2021
SCIENCE

Total marks : 80   Time : 3 hours

General instructions:
i)   *Approximately 15 minutes is allotted to read the question paper and revise the*
        answers. The question paper consists of 26 questions in 5 categories.
ii)   *All questions are compulsory.*
iii)   *Internal choice has been provided in some questions.*
iv)   *Marks allocated to every question are indicated against it.*
v)   *Alternate questions for the visually impaired students are provided in some*
        questions. ***Only the visually impaired students has to attempt such alternate***
        questions.
N.B: Check that all pages of the question paper is complete as indicated on the top left side.

1.   **Choose the correct answer from the given alternatives:**

      (a)   The decomposition of vegetable matter into compost is an example of   1
            (i)   endothermic reaction   (ii)   decomposition reaction
            (iii)   exothermic reaction   (iv)   combination reaction

      (b)   Which among the following is the most reactive metal?   1
            (i)   Magnesium   (ii)   Calcium
            (iii)   Zinc   (iv)   Aluminium

      (c)   Ethane with the molecular formula C_2H_6 has   1
            (i)   6 covalent bonds   (ii)   7 covalent bonds
            (iii)   8 covalent bonds   (iv)   9 covalent bonds

      (d)   The atomic number of an element is a more fundamental property than its
            atomic mass was showed by   1
            (i)   Henry Mosely   (ii)   J. Dobereiner
            (iii)   John Newland   (iv)   Mendeleev

      (e)   The hormone that regulates blood sugar level is   1
            (i)   thyroxine   (ii)   testosterone
            (iii)   insulin   (iv)   oestrogen

      (f)   Characters transmitted from parents to offspring are present in   1
            (i)   cytoplasm   (ii)   ribosomes
            (iii)   golgi bodies   (iv)   genes

      (g)   A virtual and erect image can be obtained by using a concave mirror if
            an object is placed   1
            (i)   between P and F   (ii)   at infinity
            (iii)   between C and F   (iv)   at C

(h) The least distance of distinct vision for a young adult with normal vision is   **1**
  (i)   25m   (ii)   2.5m
  (iii) 25cm   (iv) 2.5cm

(i) What do this symbol ⊸(•)⊸ represent in a circuit diagram?   **1**
  (i)   An open switch   (ii) A closed switch
  (iii) A battery   (iv) A wire joint

(j) The nature of magnetic line passing through the center of a current carrying circular loop would appear as   **1**
  (i)   circular   (ii) eclipse
  (iii) parabolic   (iv) straight line

Answer the following questions in one word or one sentence:

2.   Name any two natural acid-base indicators.   **1**

3.   What is anodizing?   **1**

4.   Write two allotropes of carbon.   **1**

5.   What will be the ratio of F_2 progeny, if F_1 tall plants reproduce by self-pollination?   **1**

6.   Name any two devices in which electric motors are used.   **1**

Answer the following questions in about 20-30 words:

7.   Balance the following chemical equations:
  (i) $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$
  (ii) $Pb(NO_3) \rightarrow PbO + NO_2 + O_2$ **1+1=2**

  Alternate question for the visually impaired students:
  What is a balanced chemical equation? Why chemical equation needs to be balanced?   **(1+1=2)**

8.   Why does menstruation occur?   **2**

9.   A person has difficulty reading newspaper. What could be the defect the person has? How can it be corrected?   **1+1=2**

10.   State Ohm's Law. Express it mathematically.   **1+1=2**

11.   State Fleming's Left Hand Rule.   **2**

Answer the following questions in about 40-60 words:

12.   What is a redox reaction? Give any two examples.   **1+2=3**

13. **a.** Write any three uses of washing soda.

                    Or   **3**

   b. Write any three uses of bleaching powder.

14. Write any three differences between metals and non-metals basing on their physical properties.   **3**

15. Explain the cleansing action of soap and draw the formation of a micelle.

                                                2+1=3

   Alternate question for the visually impaired students:

   Differentiate between soaps and detergents. What causes hardness of water?

                                                  (2+1=3)

16. State the three events that occur during the process of photosynthesis.   **3**

17. Why is it important for us to have iodised salt in our diet? Iodine is necessary for the synthesis of which hormone in the human body? Write one symptom caused due to lack of iodine in the diet.   **1+1+1=3**

18. Explain the sex determination in human beings.   **3**

19. **a.** An object 5cm in length is placed at a distance of 20cm in front of a convex mirror of radius of curvature 30cm. Find the position of the image, its nature and size.

                    Or   **3**

   b. A 2cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10cm. The distance of the object from the lens is 15cm. Find the nature, position and size of the image. Also, find its magnification.

   Alternate question for the visually impaired students:

   Define: (i) Pole

           (ii) Radius of curvature

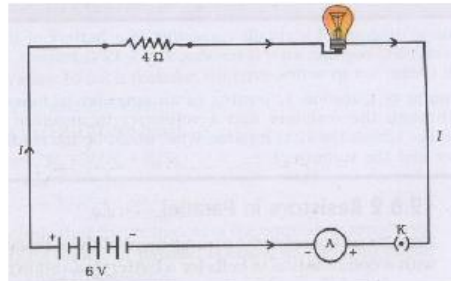   (iii) Principle axis of spherical mirrors.   (3×1=3)

20. **a.** What is a spectrum? Explain in brief how rainbow is formed.

                    Or   **1+2=3**

   b. What is Tyndall effect? Explain in brief why the colour of the sky appears blue.

21. **a.** An electric lamp, whose resistance is 20Ω and a conductor of 4Ω resistance are connected to a 6V battery in the given figure.

Calculate:
(i) the total resistance of the circuit
(ii) the current through the circuit
(iii) the potential difference across the electric lamp and conductor.

<div align="center">Or</div> 3

b. An electric bulb is connected to 220V mains. The current is 0.50A. What is the power of the bulb? If the bulb operates for 8 hours per day, what will be the cost of the energy to operate it for 30 days at ₹300 per kWh?

Alternate question for the visually impaired students:
Write three applications of heating effect of electric current. (3×1=3)

Answer the following questions in about 70-100 words:

22. On what basis did Mendeleev arrange the elements in his periodic table. State Mendeleev's periodic law. Write three limitations of Mendeleev's periodic table. 1+1+3=5

23. **a.** Describe the structure of the human heart with a labelled diagram.

<div align="center">Or</div> 3+2=5

b. Explain the mechanism for exchange of gases in human lungs, with a labelled diagram of the human respiratory system.

Alternate question for the visually impaired students:
(i) What is the function of carbohydrates in plants? How is it stored, if it is not used immediately?
(ii) In what form is food stored in our body?
(iii) What is the green pigment found in chloroplasts?
(iv) Name a plant that takes CO_2 at night and act on it during the day.

(2+1+1+1=5)

24. **a.** Name any two sexually transmitted diseases. Explain four different methods of contraception.   **1+4=5**

<center>Or</center>

b. Explain asexual reproduction by fission and vegetative propagation with one example each.   **2½+2½=5**

25. **a.** Draw a ray diagram to show the image formation by a concave mirror, when an object is placed between C and F. Write any three uses of concave mirror.

<center>Or   **2+3=5**</center>

b. Draw a ray diagram to show the image formation by a convex mirror, when an object is placed between infinity and the pole P of the mirror. Write any three uses of convex mirror.

Alternate question for the visually impaired students:

List any three uses of concave mirror and any two uses of convex mirror.

<center>(3+2=5)</center>

26. **a.** Explain the working of an electric motor with a labelled diagram.

<center>Or   **3+2=5**</center>

b. Explain the working of an electric generator with a labelled diagram.

Alternate question for the visually impaired students:

What is an electric motor and an electric generator? Give the principle of the working of an electric motor and a generator. Write the full forms of AC and DC.   (2+2+1=5)

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