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Part III — FOUNDATION SCIENCE

(English Version)

Time Allowed : 3 Hours]

[Maximum Marks : 150

[Note : Each Section carries 75 marks.]

- Instructions :**
- i) Answer the questions in two Subjects only in the Foundation Science, leaving out the Subject chosen under related Subjects.
 - ii) Candidates should answer the two Subjects in separate answer-books indicating the name of the Subject.

SECTION - A**(CHEMISTRY)**

(Marks : 75)

I. Answer any four of the following :

4 × 5 = 20

1. What are colligative properties ? Give examples.
2. Write a note on Tyndall effect. Give example.
3. Define pH and pOH.
4. How will you distinguish between aromatic and aliphatic ethers ?
5. Write a note on anti-malarials.

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II. Answer any *three* of the following : $3 \times 9 = 27$

6. a) What are the laws of osmotic pressure ? 5
- b) Write a note on Brownian movement. 4
7. Distinguish between metallic and electrolytic conductors.
8. How will you distinguish between the primary, secondary and tertiary alcohols by Victor Meyer's method ?
9. Explain the optical isomerism in lactic acid.
10. How is the structure of fructose determined ?

III. Answer any *two* questions of the following : $2 \times 14 = 28$

11. a) How are colloidal solutions prepared by condensation method ? 5
- b) Differentiate between physical adsorption and chemical adsorption. 9
12. Explain the following reactions :
- a) Rosenmund's reduction 2
- b) Cannizzaro reaction 3
- c) Perkin's reaction 3
- d) Claisen reaction 3
- e) Knoevenagel reaction. 3

13. Starting from acetic acid how would you prepare the following ?

- a) Ethyl acetate 3
- b) Acetyl chloride 3
- c) Acetamide 3
- d) Acetic anhydride 3
- e) Methane. 2

14. a) Starting from phenol how would you obtain the following compounds ?

- i) Aniline 3
- ii) Anisole 3
- iii) Picric acid. 3

b) Explain the following reactions :

- i) Reimer-Tiemann reaction 3
- ii) Down's process. 2

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SECTION - B**(PHYSICS)****(Marks : 75)****I. Answer any four of the following questions :****4 × 5 = 20**

1. Distinguish between Fresnel diffraction and Fraunhofer diffraction.
2. Define critical angle. If refractive index of glass is 1.5, find its critical angle.
3. What is photoelectric cell ? Give its uses.
4. How are radioisotopes produced ? Give two uses of radioisotopes in medicine.
5. Write the properties of paramagnetic substances.

II. Answer any three of the following questions :**3 × 9 = 27**

6. Describe the construction and working of terrestrial telescope with neat diagram.
7. What is meant by spectrum ? Describe a method of producing it.

8. Explain how a galvanometer can be converted into ammeter.

9. Explain Rutherford atom model. Give its drawbacks.

10. What are cathode rays ? Give its properties.

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

2 × 14 = 28

11. What are Newton's rings ? Explain how Newton's rings are produced in the laboratory. Derive an expression for the radius of the n^{th} dark ring.

12. State and verify Joule's laws of heating using Joule calorimeter.

13. Describe the important components of a Nuclear reactor and explain its function with neat diagram.

14. Explain the principles of monochrome television transmission with block diagrams.

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SECTION - C**(ZOOLOGY)****(Marks : 75)**

I. Answer any *four* of the following questions in not more than 5 lines each :

 $4 \times 5 = 20$

1. Explain the functions of bile in digestion.
2. What is goitre ?
3. Describe the test cross with example.
4. Draw a labelled diagram of egg of mammal.
5. Write the theories of Darwin's natural selection.

II. Answer any *three* of the following questions in not more than 15 lines each :

 $3 \times 9 = 27$

6. Describe the mechanism of coagulation of blood.
7. Enumerate the functions of cerebrum and mid-brain.
8. Explain Mendelian dihybrid cross experiment.
9. Explain different types of cleavage with example.
10. Give an account of the structure and function of placenta.

III. Answer any two of the following questions in not more than 25 lines each :

2 × 14 = 28

11. Draw a neat diagram of L.S. of human heart and describe the working of heart.
 12. Describe the mechanism of urine formation.
 13. Write an essay on multiple alleles (ABO blood groups).
 14. Describe the process of fertilization in frog with diagrams.
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