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SCIENCE AND TECHNOLOGY

(Old Course)

(FOR CANDIDATES WITH PRACTICAL MARKS)

Full Marks : 80

Pass Marks : 24

(FOR CANDIDATES WITHOUT PRACTICAL MARKS)

Full Marks : 100

Pass Marks : 30

Time : 3 hours

(FOR ALL CATEGORIES OF CANDIDATES)

General Instructions :

- (i) The candidates are advised to attempt all questions accordingly.
- (ii) Marks allocated to every question are indicated against each.
- (iii) Question Nos. **1** to **39** are to be answered by all Candidates.
- (iv) Question No. **40** is to be answered by **Candidates without Practical marks.**

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SECTION—A

(**PHYSICS**)

(Marks : 26)

Choose and write the correct answers from the following : $1 \times 3 = 3$

1. The ray of light which falls on the mirror's reflecting surface is

(A) reflected ray
(B) normal
(C) incident ray
(D) refracted ray

1

2. A freely suspended magnet always point in the

(A) east-west direction
(B) north-south direction
(C) east-south direction
(D) north-west direction

1

3. The coil of the electric kettle is made of

(A) copper
(B) tungsten
(C) aluminium
(D) nichrome

1

(3)

Answer the following questions in *one* word or *one* sentence each :

1×3=3

4. What is the speed of light waves in vacuum? 1
5. Define electric power. 1
6. Name two types of electric motor. 1

Answer the following short-answer type questions in 30–40 words each :

2×3=6

7. *Either*

- (a) Give any two differences between real image and virtual image. 2

Or

- (b) State the two laws of refraction of light. 2

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

9. (a) What is the main disadvantage of a series circuit? 1

- (b) Resistances of $8\ \Omega$, $10\ \Omega$ and $5\ \Omega$ are connected in series. Calculate the equivalent resistance of the circuit. 1

Answer the following short-answer type questions in 50–60 words each :

3×3=9

10. (a) Name the instrument used to measure (i) electric current and (ii) potential difference in a circuit. $\frac{1}{2}+\frac{1}{2}=1$

- (b) State the four factors that are responsible for the formation of a rainbow. $\frac{1}{2}\times 4=2$

(4)

11. (a) What is an electric motor? 1
(b) What are the advantages of alternating current over direct current? (Give any two points). 1+1=2

12. *Either*

- (a) What is meant by magnetic effect of current? 1
(b) Write any two properties of a magnet. 2

Or

- (c) Write the mathematical relationship between the focal length f and radius of curvature R of a spherical mirror. 1
(d) The radius of curvature of a spherical mirror is 20 cm. What is its focal length? 2

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

13. *Either*

- (a) Define near point of the eye. 1
(b) What is presbyopia? How can it be corrected? $1\frac{1}{2}+1\frac{1}{2}=2$
(c) Name and explain about any two safety measures commonly used in electric circuits and appliances. 2

Or

- (d) Write about any three characteristics of the combination of resistors in parallel. 3
(e) What are conductors? Name two conductors. $1+1\frac{1}{2}+1\frac{1}{2}=2$

(5)

SECTION—B

(**CHEMISTRY**)

(Marks : 26)

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

14. The reaction $\text{H}_2 + \text{Br}_2 \rightarrow 2\text{HBr}$ is

- (A) a reduction reaction
- (B) an oxidation reaction
- (C) a displacement reaction
- (D) a combination reaction

1

15. The organic compounds containing —COOH are called

- (A) esters
- (B) carboxylic acids
- (C) alcohols
- (D) aldehydes

1

16. The impurities associated with ore used in metallurgy are called

- (A) flux
- (B) slag
- (C) gangue
- (D) None of these

1

(6)

Answer the following questions in *one* word or *one* sentence each :

1×2=2

17. What is the condition necessary for rusting? 1

18. Name two weak acids. $\frac{1}{2} + \frac{1}{2} = 1$

Answer the following short-answer type questions in 30–40 words each :

2×2=4

19. What is combination reaction? Give one example with the chemical equation. $1 + \frac{1}{2} + \frac{1}{2} = 2$

20. *Either*

(a) Give two uses of methane. 1+1=2

Or

(b) What would be the anode, cathode and electrolyte in the electro-refining of copper? Name the impurity formed at the bottom of the container. $1 + \frac{1}{2} + \frac{1}{2} = 2$

Answer the following short-answer type questions in 50–60 words each :

3×4=12

21. (a) What is an acid salt? Give two examples. $1 + \frac{1}{2} + \frac{1}{2} = 2$

(b) What is monobasic acid? 1

22. (a) What do you mean by period and group in the periodic table? $\frac{1}{2} + \frac{1}{2} = 1$

(b) How does the valency of an element change on (i) moving down a group and (ii) moving from left to right in a period? 1+1=2

(7)

23. (a) Define the term 'ore'. 1

(b) What is meant by concentration of an ore? Name two methods used for the concentration of ores. $1 + \frac{1}{2} + \frac{1}{2} = 2$

24. *Either*

(a) What is pyrolysis? 1

(b) Write any two uses of sodium hydrogen carbonate. 2

Or

(c) State any two uses of ethanoic acid. 2

(d) Write the structural formula of butane. 1

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

25. *Either*

(a) Name any four methods which are commonly used for refining of impure metals. $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 2$

(b) Describe the process of froth floatation. 3

Or

(c) Define the term 'pH'. Mention one application of pH in our daily life. $1 + 1 = 2$

(d) What is neutralisation? Give two applications of neutralisation. $1 + 2 = 3$

(8)

SECTION—C

(**BIOLOGY**)

(Marks : 28)

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

26. During photosynthesis, oxygen comes from

- (A) water
- (B) light energy
- (C) carbon dioxide
- (D) both carbon dioxide and water

1

27. Exchange of gases between alveolar sac and alveolar capillaries occurs by

- (A) osmosis
- (B) diffusion
- (C) active transport
- (D) endocytosis

1

28. Junction of two neurons is called

- (A) joint
- (B) synapsis
- (C) synaptic buttons
- (D) synapse

1

(9)

Answer the following questions in *one* word or *one* sentence each :

1×3=3

29. What is holozoic nutrition? 1

30. Name the functional units of lungs and nervous system. 1

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

Answer the following short-answer type questions in 20–30 words each :

2×4=8

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

33. Give any two differences between breathing and respiration. 2

34. *Either*

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

Or

(b) Name the organs that help in excretion in tapeworm, cockroach, earthworm and humans. $\frac{1}{2} \times 4 = 2$

35. Mention any two advantages of vegetative reproduction. 2

(10)

Answer the following short-answer type questions in 50–60 words each :

3×3=9

- 36.** (a) What is cross-pollination? 1
(b) Give two advantages of cross-pollination. 2

37. *Either*

- (a) Mention any three modes of transmission of HIV. 3

Or

- (b) What is variation? 1
(c) Define the following : 1+1=2
(i) Dominant gene
(ii) Recessive gene

- 38.** (a) Name the two steps of breathing mechanism in humans. $\frac{1}{2} + \frac{1}{2} = 1$
(b) Name four types of respiratory organs found in animals. $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 2$

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

5

39. *Either*

- (a) Describe the main functions of plant hormones. 1×5=5

Or

- (b) Write and explain functions of lymph. 5

(11)

[For Candidates without Practical Marks]

(Marks : 20)

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

- (a) What is a spectrum? 2
- (b) Distinguish between regular and irregular reflection of light. 2
- (c) What is meant by scattering of light? 2
- (d) What is an electric fuse? 2
- (e) What is solenoid? 2

II. Answer any *three* of the following questions : $2 \times 3 = 6$

- (a) What is an exothermic and an endothermic reaction? 2
- (b) What is rusting? Name two ways of prevention of rusting. $1 + \frac{1}{2} + \frac{1}{2} = 2$
- (c) What are alkalis? Name two alkalis. $1 + \frac{1}{2} + \frac{1}{2} = 2$
- (d) Which process is used for the enrichment of
(i) sulphide ores and (ii) oxide ores? $1 + 1 = 2$
- (e) Give an example of a metal which
(i) is the best conductor of heat
(ii) can be easily cut with a knife $1 + 1 = 2$

(12)

III. Answer any *four* of the following questions : $2 \times 4 = 8$

- (a) What are omnivorous animals? Give two examples. $1 + \frac{1}{2} + \frac{1}{2} = 2$
- (b) Differentiate between stock and scion. $1 + 1 = 2$
- (c) (i) Why is urine yellow in colour? 1
(ii) Define dialysis. 1
- (d) How does secretion of the endocrine gland reach the target organs? 2
- (e) What is binary fission? Give the names of two organisms which undergo binary fission. $1 + \frac{1}{2} + \frac{1}{2} = 2$
- (f) What are homologous organs? Give two examples. $1 + 1 = 2$

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