergents

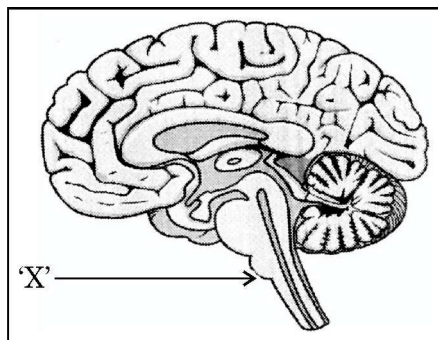
4. The values of **a**, **b**, **c** and **d** in the following balanced chemical equation are respectively :



- (A) 1, 1, 2, 1 (B) 1, 1, 1, 2
(C) 2, 2, 1, 4 (D) 2, 2, 4, 1

5. The main observations while performing the experiment of burning magnesium ribbon in air are :
- (i) Magnesium ribbon burns with a dazzling white flame.
 - (ii) A white powder is formed.
 - (iii) Magnesium ribbon vapourises.
 - (iv) Aqueous solution of the white powder turns blue litmus to red.
- (A) (i) and (iv) (B) (ii) and (iii)
(C) (i) and (ii) (D) (iii) and (iv)
6. A metal, 'X', on treatment with sodium hydroxide liberates a gas 'G'. It also liberates the same gas, 'G' on treatment with dilute sulphuric acid. Based on above information, 'X' and 'G' respectively are
- (A) Copper and Sulphur dioxide (B) Zinc and Sulphur dioxide
(C) Zinc and Hydrogen (D) Copper and Hydrogen
7. A metal, M, displaces iron from aqueous solution of ferrous sulphate but fails to do so in case of aqueous solution of aluminium sulphate. The metal M is
- (A) Magnesium (B) Copper
(C) Lead (D) Zinc

8.



Which among the following is not a neural action controlled by the part of human brain labelled 'X' in the figure above ?

- (A) Salivation (B) Hunger
(C) Vomiting (D) Blood Pressure

9. Listed below are the steps of nutrition in Amoeba. Select the correct sequence of these steps :
- (i) Diffusion of simple nutrients into cytoplasm
 - (ii) Food vacuole formation
 - (iii) Formation of finger like temporary extensions of cell surface
 - (iv) Complex substances broken to simpler ones
 - (v) Undigested material thrown out of the cell surface
- (A) (iv), (i), (ii), (iii), (v) (B) (iii), (ii), (iv), (i), (v)
(C) (ii), (i), (iv), (v), (iii) (D) (iii), (iv), (i), (ii), (v)
10. The plant hormones promoting rapid cell division in seeds and wilting of leaves respectively are
- (A) Auxins and Absciscic acid
 - (B) Cytokinins and Absciscic acid
 - (C) Gibberellins and Auxins
 - (D) Absciscic acid and Gibberellins
11. The modes of reproduction in *Spirogyra* and *Planaria* respectively are
- (A) Regeneration and budding
 - (B) Regeneration and fragmentation
 - (C) Fragmentation and regeneration
 - (D) Budding and regeneration
12. In order to obtain large images of the teeth of patients, the dentist holds the concave mirror in such a manner that the teeth are positioned
- (A) at the focus of mirror.
 - (B) between pole and focus of the mirror.
 - (C) between focus and centre of curvature of the mirror.
 - (D) at the centre of curvature of the mirror.

13. In aerobic respiration, the steps are : breakdown of glucose to pyruvate and its further conversion to carbon dioxide. Both processes respectively occur in –
- (A) Vacuole and Cytoplasm
 - (B) Chloroplast and Mitochondria
 - (C) Mitochondria and Cytoplasm
 - (D) Cytoplasm and Mitochondria
14. A boy while reading a book, keeps it much beyond 25 cm from his eyes. This defect of vision has arisen because of
- (A) excessive curvature of the eye lens
 - (B) the focal length of the eye lens has increased
 - (C) the eye ball has elongated
 - (D) the focal length of the eye lens has become too small
15. Human activities that are affecting the environment are :
- (A) minimising the use of chlorofluorocarbons.
 - (B) excessive use of disposable cups and plates.
 - (C) maximising the use of reusable utensils for eating food and drinking fluids.
 - (D) segregating the wastes into biodegradable and non-biodegradable before disposal.
16. The examples of natural and manmade (artificial) ecosystems are respectively
- (A) Forests and ponds
 - (B) Crop fields and lakes
 - (C) Lakes and gardens
 - (D) Crop fields and forests

Question Nos. 17 to 20 consists of **two** statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option from (A), (B), (C) and (D) 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 embryo gets nutrition from the mother's blood with the help of a special tissue called placenta.

Reason (R) : Placenta is a disc which is embedded in the uterine wall.

18. **Assertion (A)** : All organisms can make organic compounds like sugar and starch from inorganic substances using radiant energy of the sun.

Reason (R) : The organisms which can produce food by photosynthesis are called producers.

19. **Assertion (A)** : Silver chloride turns grey in sunlight.

Reason (R) : Decomposition of silver chloride into silver and chlorine takes place by sunlight.

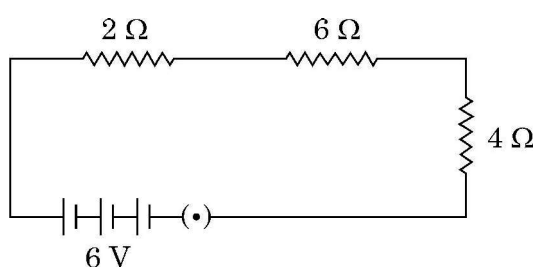
20. **Assertion (A)** : The pattern of the magnetic field of a solenoid carrying a current is similar to that of a bar magnet.

Reason (R) : The pattern of the magnetic field around a current carrying conductor is independent of the shape of the conductor.

SECTION – B

**Question Nos. 21 to 26 are Very Short Answer type questions.
Each question carries 2 marks.**

21. A gas 'X' is found in the upper layer of atmosphere. It is a deadly poison, but still essential for all life forms on earth.
- (a) Identify the gas and state the main factor for its depletion in the atmosphere.
- (b) How is this gas formed in the upper atmosphere ?
22. (A) Use Ohm's law to determine the potential difference across the $6\ \Omega$ resistor in the following circuit when key is closed :



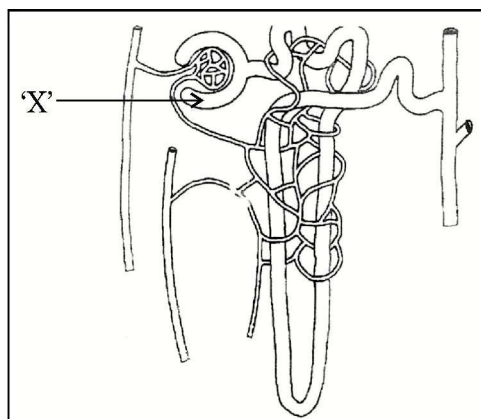
OR

- (B) Prove that if the current through a resistor is increased by 100%, then the increase in power dissipated through the resistor will be 300%.
23. When an incident ray of light enters a medium 'X' from air, it bends towards the normal.
- Infer about the following with respect to air :
- (a) Optical density of medium 'X'.
- (b) Speed of light through medium 'X'
- Give reason for your answer in each case.

24. (A) How is lymph formed ? State its important function.

OR

- (B) (a) Identify 'X' in the figure of human nephron shown below. What role does it play in the process of urine formation ?



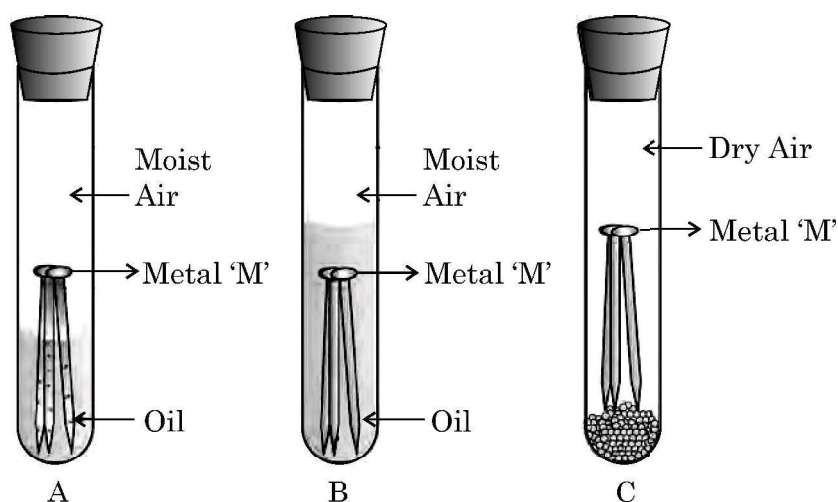
- (b) Why some substances are selectively reabsorbed from the initial filtrate of urine, as it flows along the tubular part of nephron ?
25. Give reasons :
- (a) The male reproductive organ responsible for formation of germ cells is located outside the abdominal cavity.
 - (b) The roles of the glands, present along the path of the vas-deferens, are very significant.
26. Write chemical equation for the chemical reaction between the aqueous solutions of sodium sulphate and barium chloride. State two types of chemical reactions in which this reaction can be placed.

SECTION – C

Question Nos. 27 to 33 are Short Answer type questions. Each question carries 3 marks.

27. What is short circuiting ? State its possible causes. What is likely to happen if a domestic circuit gets short circuited ? Give reason for the justification of your answer.

28. The resistance of a wire of 0.01 cm radius is 7 ohms. If the resistivity of the material of the wire is 44×10^{-6} ohm meter, calculate the length of the wire.
29. The power of a lens is -0.25 D. Based on this information, find out
- The type of lens and its focal length.
 - The eye defect for which it may be used as a corrective lens.
 - The nature and size of the image formed by this lens when an object is placed between F and 2F from the optical centre of this lens.
30. (A) Observe the following diagram showing an experiment to determine the conditions under which a metal 'M' corrodes.



List your observations in each of the three cases A, B and C with reason, if the metal 'M' is generally protected against corrosion by the method of galvanisation.

OR

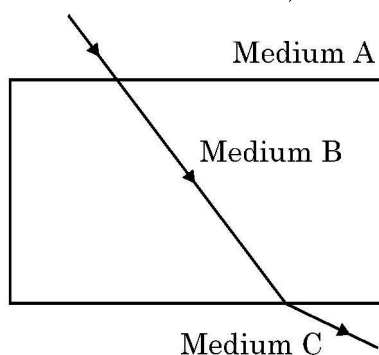
- (B) (a) Show the formation of Aluminium Nitride (AlN) by the transfer of electrons. [At. no. of Al = 13; At. no. of N = 7]
- (b) "Ionic compounds are solids and are generally brittle and break into pieces when pressure is applied." Give reason to justify the statement.

31. Write chemical formula of washing soda. How is it obtained from baking soda ? List two uses of washing soda.
32. Differentiate between a gamete and a zygote. State their significance in sexual reproduction.
33. Give reasons for the following :
- (a) Rate of breathing in aquatic animals is much faster than terrestrial organisms.
 - (b) Rings of cartilage are present in throat of human being.
 - (c) During anaerobic respiration, a 3 carbon molecule (compound) is formed as an end product instead of CO_2 in some cells of human beings.

SECTION – D

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

34. (A) (a) Observe the following diagram and compare (i) speed of light and (ii) optical densities of the three media A, B and C. Also give justification for your answer of any one of the two cases in terms of refractive indices of A, B and C.



- (b) Redraw the path of a ray of light through the three media, if the ray of light starting from medium A falls on the medium B
- (i) Obliquely and the optical density of medium B is made more than that of A and C.
 - (ii) The ray falls normally from medium A to medium B.

OR

- (B) Analyse the following observation table showing variation of image distance (v) with object distance (u) in case of a convex lens and answer the questions that follow without doing any calculations :

Observation Number	Object distance (u) in cm	Image distance (v) in cm
1	-15	-60
2	-25	+100
3	-30	+60
4	-40	+40
5	-60	+30
6	-100	+25

- (a) Determine the focal length of the lens. Give reason for your answer.
- (b) Find magnification of the image formed in Observation No. 3.
- (c) The numerical value of magnifications in cases of observation 1 and 2 is same. List two differences in the images formed in these two cases.
35. (A) (a) Define the term “homologous series of carbon compounds”. Write a homologous series of compounds having functional group – CHO.
- (b) Design an experiment to distinguish between an alcohol and a carboxylic acid. Also write chemical equation for that case in which reaction occurs.

OR

- (B) (a) Define the term “structural isomers”. Write the structures of two isomers of butane (C_4H_{10}).
- (b) Two carbon compounds X and Y have the molecular formula C_2H_4 and C_3H_8 respectively. Which one of the two is most likely to show addition reaction ? Justify your answer. Also give (i) chemical equation to explain the process of addition reaction in this case and (ii) name of the industry where this reaction is applied.
36. (A) (a) Analyse the given situations and interpret the possible reason for each :
- (i) Iodine deficiency in diet increases the possibility of a disease of swollen neck in a person.
- (ii) Some people in population may have very short heights (dwarfs).
- (iii) Thick facial hairs develop in boys at the age of 10-12 years.
- (b) Explain two reasons which necessitate the need of chemical communication in multicellular organisms.

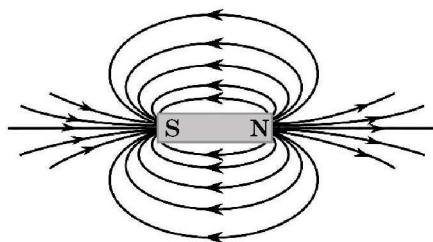
OR

- (B) (a) Differentiate between voluntary and involuntary action.
- (b) Define reflex action. With the help of a flow diagram, show the correct sequence of path of Nerve impulse from place of its origin.

SECTION – E

Question Nos. 37 to 39 are Case/Data based questions with 2 or 3 sub parts. Internal choice is provided in one of these sub parts. Each question carries 4 marks.

37. In order to obtain magnetic field lines around a bar magnet, a student performed an experiment using a magnetic compass and a bar magnet. The magnet was placed on a sheet of white paper fixed on a drawing board. Using magnetic needle he obtained on the paper a pattern of magnetic field lines (as shown below) around the bar magnet.



- (a) By convention, the field lines emerge from north pole and merge at south pole. Why ? Give reason.
- (b) State the relationship between strength of the magnetic field and the degree of closeness of the field lines.
- (c) (A) (i) No two field lines can ever intersect each other. Give reason.
(ii) The magnetic field in a given region is uniform. Draw a diagram to represent it.

OR

- (c) (B) Draw the pattern of the magnetic field lines through and around a current carrying solenoid. What does the pattern of field lines inside the solenoid represent ?

38. In human beings, there are 23 pairs of chromosomes. Out of these 23 pairs of chromosomes (i.e. 46 chromosomes), 22 pairs of chromosomes are called autosomes and one pair of chromosomes. i.e. two chromosomes are called sex chromosomes. The sex chromosomes are of two types – ‘X’ chromosomes and ‘Y’ chromosomes. The sex of a child (i.e. progeny), is decided at the time of fertilisation. In other words, at the time of zygote formation the sex chromosomes inherited from the parents of a child decide whether the new born will be a boy or a girl.

- (a) What are chromosomes ?
- (b) Why is the pair of sex chromosomes in human males called mismatched pair ?
- (c) (A) Show with the help of a flow chart that the statistical probability of getting a boy or a girl is 50 : 50.

OR

- (c) (B) Mention two examples of animals where sex is not determined genetically like human beings. Describe in brief the method of sex determination in these animals.

39. The combining capacity of various elements depends on the number of valence electrons. Also the reactivity of elements is explained as their tendency to attain a completely filled outer shell, that is, to attain a noble gas configuration. This may be either through gain of electrons or loss of electrons or sharing of electrons.

- (a) An element A has atomic number 16, how will it attain its nearest noble gas configuration ?
- (b) Write the number of (i) single and (ii) double covalent bonds in a molecule of butene (C_4H_8).

- (c) (A) Explain the formation of a molecule of ammonia (NH_3), using electron dot structure. (Atomic number of nitrogen is 7)

OR

- (c) (B) Why does carbon share its valence electrons with other atoms of carbon or with atoms of other elements ?