X/14/S & T

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SCIENCE AND TECHNOLOGY

(CANDIDATES WITH PRACTICAL/INTERNAL ASSESSMENT)

Full Marks : 80
Pass Marks : 24

(CANDIDATES WITHOUT PRACTICAL/INTERNAL ASSESSMENT)

Full Marks : 100
Pass Marks : 30

Time : 3 hours
(For Both Categories of Candidates)

The figures in the margin indicate full marks for the questions

General Instructions :

(i)   The question paper comprises of three Sections A, B and C.

(ii) The candidates are advised to attempt all the questions of Sections A, B and C separately.

(iii) Marks allocated to every question are indicated against each.

(iv) Question Nos. **1** to **39** are to be answered by both Regular and Private Candidates.

(v)   Question No. **40** is to be answered by Private Candidates (without Practicals) only.

(vi) Regular Candidates should not answer Question No. **40**.

[P.T.O.

(**2**)

SECTION—A

(PHYSICS)

(*Marks* : 26)

Choose and write the correct answers from the following :   **1×3=3**

1. The speed of light in vacuum is

(a) 3 10^8 ms $^{-1}$

(b) 3 10^{-8} ms $^{-1}$

(c) 3 10^{18} ms $^{-1}$

(d) 3 10 ms $^{-1}$ 1

2. In lens all distances are measured from

(a) focus

(b) pole

(c) optical centre

(d) radius of curvature   1

3. If the total resistance of the circuit is less than the smallest resistance in the circuit, the resistors are connected in

(a) series

(b) parallel

(c) both series and parallel

(d) None of the above   1

(3)

Answer the following questions in one word or one sentence each : 1×3=3

4. Define a spherical mirror. 1

5. Name two gases which are filled in an electric bulb. 1

6. What are the SI units of electric current and resistance of a conductor? ½+½=1

Answer the following short-answer type questions in 30–40 words each : 2×3=6

7. *Either*

(a) What happens when a ray of light falls normally on the surface of a mirror? What are the *(i)* angle of incidence and *(ii)* angle of reflection? 1+½+½=2

Or

(b) If the sum of focal length and radius of curvature of spherical mirror is 15 cm, what is the focal length of that spherical mirror? 2

8. What is myopia? How is it corrected? 1+1=2

9. What is electrical resistivity? Name the two factors affecting resistivity of a substance. 1+1=2

Answer the following short-answer type questions in 50–60 words each : 3×3=9

10. Without touching, how will you distinguish among plane, concave and convex mirrors? 3

11. *(a)* State the law of combination of resistances in series.   1

(b) Three resistors 4 , 6 and 8 are connected in parallel. Calculate the total resistance of the circuit.   2

12.   *Either*

(a) Write any three advantages of alternating current over direct current.   3

Or

(b) What is earthing? Why is earthing of electrical appliances necessary?   1+2=3

Answer the following long-answer type question in 70–80 words :   **5**

13.   *Either*

(a) What is electric generator? State its working principle.

1+2=3

(b) Distinguish alternating current from direct current (Mention any 2 points.)   2

Or

(c) Distinguish between real image and virtual image formed by a lens. (Mention any 2 points.)   2

(d) Name the light sensitive and colour sensitive cells of the human eye.   ½+½=1

(e) Why is convex mirror used as rear-view mirror in cars? Give two reasons.   2

SECTION—B

(CHEMISTRY)

(*Marks* : 26)

Choose and write the correct answers from the following :   **1×3=3**

14. Which of the following is a Bronsted-Lowry acid?   1

    (a) CO_2

    (b) SO_2

    (c) SO_3

    (d) H_2O

15. The metal with the lowest density is

    (a) sodium

    (b) potassium

    (c) lithium

    (d) caesium   1

16. The process of heating an ore in the absence of air below its melting point is called

    (a) calcination

    (b) roasting

    (c) smelting

    (d) ore dressing   1

Answer the following questions in one word or one sentence each :   **1×2=2**

17. What are meant by period and group in the periodic table?   1

18. What are hydrocarbons?   1

Answer the following short-answer type questions in 30–40 words each :   **2×2=4**

19. *(a)* Identify the oxidising and reducing agents in the following reaction :   ½+½=1

$$3MnO_2 \quad 4Al \quad 3Mn \quad 2Al_2O_3$$

    (b) What is redox reaction?   1

20.   *Either*

    (a) What is efflorescence? Give an example.   1½+½=**2**

                 Or

    (b) How is bleaching powder prepared? Give the chemical equation.   1+1=2

Answer the following short-answer type questions in 50–60 words each :   **3×4=12**

21. Identify normal, acid and double salts from the following list of salts :   1+1+1=3

    (i) $NaHCO_3$

    (ii) $KCl \quad MgCl_2 \quad 6H_2O$

    (iii) $NaCl$

22. What are monoacidic base and diacidic base? Give one example of each. $1\frac{1}{2}+1\frac{1}{2}=3$

23. Define the term mineral. Name four methods for the preparation of pure metals. $1+2=3$
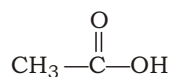
24. *Either*

(a) How does the valency vary *(i)* on going down a group and *(ii)* in a period on going from left to right? $1+1=2$

(b) What is catenation? 1

Or

(c) What are alcohols? Give the IUPAC name of the following compound : $1+1=2$

$$CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-OH$$

(d) Write the structural formula of butane. 1

Answer the following long-answer type question in 70–80 words : **5**

25. *Either*

(a) What is displacement reaction? Give an example. $1+1=2$

(b) Define the term pH. Mention two applications of pH. $1+2=3$

Or

(c) Name the raw materials used for making soap. Describe the hot process for manufacture of soap. $2+3=5$

SECTION—C

(BIOLOGY)

(*Marks* : 28)

Choose and write the correct answers from the following :   1×3=3

26. The mode of nutrition in fungi (mushroom) is called

   (a) autotrophic

   (b) holozoic

   (c) heterotrophic

   (d) saprophytic   1

27. In human beings, gas exchange between the environment and the body takes place in the

   (a) larynx

   (b) bronchi

   (c) alveoli

   (d) trachea   1

28. Which of the following is not a plant hormone?   1

   (a) Gibberellin

   (b) Oxytocin

   (c) Ethylene

   (d) Cytokinin

Answer the following questions in one word or one sentence each : **1×3=3**

29. Name the receiving and pumping chambers of the heart. 1

30. Name the double-layered protective covering of the heart. 1

31. Define evolution. 1

Answer the following short-answer type questions in 30–40 words each : **2×4=8**

32. Define photosynthesis. Write the overall reaction of photosynthesis. 1+1=2

33. Name the structures that help in excretion in tapeworm, cockroach, earthworm and human. ½×4=2

34. *Either*

(a) What do you mean by stimulus? What is phototropism?

1+1=2

Or

(b) What is fertilization? What do you mean by double fertilization? 1+1=2

35. Define the following : 1+1=2

(a) Grafting

(b) Layering

Answer the following short-answers type questions in 50–60 words each : **3×3=9**

36. *(a)* Define respiration. 1

(b) Name the four main types of respiratory organs found in animals. 2

37.

<div align="center">Either</div>

(a) Give two important characteristics of hormones. How do secretions of the endocrine glands reach the target point?

<div align="right">2+1=3</div>

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

(b) What is cross-pollination? 1

(c) Give two advantages of cross-pollination. 2

38. Name the iron-containing pigment in erythrocytes. Write any two functions of blood. 1+2=3

Answer the following long-answer type question in 70–80 words : 5

39.

<div align="center">Either</div>

(a) Name the three major divisions of the human brain. Which is the largest and the most prominent part of the brain? Mention any three common examples of reflex action.

<div align="right">1½+½+3=5</div>

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

(b) Mention five points of differences between Aerobic respiration and Anaerobic respiration. 5

[For Private Candidates (without Practicals) only]

40. I. Answer any *three* of the following questions : 2×3=6

(a) What is lens? Name the two main types of lens. 1+1=2

(b) What is hypermetropia? How can it be corrected?

<div align="right">1+1=2</div>

(c) What is electric motor? Give one use of electric motor.

<div align="right">1+1=2</div>

(d) What is the SI unit of potential difference? Define one ohm.   1+1=2

(e) What is dispersion of light?   2

II. Answer any *three* of the following questions :   2×3=6

(a) What is decomposition reaction? Give one example.   1+1=2

(b) What do you mean by exothermic reaction? Why do gold and silver not corrode in moist air?   1+1=2

(c) Give two uses of sodium hydrogen carbonate.   2

(d)   *(i)* State Mendeleev's periodic law.   1

     (ii) Write the electronic configuration of Na (atomic number : 11).   1

(e) Give two uses of methane.   2

III. Answer any *four* of the following questions :   2×4=8

(a) Name any two digestive glands present in humans.   2

(b)   *(i)* Give one word for a sequence of contraction and relaxation of the heart.   1

     (ii) Write the full form of ECG.   1

(c) What are the functions of xylem and phloem in plants?   2

(d) Name four methods of artificial vegetative reproduction.   2

(e) What is saprophytic nutrition? Give two examples.   1+1=2

(f) Define genetics. Who is known as father of genetics? 1+1=2

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