

Series : GFHE5



SET ~ 3

प्रश्न-पत्र कोड
Q.P. Code

31/5/3



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 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 :

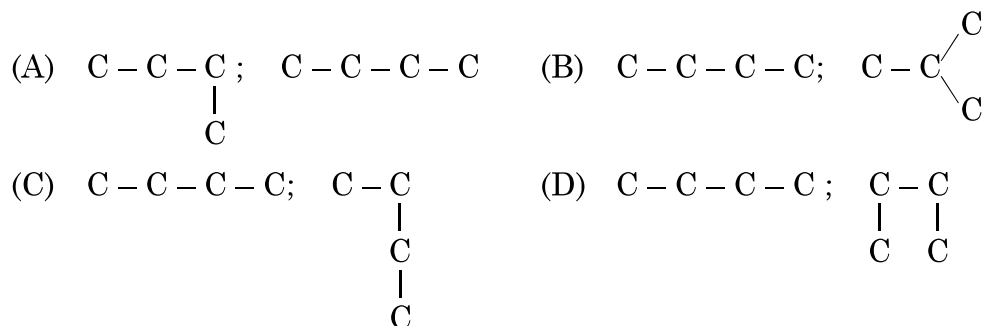
- (i) *This question paper comprises 39 questions. All questions are compulsory.*
- (ii) *This Question paper is divided into five sections – A, B, C, D and E.*
- (iii) *Section A – Question Nos. 1 to 20 are Multiple Choice Questions. Each question carries 1 mark.*
- (iv) *Section B – Question Nos. 21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

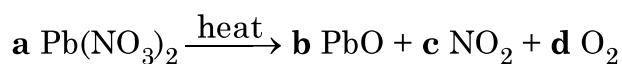
In this section, Question Nos. 1 to 20 are Multiple Choice Questions. All questions are compulsory.

1. 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

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



3. 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
4. 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

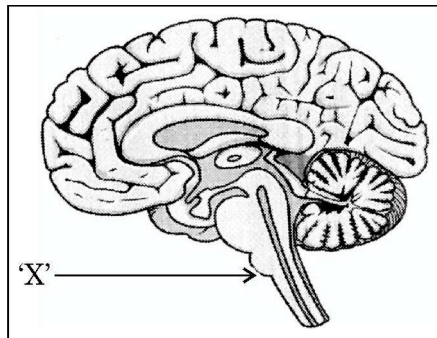
5. When a mixture of baking soda and tartaric acid is heated (or mixed in water) a product 'X' is formed, which is responsible for making breads and cakes soft and spongy.

The product 'X' is

- (A) Carbon dioxide (B) Carbon monoxide
(C) Sodium tartrate (D) Hydrogen
6. 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
7. 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)
8. 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

9. 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
10. 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

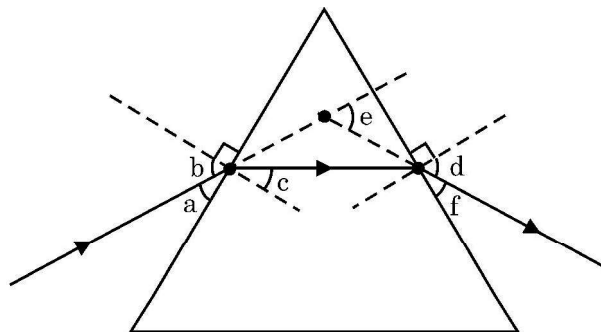
11.



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
12. 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)

13. Human activities that are affecting the environment are :
- (A) minimising the use of chloroflurocarbons.
 - (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.
14. 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
15. Consider the following ray diagram :



Here, the angle of incidence and angle of deviation respectively are

- (A) a and e
 - (B) b and d
 - (C) b and e
 - (D) a and f
16. 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.

Question Nos. 17 to 20 consists of two statements Assertion (A) and Reason (R).

Answer these questions selecting the appropriate option 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)** : 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.

18. **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.

19. **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.

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

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

SECTION – B

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

21. During an experiment, a student observes that the given mirror is forming an erect and diminished image for all positions of the object placed in front of it.

Based on the this information, answer the following questions :

- (a) Identify the mirror.
 - (b) Using new Cartesian sign convention, write the magnitude of the magnification in this case.
 - (c) What will be the radius of curvature of the mirror if its focal length is 20 cm ?
22. (A) Determine the maximum and minimum resistance which can be obtained by joining five resistors of $\frac{1}{5} \Omega$ each.

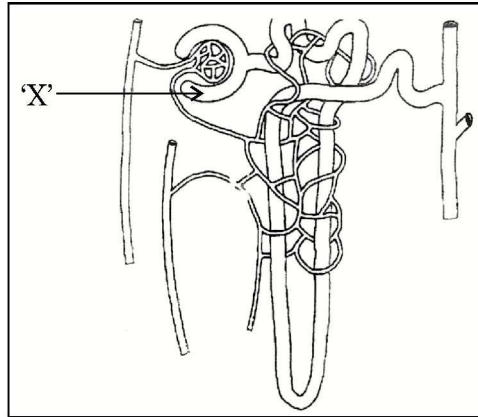
OR

- (B) Calculate potential difference across a 4Ω resistor that produces 100 J of heat every second.
23. 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.

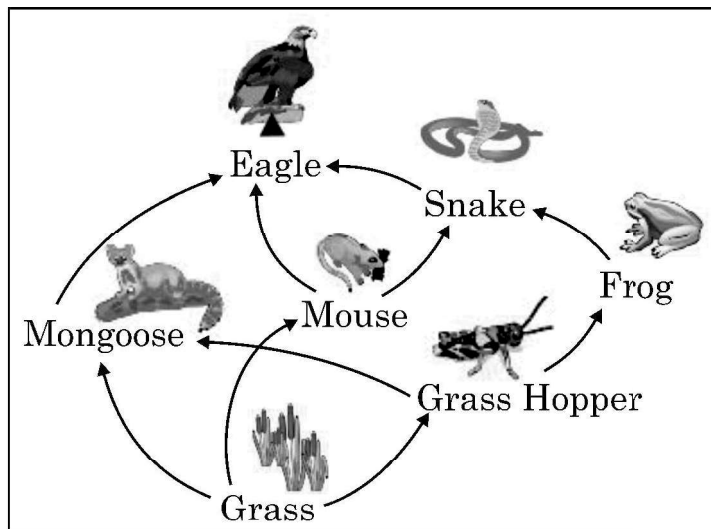
24. (A) How is lymph formed ? State its important function.

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 tabular part of nephron ?
25. Study the food web given below :



- (a) Identify the food chain(s) in which the eagle receives the highest energy from the producers.
- (b) Identify the organism in which a non-biodegradable pesticide will be found in maximum concentration. Name the term used for this phenomenon.

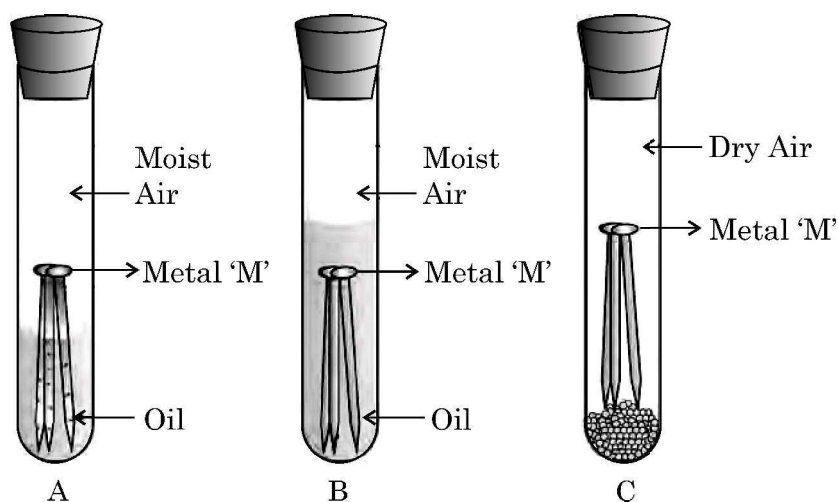
26. A copper wire on burning in flame, gets coated with a black substance. Write the chemical equation of the reaction that takes place. How can this chemical change be reversed ?

SECTION – C

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

27. Answer the following questions for a case in which a current carrying conductor is placed in a uniform magnetic field :
- (a) List three factors on which the magnitude of the force acting on the conductor depends.
 - (b) When is the magnitude of force on the conductor maximum ?
 - (c) Name the rule which helps in determining the direction of force on the conductor and give its one application.
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
- (a) The type of lens and its focal length.
 - (b) The eye defect for which it may be used as a corrective lens.
 - (c) 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. Differentiate between self-pollination and cross pollination. Which one of the two is better for the survival of species ? Give reason to justify your answer.
31. List three raw materials required by terrestrial plants for photosynthesis. Explain how nature provides these raw material to the plants.
32. (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.

33. Write chemical formula of washing soda. How is it obtained from baking soda ? List two uses of washing soda.

SECTION – D

Question Nos. 34 to 36 are Long Answer type questions. Each question carries 5 marks.

34. (A) (a) Define the term “Functional group of a carbon compound”.
Write the formula of functional group present in (i) propanol and (ii) propanone.
- (b) Name the process of conversion of (i) ethanol to ethene and (ii) ethanol to ethanoic acid. Write the reaction equation stating the conditions required for each of the reactions to occur.

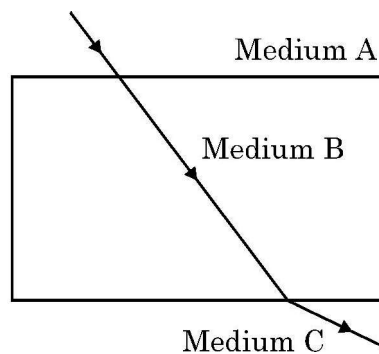
OR

- (B) (a) Name two cyclic hydrocarbons and draw the structure of any one.
- (b) Explain the process of micelle formation on adding soap in water.
35. (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.
36. (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 :

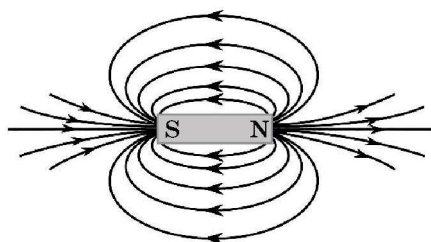
Observation Number	Object distance (u) in cm	Image distance (v) in cm
1	-15	-60
2	-25	+100
3	-30	+60
4	-40	+40
5	-60	+30
6	-100	+25

- (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.

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. 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 ?

39. 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.