Register Number | | | | | | |

Part III — FOUNDATION SCIENCE

(Common to Medical Laboratory Assistant, Nursing Course, Hospital Housekeeping, Ophthalmic Technician, Physiotherapy and Dental Hygienist)

(New Syllabus)

(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 : $4 \times 5 = 20$

1. Define osmotic pressure. Give the laws of osmosis.

2. What are buffer solutions ? Give two examples.

3. State Henry's law and mention its limitation.

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4. How are the following compounds obtained from phenol ?

   i) Picric acid

   ii) Salicyl aldehyde.

5. What are alkaloids ? Give their general characteristics.

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

6. a) Define the following :

   i) Isotonic solutions

   ii) Solubility product. **4**

   b) Give the applications of solubility product principle. **5**

7. a) State the postulates of Arrhenius theory of electrolytic dissociation. 5

   b) How are colloids purified by dialysis ? **4**

8. a) How is ethyl alcohol manufactured by fermentation process ? **5**

   b) Give two reactions to distinguish between diethyl ether and ethyl alcohol. **4**

9. a) Explain the optical isomerism of lactic acid. **5**

   b) Give the preparation and uses of phthalic acid. **4**

10. a) How are carbohydrates classified ? Give the functions of carbohydrates in living organisms. **6**

b) What are sulpha drugs ? What are their uses ? **3**

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

11. a) Explain the dispersion methods of preparation of colloids. **6**

b) Explain the Lowry-Brönsted theory and Arrhenius theory of acids and bases with examples. **8**

12. a) Explain the electrophilic substitution reactions of phenol. **8**

b) Explain the following reactions : **6**

i) Haloform reaction

ii) Williamson's synthesis

iii) Clemmensen reduction.

13. a) Give the reactions of benzaldehyde with the following : **8**

i) NH_3

ii) phenyl hydrazine

iii) aniline

iv) acetaldehyde.

b) Give a test to identify

i) primary amine

ii) aldehyde. 4

c) Give the uses of naphthalene. 2

14. a) What is a peptide linkage ? How is it formed ? Illustrate with an example. 4

b) Explain the structure of glucose. 4

c) How are vitamins classified ? Give the names of any four vitamins, their sources and deficiency diseases. 6

SECTION - B

(PHYSICS)

(Marks : 75)

I. Answer any *four* of the following questions : $4 \times 5 = 20$

1. Give the uses of ultraviolet rays and infrared rays.

2. Explain polarisation by reflection.

3. How are radio isotopes produced ? Give two uses of radio isotopes in medicine.

4. Define critical angle. If refractive index of glass is 1.5, then find its critical angle.

5. Write the properties of paramagnetic substances.

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

6. Describe the construction and working of the compound microscope. What is its magnifying power ?

7. Explain how a galvanometer can be converted into a voltmeter.

8. Explain Rutherford atom model and give its drawbacks.

9. Explain the construction and working of a photoelectric cell. Give its uses.

10. How are *X*-rays produced using the Coolidge tube ? Give its use in medicine.

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

11. List the properties of α- and β-rays. Describe the Geiger counter and explain its working with a diagram.

12. What is meant by pure spectrum ? Describe a method of producing it. What are Fraunhofer lines ? What do we understand of the sun's atmosphere from it ?

13. Describe Young's double slit experiment for producing an interference pattern. Derive an expression for the bandwidth.

14. Give the difference between alternating current (AC) and direct current (DC). Describe the principle, construction and working of a DC generator.

SECTION - C

(ZOOLOGY)

(Marks : 75)

I. Answer any *four* of the following in not more than 5 lines each. $4 \times 5 = 20$

1. Draw a neat labelled sketch of longitudinal section of kidney.

2. Write any five functions of placenta.

3. What are the blood groups of man ? What are the uses of blood grouping in man ?

4. What are the functions of liver ?

5. Where are adrenal glands ? State any three functions of adrenalin.

II. Answer any *three* of the following in not more than 15 lines each. $3 \times 9 = 27$

6. Explain the mechanism of respiration in human beings.

7. Explain the types of egg membranes.

8. Explain the theory of abiogenesis with examples.

9. Describe the various organs formed from the germinal layers of frog.

10. Describe Mendel's monohybrid cross with example.

III. Answer any *two* of the following in not more than 25 lines each : $2 \times 14 = 28$

11. Tabulate a comparative account on spermatogenesis and oogenesis of frog with neat labelled sketches.

12. Draw the longitudinal section of human heart and name the parts. Describe the structure and working of the heart.

13. Explain the role of pituitary gland in human body.

14. Explain the theories regarding origin of life.