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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**.

(2)

SECTION—A

(PHYSICS)

(Marks : 26)

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

1. The image formed by a concave lens is always

- (a) magnified
- (b) highly enlarged
- (c) same in size
- (d) diminished

1

2. The substance having highest refractive index is

- (a) water
- (b) ice
- (c) diamond
- (d) ruby

1

3. If the potential difference across the ends of a conductor is doubled, the current becomes

- (a) doubled
- (b) halved
- (c) tripled
- (d) one-third

1

(3)

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

1×3=3

4. In which part of the eye, image of an object is formed? 1
5. What is a spectrum? 1
6. What are conductors? 1

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

2×3=6

7. *Either*

- (a) Give two differences between convex lens and concave lens. 2

Or

- (b) Light enters from air to glass having refractive index 1.50. What is the speed of light in glass? The speed of light in vacuum is $3 \times 10^8 \text{ ms}^{-1}$.

8. State the laws of reflection of light. 2

9. Define potential difference. What is its SI unit? Is it a scalar or a vector quantity? $1 + \frac{1}{2} + \frac{1}{2} = 2$

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

3×3=9

10. (a) Define near point of the eye. 1
- (b) What is presbyopia? How can it be corrected? $1\frac{1}{2} + \frac{1}{2} = 2$

(4)

11. (a) What is a magnetic field? 1
(b) What is electromagnetic induction? 2

12. *Either*

- (a) What happens when a current is passed through a solenoid? 1
(b) How does a solenoid carrying current behave like a bar magnet? (Give only 2 points.) 2

Or

- (c) A conductor of 4 Ω is connected in series with another conductor of 8 Ω . A potential difference of 6 V is applied across the combination. Calculate the (i) total resistance of the circuit and (ii) current through the circuit. $1\frac{1}{2}+1\frac{1}{2}=3$

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

13. *Either*

- (a) Define power of a lens. 1
(b) What is meant by scattering of light? 1
(c) Give two examples which show Tyndall effect. 3

Or

- (d) When electric current is passed through a bulb, it becomes warm. Give reasons. 1
(e) What is an electrical fuse? 1
(f) Give three characteristics possessed by nichrome alloy that make it the best heating element. 3

(5)

SECTION—B

(CHEMISTRY)

(Marks : 26)

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

14. In the reaction $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$, which substance gets reduced?

(a) Fe_2O_3

(b) CO

(c) Fe

(d) CO_2

1

15. Which of the following is a strong acid?

(a) CH_3COOH

(b) H_3PO_4

(c) H_2CO_3

(d) HCl

1

16. The organic compounds containing —CHO group are called

(a) ketones

(b) carboxylic acids

(c) aldehydes

(d) alcohols

1

(6)

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

17. Define an acid according to Brönsted-Lowry concept. 1

18. What is metallurgy? 1

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

19. Define corrosion. Name two methods used for the prevention of corrosion. $1+\frac{1}{2}+\frac{1}{2}=2$

20. *Either*

(a) What are normal salts? Give two examples. 2

Or

(b) Give two uses of sodium carbonate.

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

21. (a) What do you mean by electropositive character? 1

(b) How does the metallic character of elements change (i) on moving down a group and (ii) on moving across a period? $1+1=2$

(7)

22. (a) Why are sodium and potassium stored under kerosene? 2
(b) Name the most malleable metal and ductile metal. 1
23. (a) State the modern periodic law. 1
(b) What is the valency of magnesium with atomic number 12 and sulphur with atomic number 16? 2
24. *Either*
- (a) What is pyrolysis? 1
(b) Name any two greenhouse gases. $\frac{1}{2} + \frac{1}{2} = 1$
(c) What is cracking? 1
- Or*
- (d) What is denaturation of alcohol? 1
(e) Give two uses of ethanoic acid. 2

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

25. *Either*
- (a) What would be the anode, cathode and electrolyte in the electrorefining of copper? Name the impurity formed at the bottom of the container. $1\frac{1}{2} + \frac{1}{2} = 2$
- (b) Differentiate between the roasting and calcination processes used in metallurgy. Give one example of each. $2 + \frac{1}{2} + \frac{1}{2} = 3$
- Or*
- (c) What is double displacement reaction? Give an example. $1 + 1 = 2$
- (d) How is mercury obtained by self-reduction process? 3

(8)

SECTION—C

(**BIOLOGY**)

(Marks : 28)

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

26. The lungs are covered by a membrane called

(a) pericardium

(b) pleura

(c) myelin sheath

(d) periosteum

1

27. The hormone glucagon is secreted by the

(a) adrenal gland

(b) parathyroid gland

(c) pancreas

(d) pituitary gland

1

28. The enzyme present in saliva is

(a) lipase

(b) pepsin

(c) ptyalin

(d) lactase

1

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

1×3=3

29. Define nutrition. 1

30. Name any two fluids found in the human body. $\frac{1}{2}+\frac{1}{2}=1$

31. What are arteries? 1

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

2×4=8

32. What are the different parts of a nerve cell? Name the junction between two nerve cells. $1\frac{1}{2}+\frac{1}{2}=2$

33. What is a nephron? Name the different parts of a nephron. $\frac{1}{2}+1\frac{1}{2}=2$

34. *Either*

(a) Write any two symptoms of cretinism. $1+1=2$

Or

(b) Name the four whorls of a typical flower. $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}=2$

35. Define the following : $1+1=2$

(a) Heredity

(b) Phenotype

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

3×3=9

36. (a) Define heterotrophic nutrition. 1

(b) Give two examples of organisms which exhibit (i) holozoic nutrition and (ii) parasitic nutrition. $1+1=2$

(10)

37.

Either

- (a) Name any two plant hormones. Give two main functions of plant hormones. 1+2=3

Or

- (b) What are homologous and analogous organs? Give an example for each. 2+1=3

38. Give three differences between breathing and respiration. 3

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

39.

Either

- (a) Name two lymphatic organs. Give any four functions of lymph. 1+4=5

Or

- (b) What are the significances of photosynthesis? 5

[For Private Candidates (without Practicals) only]

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

(a) What is the magnification of a spherical mirror? 2

(b) Give two uses of concave mirror. 2

(c) Name the instrument used to measure current and potential difference. 1+1=2

(d) State Ohm's law. 2

(e) What is resistance? What is its SI unit? 1+1=2

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

(a) Give two uses of bleaching powder. 2

(b) What is decomposition reaction? Give an example. 2

(c) Name the densest and lightest metal. 2

(d) What are malleability and ductility? 2

(e) Write two uses of ethanol. 2

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

(a) Name any four receptors. $\frac{1}{2} \times 4 = 2$

(b) What are the factors affecting the rate of photosynthesis? $\frac{1}{2} \times 4 = 2$

(c) What is pollination? Name the two types of pollination. $1 + 1 = 2$

(d) What is the full form of AIDS? Name the virus that causes AIDS. $1 + 1 = 2$

(e) What is excretion? Name any two nitrogenous waste products. $1 + \frac{1}{2} + \frac{1}{2} = 2$

(f) What is reproduction? Name the two types of reproduction. $1 + 1 = 2$
