Total No. of Printed Pages—11

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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 **36** are to be answered by both Regular and Private Candidates.

(v) Question No. **37** is to be answered by Private Candidates (without Practicals) only.

(vi) Regular Candidates should not answer Question No. **37**.

SECTION—A

(PHYSICS)

(*Marks* : 26)

Answer the following questions in *one* word or *one* sentence each : 1×4=4

1. Write the relationship among the distance of the object u, the distance of the image v and focal length f of the spherical mirror. 1

2. What happens when a ray of light travels from a rarer medium to a denser medium? 1

3. What happens to the current when the resistance is halved? 1

4. What is a magnetic field? 1

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

5. Distinguish between real image and virtual image. 2

6. *(a)* Define power of a lens. 1

(b) What is one dioptre? 1

7. *Either*

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

Or

(b) Define magnification of a spherical lens. 2

8. *(a)* What is one volt? 1

(b) How much work is done in moving a charge of 3 C across two points having potential difference of 15 V? 1

Answer the following short-answer type questions in 30–40 words each : 3×3=9

9. Define resistance of a conductor. What are the factors affecting the resistance of a conductor? 1+2=3

10. Write any three uses of concave mirror. 3

11. *Either*

(a) State Ohm's law. Give its mathematical expression. 2

(b) Name the factors on which the strength of electric current flowing in a given conductor depends. 1

Or

(c) Derive the relation between SI unit of electrical energy and commercial unit of electrical energy. 3

Answer the following long-answer type question in 50–60 words : 5

12. *Either*

(a) What is a solenoid? 2

(b) What do you mean by the electromagnetic induction? 1

(c) Write any two safety measures commonly used in electric circuits and appliances. 2

Or

(d) What is meant by heating effect of electric current? Name any two electrical devices based on heating effect of electricity. 1+1=2

(e) Why is tungsten used to make the filament of a bulb? Give any three reasons. 3

SECTION—B

(CHEMISTRY)

(*Marks* : 26)

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

13. Define activity series of metals. 1

14. What is acid-base indicator? 1

15. Give an example of a metal which can be easily cut with a knife. 1

Answer the following short-answer type questions in 20–30 words each : 2×3=6

16. What is decomposition reaction? Give one example. 1+1=2

17. *Either*

(a) Define acid and base according to Arrhenius concept. 2

Or

(b) Why is sodium kept immersed in kerosene oil? 2

18. What is ore? What is meant by concentration of ore? 1+1=2

Answer the following short-answer type questions in 30–40 words each : 3×4=12

19. *(a)* State the modern periodic law. 1

(b) What is meant by electron affinity? 1

(c) Mention two factors which determine the magnitude of electron affinity. 1

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

(b) Name two allotropes of carbon. 1

(c) Write the functional groups present in alcohols and carboxylic acids. ½+½=1

21. *Either*

(a) What are acid salts? 1

(b) Write any two applications of neutralisation reaction in our daily life. 2

Or

(c) What is corrosion? 1

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

22. *(a)* Give the structural formula and IUPAC name of formic acid. 1+1=2

(b) What is soap? 1

Answer the following long-answer type question in 50–60 words : 5

23. *Either*

(a) What are monobasic acid and dibasic acid? Give one example of each. 3

(b) Give two uses of bleaching powder. 2

Or

(c) What is flux? What chemical process is used for obtaining a metal from its oxide? 1+1=2

(d) Describe the process of froth floatation. 3

SECTION—C

(BIOLOGY)

(*Marks* : 28)

Answer the following questions in *one* word or *one* sentence each : 1×4=4

24. Name the process by which solar energy is converted into chemical energy. 1

25. Name any two digestive glands present in humans. 1

26. Name two toxic substances present in tobacco. 1

27. Define blood pressure. 1

Answer the following short-answer type questions in 20–30 words each : 2×5=10

28. What is lymph? Mention any one function of lymph. 1+1=2

29. Write two differences between arteries and veins. 2

30. *Either*

(a) Define translocation of food in plants. 1

(b) What is transpiration? 1

Or

(c) Define reproduction. 1

(d) Name the two types of reproduction that occur in living organisms. 1

31. Differentiate between stock and scion. 2

32. What are vestigial organs? Give any two examples of vestigial organs. 1+1=2

Answer the following short-answer type questions in 30–40 words each : 3×3=9

33. *(a)* Write the full form of ATP. 1

(b) Define emphysema. 2

34. *Either*

(a) Define hormone. 2

(b) What are the diseases caused by hyperactivity of the pituitary gland? ½+½=1

Or

(c) What is self-pollination? 1

(d) Mention any two advantages of self-pollination. 2

35. Mention any three modes of transmission of HIV. 3

Answer the following long-answer type question in 50–60 words : 5

36. *Either*

(a) Define holozoic nutrition. 1

(b) Describe any two types of holozoic nutrition with examples. 2+2=4

Or

(c) What are the basic features of asexual reproduction? 5

[For Private Candidates (without Practicals) only]

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

(a) *(i)* What is a concave mirror? 1

(ii) Why is a concave mirror called a converging mirror? 1

(b) What is myopia? How can it be corrected? 2

(c) What is electric current? State its SI unit. 1+1=2

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

(e) List any two ways by which the speed of rotation of the coil in an electric motor can be increased. 2

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

(a) What do you mean by endothermic reaction? Give an example. 1+1=2

(b) What are alloys? Give two examples of an alloy. 1+1=2

(c) Give an example of metal which is—

(i) the best conductor of heat and electricity;

(ii) the lightest metal. 1+1=2

(d) Mention two applications of pH. 2

(e) Give two harmful effects of drinking alcohol. 2

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

(a) What are nutrients? 2

(b) Define heterotrophic nutrition. 2

(c) Define dialysis. Name the excretory organ in tapeworm. 1+1=2

(d) State any two functions of plant hormones. 2

(e) Give two examples each of organisms which reproduce by the following methods : 1+1=2

(i) Budding

(ii) Spore formation

(f) Define the terms 'chromosome' and 'gene'. 1+1=2

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