Total No. of Printed Pages—12

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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) This 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**.

SECTION—A

(PHYSICS)

(*Marks* : 26)

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

1. With respect to the object, the real image is

(a) slanted

(b) flat

(c) inverted

(d) erect 1

2. When a ray of light travels from a rarer medium to a denser medium obliquely

(a) it bends towards the normal

(b) it bends away from the normal

(c) it goes undeviated

(d) it is reflected back 1

3. The coil of the electric kettle is made of

(a) copper

(b) tungsten

(c) aluminium

(d) nichrome 1

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

4. Define magnification of a lens. 1

5. Name the light sensitive and colour sensitive cells present in the retina of the human eye. ½+½=1

6. What is a magnetic field? 1

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

7. *Either*

(a) State the laws of refraction of light. 2

Or

(b) Define power of a lens. 1

(c) Name the instrument used for measuring the power of a lens. 1

8. What is myopia? How is it corrected? 2

9. How much work is done in moving a charge of 3 C across two points having a potential difference 15 V? 2

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

10. Give the type of mirror which is used as a rear-view mirror in a car. Give two reasons. 1+2=3

11. *(a)* What is electric motor? 1

(b) Explain the different ways to induce current in the coil. 2

12. *Either*

(a) Name a substance used almost exclusively for making filaments of electric bulbs. 1

(b) Name the factors affecting the resistance of a conductor. ½+½+½+½=2

Or

(c) Define resistivity of a substance. 1

(d) Write the formula for equivalent resistance when three resistances R_1, R_2 and R_3 are connected in parallel. 2

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

13. *Either*

(a) What do you mean by electromagnetic induction? 1

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

(c) A 200 W bulb is lighted for 2 hours. How much energy is consumed? 1

Or

(d) Write any three differences between a convex lens and a concave lens. 3

(e) Find the power of a concave lens of focal length 2 m. 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 organic compounds containing —CHO group are called

(a) ketone

(b) carboxylic acid

(c) aldehyde

(d) alcohol 1

16. Which of the following metals is the most abundant in the earth's crust?

(a) Iron

(b) Sodium

(c) Magnesium

(d) Aluminium 1

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

17. What do you mean by the term metallurgy? 1

18. What is rancidity? 1

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

19. Why does the colour of copper (II) sulphate solution change, when an iron nail is dipped in it? 2

20. *Either*

(a) Write down two uses of sodium hydrogen carbonate. 1+1=2

Or

(b) What do you mean by the cracking of alkane? Name two types of cracking. 1+½+½=2

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

21. *(a)* Define displacement reaction. Give example. 1+1=2

(b) State Mendeleev's periodic law. 1

22. *(a)* What are hydrocarbons? 1

(b) Give the IUPAC name of CH_3COOH. 1

(c) Write down the structural formula of methanoic acid. 1

23. What is meant by refining of metals? Name four methods commonly used for refining of impure metals. 1+(½×4)=3

24. *Either*

(a) What do you mean by period and group in the periodic table? ½+½=1

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

Or

(c) What are monoacidic base and diacidic base? Give one example of each. 1½+1½=3

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

25. *Either*

(a) What is redox reaction? Give example. 2

(b) What is neutralization? 1

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

Or

(d) What are semimetals? Name any two semimetals. 2

(e) What do you mean by ionization energy? What are the factors which determine the magnitude of ionization of energy? 1+1+1=3

SECTION—C

(BIOLOGY)

(*Marks* : 28)

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

26. Which of the following cells are formed in the bone marrow?

(a) RBCs

(b) Leucocytes

(c) Leucocytes and RBC

(d) Lymphocytes 1

27. Hormone which controls cellular metabolism is

(a) adrenaline

(b) insulin

(c) thyroxine

(d) testosterone 1

28. Bryophyllum plant produces vegetatively by

(a) leaf bud

(b) adventitious buds

(c) root

(d) stem 1

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

29. Name the plant tissue concerned with transport of water and food materials. 1

30. Name the male and female reproductive whorl of a flower. ½+½=1

31. Define heredity. 1

Answer the following short-answer type questions in *20–30* words each : 2×4=8

32. Distinguish between breathing and respiration (any *two* points). 2

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

34. *Either*

(a) Define photosynthesis. Write the overall reaction of photosynthesis. 1+1=2

Or

(b) What is reproduction? Name the different types of reproduction. 1+½+½=2

35. Differentiate between homologous and analogous organs. 1+1=2

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

36. *(a)* Name the three major divisions of the human brain. Which is the most prominent part of the brain? 1½+½=2

(b) What do you mean by reflex action? 1

37. *Either*

(a) Differentiate any three points between aerobic and anaerobic respiration. 3

Or

(b) Differentiate between sensory and motor nerve cells. 1+1=2

(c) What is ultrafiltration? 1

38. Write the full form of AIDS. Write down any two preventive methods of AIDS. 1+2=3

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

39. *Either*

(a) Write down any three digestive functions of liver. 3

(b) Differentiate between saprophytic and parasitic nutrition. 2

Or

(c) Why is blood red in colour? 1

(d) Give any four functions of lymph. 4

[For Private Candidates (without Practicals) only]

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

(a) Distinguish between real image and virtual image. 2

(b) What is a lens? Name the two types of lens. 1+½+½=2

(c) Define electric power. State its SI unit. 1+1=2

(d) What are conductors? Give two examples. 1+1=2

(e) What do you mean by atmospheric refraction? 2

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

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

(b) *(i)* Define activity series of metals. 1

(ii) Name the metal having the highest melting point and lowest melting point. ½+½=1

(c) Give two uses of sodium carbonate. 2

(d) Which process are used for the enrichment of *(i)* sulphide ores and *(ii)* oxide ores? 1+1=2

(e) *(i)* Name two allotropes of carbon. ½+½=1

(ii) Write down the IUPAC name of C_2H_5OH. 1

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

(a) Differentiate between self-pollination and cross-pollination. 2

(b) What is excretion? Name any two nitrogenous wastes products. 1+½+½=2

(c) Differentiate between systemic circulation and pulmonary circulation. 1+1=2

(d) Write down the differences between dominant gene and recessive gene. 1+1=2

(e) Give two examples of reflex actions in our daily life activities. 1+1=2

(f) Name the following :

(i) Small openings present on the leaf surface 1

(ii) The duct which carries urine from urinary bladder to outside the body 1

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