



**Series : GHF2E**

**SET~3**

प्रश्न-पत्र कोड  
Q.P. Code

**31/2/3**

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 <b>27</b> हैं।                                                                                                                                                                                        | (I) Please check that this question paper contains <b>27</b> 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 <b>39</b> प्रश्न हैं।                                                                                                                                                                                             | (III) Please check that this question paper contains <b>39</b> 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।<br># | (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** – 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**

*Questions No. **1** to **20** are Multiple Choice Questions. Only one of the choices is correct. Select and write the most appropriate option out of the four options given for each.*

*20×1=20*

1. In the electrolysis of water, the mass ratio of hydrogen and oxygen gases liberated at the electrodes is :
- (A) 1 : 2
  - (B) 1 : 4
  - (C) 1 : 8
  - (D) 1 : 16

2. The body of human beings works within the pH range of :
- (A) 6.1 to 6.8 (B) 6.5 to 7.3  
(C) 7.0 to 7.8 (D) 7.5 to 8.1
3. The warning sign shown in the given figure must invariably be displayed/pasted on the containers which contain hydroxide of :



- (A) Aluminium (B) Calcium  
(C) Sodium (D) Magnesium
4. Two metals zinc and tin are dissolved separately in definite proportions in molten copper (the primary metal) to obtain two different alloys respectively known as :
- (A) Bronze and Brass (B) Brass and Solder  
(C) Brass and Bronze (D) Solder and Bronze
5. Aluminium powder is used in thermit welding because :
- (A) Its reaction with iron is highly exothermic.  
(B) When it is heated with iron (III) oxide, molten iron is obtained.  
(C) When it is heated with iron (III) oxide, molten aluminium oxide is obtained to join railway tracks.  
(D) Its melting point is low as compared to iron and a molten alloy of iron and aluminium is formed on heating which is used to join railway tracks.

6. Select the correct option from the following statements about the functioning of the human heart.
- (A) Right atrium receives deoxygenated blood from different parts of the body and sends it to pulmonary veins.
  - (B) Left atrium sends oxygenated blood to right ventricle which pumps it to different parts of the body.
  - (C) Right atrium receives deoxygenated blood from the body and sends it to the right ventricle.
  - (D) Left atrium receives oxygenated blood from the pulmonary arteries and sends it to the left ventricle.
7. Observe the given figures A and B. When *chhui-mui* (sensitive) plant is touched, its leaves fold. This is due to :



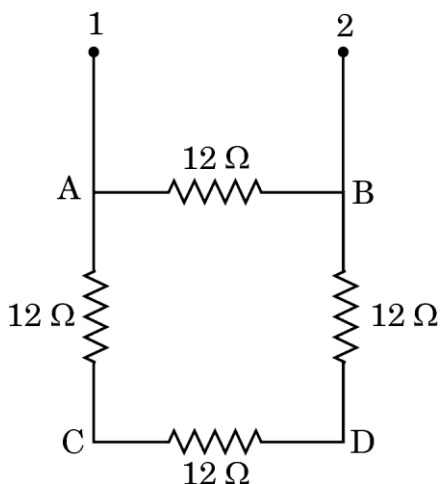
Figure A



Figure B

- (A) Hormonal effect
  - (B) Thermal effect
  - (C) Change in amount of water in cells
  - (D) Electromagnetic effect
8. One-cell thick blood vessels are known as :
- (A) Alveoli
  - (B) Capillaries
  - (C) Arteries
  - (D) Veins

9. Which of the following is the correct sequence of parts of female reproductive system of flowering plants in terms of their placement ?
- (A) Stigma, ovule, ovary, style  
 (B) Ovule, stigma, ovary, style  
 (C) Style, stigma, ovule, ovary  
 (D) Stigma, style, ovary, ovule
10. The number of chromosomes in a cell division is halved. This kind of cell division is observed in :
- (A) Only testis (B) Only ovary  
 (C) Ovary and testis both (D) All cells of the body
11. An electric bulb is connected to a power supply of 220 V. If the current drawn by the bulb from the supply is 500 mA, the power of the bulb is :
- (A) 11 W (B) 110 W  
 (C) 220 W (D) 1100 W
12. Four identical resistors of  $12\ \Omega$  each are connected in series to form a square ABCD as shown in the figure. The resistance of the network between the two points 1 and 2 is :



- (A)  $48\ \Omega$  (B)  $36\ \Omega$   
 (C)  $9\ \Omega$  (D)  $6\ \Omega$

13. The part of the human eye which can modify the curvature of the eye lens to some extent is :
- (A) Pupil
  - (B) Cornea
  - (C) Ciliary muscles
  - (D) Aqueous humour
14. If the absolute refractive indices of two media X and Y are  $\frac{6}{5}$  and  $\frac{4}{3}$  respectively, then the refractive index of Y with respect to X will be :
- (A)  $\frac{10}{9}$
  - (B)  $\frac{9}{10}$
  - (C)  $\frac{9}{8}$
  - (D)  $\frac{8}{9}$
15. An object is placed at a distance of 30 cm from the pole of a concave mirror. If its real and inverted image is formed at 60 cm in front of the mirror, the focal length of the mirror is :
- (A) – 15 cm
  - (B) – 20 cm
  - (C) + 20 cm
  - (D) + 15 cm
16. Identify from the following a group containing all non-biodegradable substances.
- (A) Leather, Glass, Plastic
  - (B) Cotton, Wood, Nylon
  - (C) DDT, Polyester, Glass
  - (D) Leather, Silk, Wool

***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)* : Ductility is that property of metals which enables copper to be used in making cooking utensils.  
*Reason (R)* : Copper is a metal which is ductile as well as malleable.
18. *Assertion (A)* : A mango seed will germinate to form a mango tree.  
*Reason (R)* : Heredity determines the process by which traits and characteristics are reliably inherited from parents to offspring.
19. *Assertion (A)* : The bending of a wire in the form of a coil of several turns does not affect its electrical resistance.  
*Reason (R)* : The electrical resistance of a wire is directly proportional to its electrical resistivity.
20. *Assertion (A)* : Animals will not get energy if they eat (consume) coal as food.  
*Reason (R)* : Specific enzymes are needed for the breakdown of a particular food.

## SECTION B

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

21. (a) In common practice silver is recovered from silver nitrate solution by the use of copper metal. Name the type of reaction that takes place in this process and give the chemical equation of the reaction involved.
- (b) Name the method used for refining silver. 2
22. What are micelles ? Draw the structure. 2
23. A person is making a list to purchase few things from a nearby market. Explain how the fore-brain plays an important role in performing this activity. 2

24. (a) Write one function each of the following, in a seed : 2
- |               |                |
|---------------|----------------|
| (i) Seed coat | (ii) Cotyledon |
| (iii) Radicle | (iv) Plumule   |

**OR**

- (b) Write the main steps to culture yeast in the laboratory. 2

25. (a) Out of the two lenses, one concave and the other convex, state which one will diverge a parallel beam of light falling on it. Draw a ray diagram to show the principal focus of the lens. 2

**OR**

- (b) A ray of light after refraction from a convex lens emerges parallel to its principal axis. 2
- (i) Draw a labelled ray diagram to show it.
- (ii) In this case, the incident ray before refraction from the lens passes through a point on its principal axis. Name the point.

26. How and why is an electric fuse used in an electric circuit ? Briefly describe its function. 2

### **SECTION C**

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

27. (a) (i) Define the term decomposition reaction. Write one chemical equation each for decomposition reaction where energy is supplied in the form of heat, light or electricity.
- (ii) Decomposition of vegetable matter into compost is considered an exothermic reaction. Why ? 3

**OR**

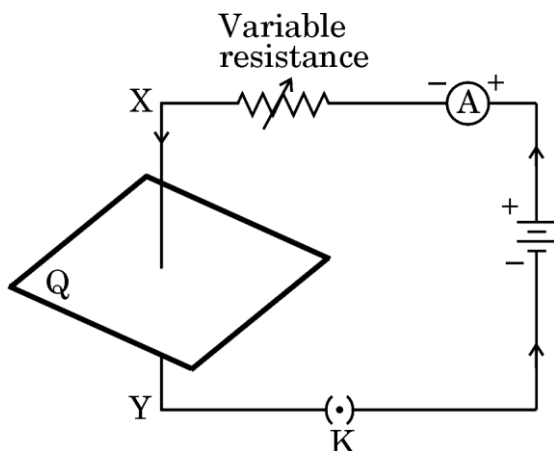
- (b) Why are decomposition reactions called the opposite of combination reactions ? Write one chemical equation each for these two types of reactions mentioning the name of the reactant(s) and the product(s) involved in the reactions. 3

- 28.** Two substances 'A' and 'B' are burnt in air separately. For 'A', ashes are collected and dissolved in water to get solution 'X', while for 'B', fumes produced are passed through water to get solution 'Y'. Both the solutions 'X' and 'Y' are then tested with pH paper. 3
- (a) If 'X' gives light blue colour and 'Y' gives orange colour to the pH paper, then write the nature and range of pH of 'X' and 'Y'.
- (b) Which one of the two – A and B, is a metal ? Justify your answer.
- 29.** (a) Define hormone. 3
- (b) "Hormones should be secreted in precise quantities. We have a feedback mechanism through which this is done." With the help of an example justify the statement.
- 30.** A pure pea plant bearing terminal flowers was cross-pollinated with a pure plant having axillary flowers. In  $F_1$  generation, plants with axial flowers only were obtained.  $F_1$  generation plants are self-pollinated and  $F_2$  generation is obtained. 3
- (a) Work out the pattern of inheritance in this case.
- (b) What will be the ratio of plants obtained in  $F_2$  generation ?
- 31.** A convex mirror used for rear view on an automobile has a focal length of 1.5 m. If a 3 m high bus is located at 6.0 m from the mirror, use mirror formula to determine the position and size of the image of the bus as seen in the mirror. 3
- 32.** Three resistors of  $2\ \Omega$ ,  $3\ \Omega$  and  $6\ \Omega$  are connected in (i) series, and (ii) parallel. Draw the arrangements of the resistors and find the equivalent resistance of each arrangement. 3
- 33.** Some harmful chemicals get accumulated in human bodies through the food chain. Name this phenomenon. Explain the reason of maximum concentration of these chemicals found in our bodies. 3

## SECTION D

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

34. (a) The given figure shows the current passing through the straight conductor XY.

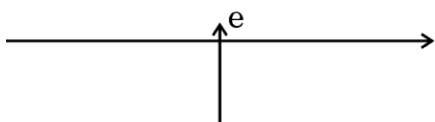


- (i) Copy the diagram and draw the magnetic field lines when current flows from conductor X to Y.
- (ii) Name and state the rule used in determining the direction of the magnetic field lines in the situation given above.
- (iii) State Fleming's left hand rule. Using this rule, determine the direction of force applied on an electron entering a uniform magnetic field as shown in the figure.

5



—————→ Magnetic field



**OR**

- (b) (i) Define the term solenoid. Draw the pattern of the magnetic field lines in and around a current carrying straight solenoid. Mark on the pattern the (i) direction of current, (ii) direction of field lines near the ends of the solenoid, and (iii) region where the magnetic field is uniform.
- (ii) How would you make an electromagnet using a current carrying solenoid ?

5

35. (a) (i) A compound 'X' having two carbon atoms in its molecule turns blue litmus red and 5 – 8% solution of 'X' in water is widely used as a preservative. Identify the compound 'X' and write its structure.
- (ii) Compare its pH nature with a mineral acid.
- (iii) 'X' on reacting with alcohols produces sweet smelling compounds, used in making perfumes. Name the reaction and write its chemical equation.
- (iv) When sodium carbonate is added to 'X', a colourless gas is produced which turns lime water milky. Write the chemical equation for the reaction giving the name of the salt produced.

$1\frac{1}{2}$   
 $\frac{1}{2}$

$1\frac{1}{2}$

$1\frac{1}{2}$

**OR**

- (b) (i) Differentiate between saturated and unsaturated hydrocarbons by giving one example each, with a structural formula.
- (ii) Write the method of converting an unsaturated hydrocarbon into a saturated hydrocarbon. Name the industry where this reaction is commonly used.
- (iii) Write the name and structure of a hydrocarbon having double bond and four carbon atoms in its one molecule.

5

- 36.** (a) (i) “The length of the small intestine in various animals depends on the food they eat.” Justify the statement.
- (ii) Discuss the role of the pancreas and bile juice in the digestion of food in human beings.
- (iii) How is the small intestine designed to absorb digested food ? 5

**OR**

- (b) (i) State the role of rings of cartilage present in the throat.
- (ii) Discuss the role of the ribs and diaphragm when air is taken in during the breathing cycle.
- (iii) Why do we get muscle cramps during heavy exercise ? Explain. 5

### **SECTION E**

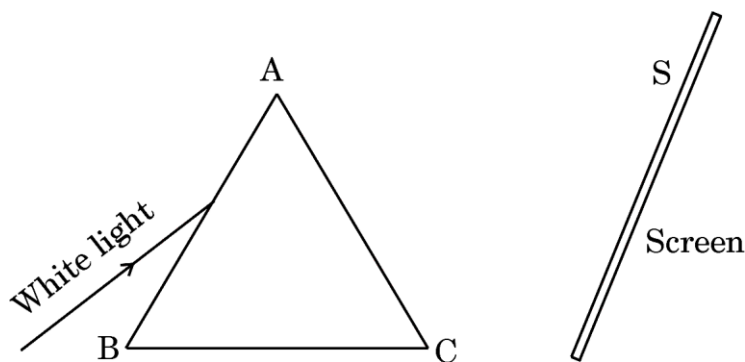
*The following questions are source-based/case-based questions. Read the case carefully and answer the questions that follow.*

- 37.** When a girl is born, the ovaries already contain thousands of immature eggs. On reaching puberty, some of these start maturing. One matured egg is released every month by one of the ovaries. The two oviducts unite into an elastic bag-like structure known as uterus.
- (a) Write the site of fertilization in human female. 1
- (b) How does the uterus prepare itself to receive and nurture the growing embryo ? Explain. 1
- (c) (i) What happens when the egg is not fertilized ? 2

**OR**

- (c) (ii) How does the developing embryo get nutrition from the mother's blood ? Explain. 2

38. A person allowed a narrow beam of white light from the sun to enter a dark room through a small aperture and placed a glass prism in its path in such a manner that the beam falls on the face AB of the prism as shown in the figure.



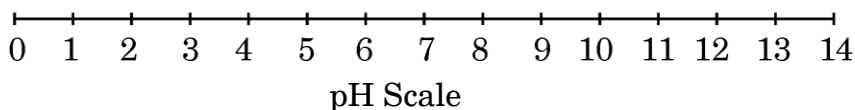
A screen S is placed on the other side of the prism, facing AC. On turning the prism slowly, a beautiful band of colours is obtained on the screen. It is the spectrum of sunlight.

- (a) Name the phenomenon due to which a prism splits the incident white light into a band of colours. 1
- (b) State the reason of getting a band of seven colours in the above case. 1
- (c) (i) Explain with the help of a labelled ray diagram, an experimental arrangement to show the recombination of the spectrum of white light. 2

**OR**

- (c) (ii) Draw a labelled ray diagram to show the formation of a rainbow. 2

- 39.** Acid-base indicators can be used to distinguish between an acid and a base. Universal indicator, a mixture of several indicators, shows different colours at different concentrations of acids and bases, thereby indicating their pH on the pH scale of 0 – 14. The pH of a solution is measured by pH paper, which is a paper impregnated with a universal indicator.



Answer the following questions :

- (a) Solution P is a strong acid while solution Q is a strong base. On the pH scale, where would you place the solutions P and Q ? 1
- (b) A solution has a pH of 7. Name a compound you would use to  
(i) increase its pH, and (ii) decrease its pH. 1
- (c) (i) When the pH of a solution is decreased from 4 to 2, what effect does it produce on its hydronium ion concentration ?  
State the colour change shown by the pH paper. 2

**OR**

- (c) (ii) A person is feeling pain and irritation in the stomach due to indigestion. What could be the pH of the fluid in the stomach ? Write the common name of the medicines people use for remedy. Give the chemical name of “milk of magnesia” often used for this purpose. 2