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SCIENCE (Theory) — Paper II
(Botany and Zoology)

Time Allowed : $2\frac{1}{2}$ Hours]

[Maximum Marks : 100

SECTION - A

BOTANY

(Marks : 50)

I. Choose and write the correct answer :

5 × 1 = 5

1. The plant body of fungi is called

a) hyphae

b) mycelium

c) chitin

d) conidia.

2. Velamen is seen in

a) epiphytes

b) hydrophytes

c) land plants

d) orchids.

3. Three nitrogenous bases code for one

a) protein

b) amino acid

c) DNA

d) RNA.

4. The endocarp is hard and stony in

a) mango

b) tomato

c) polyalthia

d) jackfruit.

5. Which of the following is the main source of fresh water ?

a) Ocean

b) Sea

c) Rain

d) Ground water.

[Turn over

II. Fill in the blanks with suitable terms :

5 × 1 = 5

6. The nuclear material in bacteria is called
7. The 'V' shaped structure of chromosome is called
8. Leaves of neem yield
9. The environment is derived from
10. are valuable rotation crops.

III. Answer any *five* of the following questions in *one* or *two* sentences each :

5 × 2 = 10

11. What is gram stain ?
12. Define photolysis of water.
13. Define abscission.
14. What are biofertilizers ?
15. What is lenticular transpiration ?
16. What is autochory ?
17. What are the internal factors necessary for seed germination ?
18. What is the basis of Ayurveda ?
19. What is acid rain ?
20. What are the three basic elements of green revolution ?

IV. Write short answers for any *four* of the following questions in 100 words each. Draw diagrams wherever necessary. Question No. 22 is compulsory.

4 × 5 = 20

21. Explain autotrophic nutrition in bacteria.
22. Draw a neat labelled diagram of ultra structure of chloroplast.
23. Distinguish between DNA and RNA.
24. Explain the special types of chromosomes.
25. Write about aggregate fruits with an example.
26. What are the causes of fresh water crisis ?
27. What are the different types of crops ?

- V. Write a detailed answer for any *one* of the following questions in about 200 words. Draw diagram wherever necessary. $1 \times 10 = 10$

28. Explain the mechanism of aerobic respiration.

29. Describe the types of dry fruit and their types.

SECTION - B

ZOOLOGY

(Marks : 50)

- VI. Choose and write the correct answer : $5 \times 1 = 5$

30. In frog the sperms are given out through

- | | |
|----------|---------------|
| a) anus | b) cloaca |
| c) mouth | d) genitalia. |

31. The hardest substance in the human body is

- | | |
|------------|----------------|
| a) dentine | b) cement |
| c) enamel | d) root canal. |

32. The corpus luteum secretes a hormone called

- | | |
|-----------------|------------------|
| a) insulin | b) glucagon |
| c) parathormone | d) progesterone. |

33. Haematopoietic stem cells give rise to

- | | |
|----------------|---------------------|
| a) nerve cells | b) epithelial cells |
| c) blood cells | d) brain cells. |

34. Ulceration in the nasal membrane is caused due to

- | | |
|------------|------------------|
| a) cocaine | b) cannabies |
| c) opiates | d) amphetamines. |

- VII. Fill in the blanks with suitable terms : $5 \times 1 = 5$

35. Blood pressure is measured by an instrument called

36. The black buck is at the verge of

37. The introduction of a new gene into the cell is

38. The accumulation of nitrogenous wastes in the blood and tissues is

39. In one group of people have no antigen in their blood. This type of blood group is called

[Turn over

VIII. Answer any *five* of the following questions in *one* or *two* sentences each :

5 × 2 = 10

40. What is assimilation ?
41. Write about the role of Haemoglobin.
42. Draw and label the structure of pancreas showing islets of Langerhans.
43. What is called morula ?
44. Define Endometrium.
45. Expand the following :
 - i) GRAIN
 - ii) ISF.
46. Write a note on Project Tiger.
47. Mention the factors causing disease.
48. What is meant by polyurea ?
49. Write the uses of C.T. scan.

IX. Write short answers for any *four* of the following questions in 100 words each. Draw diagrams wherever necessary. Question No. 53 is compulsory.

4 × 5 = 20

50. Explain the urinogenital system of Male Frog.
51. Write about the Head of Frog.
52. Describe the role of Insulin in the body.
53. Draw a neat labelled sketch of matured human sperm.
54. Write short notes on Man in the Biosphere.
55. Give an account on obesity.
56. Explain Algal culture.

X. Write detailed answer for any *one* of the following questions in 200 words. Draw diagram wherever necessary.

1 × 10 = 10

57. Explain the process involved in tissue culture in animals.
 58. Describe the origin and conduction of Heartbeat.
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SCIENCE (Theory) — Paper I
(Physics and Chemistry)

Time Allowed : $2\frac{1}{2}$ Hours]

[Maximum Marks : 100

SECTION - A

PHYSICS

(Marks : 50)

- I. Choose the correct alternative and write it against the question number in your answer-book : $10 \times 1 = 10$

1. The average value of acceleration due to gravity is

- | | |
|---------------------------|--------------------------|
| a) 9.8 ms^{-2} | b) 9.8 cm^{-2} |
| c) 19.8 ms^{-2} | d) 8.9 ms^{-2} |

2. The ratio of the wavelengths of two colours is 3 : 2. The ratio of the amount of these colours scattered by air molecules is

- | | |
|----------------|----------------|
| a) 3 : 2 | b) 2 : 3 |
| c) $2^4 : 3^4$ | d) $3^4 : 2^4$ |

3. Which of the following is based on electromagnetic induction ?

- | | |
|----------------|-----------------|
| a) Transformer | b) Galvanometer |
| c) Loudspeaker | d) Motor. |

4. The magnetic flux linked with a coil of area 0.5 cm^2 placed at right angle to a magnetic field of induction 0.1 tesla is

- | | |
|-----------------------------|------------------------------|
| a) 5×10^{-5} weber | b) 5×10^{-6} weber |
| c) 5×10^{-3} weber | d) 5×10^{-4} weber. |

[Turn over

5. Intermolecular force of attraction exists between the molecules separated by a distance of about
 - a) 10^{-3} m
 - b) 10^{-5} m
 - c) 10^{-9} m
 - d) 10^{-6} m.
6. Electrons are embedded in a positively charged sphere. This was suggested by
 - a) Thomson
 - b) Rutherford
 - c) Bohr
 - d) Dalton.
7. The coolant used in a nuclear reactor is
 - a) graphite
 - b) heavy water
 - c) water
 - d) uranium.
8. The radio-isotope used to treat cancer in the human body is
 - a) Cr^{51}
 - b) Fe^{59}
 - c) I^{131}
 - d) Co^{60} .
9. The objects which are found between the orbits of Mars and Jupiter are
 - a) meteorites
 - b) asteroids
 - c) comets
 - d) meteors.
10. The ratio of the velocities with which two galaxies move away from the earth is 3 : 5. The ratio of their distance is
 - a) 5 : 3
 - b) 3 : 5
 - c) 9 : 25
 - d) 25 : 9.

II. Answer any *five* of the following questions in *one* or *two* sentences each :

$$5 \times 2 = 10$$

11. Define moment of inertia.
12. Calculate the momentum of a particle associated with a wave of wavelength $2\text{\AA}$.

13. State Fleming's left hand rule.
14. Convert one kilowatt-hour into joules.
15. Why do small pieces of camphor dance about on the surface of water ?
16. Define coefficient of viscosity.
17. Define mass number and atomic number.
18. What is artificial radioactivity ?
19. What is remote sensing ?

III. Answer any *five* of the following questions :

$$5 \times 3 = 15$$

20. Define the relation between linear velocity and angular velocity.
21. Compare the motion of freely falling body with that of a projectile.
22. Calculate the wavelength associated with a particle of mass 5×10^{-24} kg moving with a velocity $2 \times 10^7 \text{ ms}^{-1}$.
23. On what factors does the photoelectric current depend ?
24. A transformer in a distribution station reduces AC voltage from 36000V to 2400V. The primary coil has 15000 turns. What is the number of turns in the secondary ?
25. Mention the factors on which the rate of flow of a liquid through a pipe depends.
26. Define reproduction factor. Give its significance.
27. Mention the applications of radioisotopes in the field of medicines.
28. Write notes on (a) meteors and (b) meteorites.

[Turn over

IV. Answer any *three* of the following questions :

$3 \times 5 = 15$

29. A toy car is dropped from the top of a building. It reaches the ground in 3 sec. Calculate (a) the velocity with which it strikes the ground, (b) the height of the building.
30. Derive an expression for de-Broglie wavelength.
31. Explain the role of transformer in the transmission of power.
32. State Bernoulli's principle and explain the lift of an aeroplane.
33. Write a note on chain reaction.
34. Mention the properties of X-rays.

SECTION - B

CHEMISTRY

(Marks : 50)

V. Choose the correct answer and write it against the question number in the answer-book :

$10 \times 1 = 10$

35. The oxidation number of lithium in lithium hydride (LiH) is
 - a) +1
 - b) -1
 - c) +2
 - d) -2.
36. Mass of 1 mole of water is equal to
 - a) 2 g
 - b) 44 g
 - c) 18 g
 - d) 12 g.
37. The ratio of the volumes of reactants and products in the formation of ammonia from nitrogen and hydrogen is
 - a) 1 : 3 : 2
 - b) 1 : 2 : 3
 - c) 1 : 1 : 2
 - d) 1 : 2 : 1.
38. $C + O_2 \rightarrow CO_2$, $\Delta H = -393.5 \text{ k J}$. This reaction is an example of
 - a) photochemical reaction
 - b) electrochemical reaction
 - c) endothermic reaction
 - d) exothermic reaction.

39. Germanium is purified by method.
- a) zone refining b) distillation
c) oxidation d) liquation.
40. Ammonal is mixture of aluminium powder and
- a) ammonium chloride b) ammonium phosphate
c) ammonium nitrate d) ammonium carbonate.
41. Carbonic acid is
- a) CH_3COOH b) HCOOH
c) H_2CO_3 d) $\text{C}_6\text{H}_5\text{COOH}$.
42. Ethylene glycol is an example for
- a) primary alcohol b) secondary alcohol
c) tertiary alcohol d) dihydric alcohol.
43. The IUPAC name of HCOOH is
- a) methanal b) methanol
c) formic acid d) methanoic acid.
44. The main source of sulphur dioxide pollutant is
- a) volcanic activity b) chemical industry
c) power house d) textile mill.

VI. Answer any *five* of the following questions in *one* or *two* sentences each :

$5 \times 2 = 10$

45. State Hund's rule.
46. Give the limitations of law of multiple proportion.
47. What is the present day position of law of conservation of mass ?
48. Define rate of a reaction.

[Turn over

49. What is liquation ?
50. How is phosphine obtained from white phosphorus ?
51. What is denatured alcohol ?
52. How is diethyl ether prepared by Williamson's ether synthesis ?
53. What are the changes occurring in water due to pollutants ?

VII. Answer any *five* of the following questions in brief :

5 × 3 = 15

54. Draw the shapes of *p*-orbitals.
55. Explain magnetic quantum number.
56. Calculate the equivalent mass of sodium hydroxide (NaOH). (Atomic mass of sodium is 23, oxygen is 16 and hydrogen is 1 respectively)
57. In an experiment 5.0 g of CaCO_3 on heating gave 2.8 g of CaO and 2.2 g of CO_2 . Show that these results are in accordance to the law of conservation of mass.
58. What are the conditions for reversible reaction ?
59. What is bessemerisation ? Give example.
60. What is the action of ether with
 - i) chlorine in dark
 - ii) chlorine in light ?
61. Give two tests for carboxylic acid.
62. Write a note on quick vinegar process.

VIII. Answer any *three* of the following questions in detail with necessary diagrams and equations wherever necessary : $3 \times 5 = 15$

63. Derive the relation between vapour density and relative molecular mass of a gas.
64. Distinguish metals and non-metals based on their physical properties. Mention any five points.
65. Explain the methods of preventing corrosion by
- i) Galvanisation
 - ii) Tinning.
66. How do you extract sulphur by Frasch process ?
67. Describe the manufacture of ethanol from molasses.
68. Mention any five points to conserve energy.
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