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 × 5 = 20

1. What is meant by colligative property ? Name the four colligative properties.

2. How are colloids prepared by peptisation method ? Give two applications of colloids.

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3. Define pH. Based on pH how are solutions classified as acidic, basic and neutral ?

4. Explain :

   i) Cannizzaro's reaction

   ii) Perkin's reaction.

5. Give the structure of glucose and fructose. Give the differences between glucose and fructose.

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

6. a) Explain the principle of fractional distillation of a mixture of two liquids of different boiling points. **6**

   b) Explain the optical property of colloids. **3**

7. a) Explain the nature of solubility curves. **4**

   b) Classify the following as acids and bases according to Lowry-Bronsted theory : **5**

   i) $H_2PO_4^-$ ii) H_3O^+ iii) Cl^-

   iv) CH_3COO^- v) NH_4^+.

8. a) Explain any one method of distinguishing the primary, secondary and tertiary alcohols. **5**

   b) How are the following compounds obtained from benzene diazonium chloride ?

   i) Chlorobenzene

   ii) Phenyl hydrazine. **4**

9. a) Give the preparation and use of the following : 6

   i) Chloroform

   ii) Gammexane

   iii) TNT.

   b) What is metamerism ? Explain with an example. 3

10. a) Explain the primary structure of proteins. 5

   b) What is polymerisation reaction ? Give examples for natural and synthetic polymers. 4

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

11. a) What are buffer solutions ? Give two examples. Explain the buffer action of acidic buffer. 8

   b) Explain : 6

   i) Electrophoresis

   ii) Electro-osmosis.

12. a) How will you distinguish between diethyl ether and ethyl alcohol ? 4

   b) Give the rection of diethyl ether with

   i) excess HI ii) PCl_5 . 4

   c) Explain the following reactions : 6

   i) Friedel-Crafts reaction

   ii) Aldol condensation

   iii) Kolbe's reaction.

13. a) Give the reaction of acetone with

i) HCN

ii) NH_3

iii) CH_3MgI followed by hydrolysis. 6

b) Distinguish between acetaldehyde and benzaldehyde. 4

c) What happens when

i) a mixture of calcium benzoate and calcium formate is distilled ?

ii) calcium acetate is distilled ? 4

14. a) Explain the classification of carbohydrates with examples. 4

b) What are hormones ? Name any two hormones and mention their functions. 4

c) Name the fat soluble vitamins. Give their sources and deficiency diseases. 6

SECTION - B

(PHYSICS)

(Marks : 75)

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

1. What is meant by total internal reflection ? State the conditions for total internal reflection to take place.

2. What is meant by power of accommodation of eye ? What is least distance of distinct vision ?

3. Define magnetic permeability and magnetic susceptibility.

4. State Kirchhoff's laws.

5. Write a note on radiation hazards.

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

6. Compare the human eye with a camera.

7. State Ohm's law. Draw a suitable circuit diagram and explain the method of verifying Ohm's law.

8. What are polaroids ? Explain any two kinds of polaroids and give their uses.

9. List the properties of Cathode rays.

10. Describe Fresnel's biprism method of producing interference pattern. How is it used to determine the wavelength of light ?

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

11. Draw a neat diagram and describe the principle, construction and working of an AC generator.

12. Define specific resistance of the material of a wire. How will you determine the specific resistance of the material of a given wire using the metre bridge ?

13. What is a nuclear reactor ? Describe the essential parts of a nuclear reactor. Give its uses.

14. With the help of a block diagram, explain TV broadcasting and reception.

SECTION - C

(ZOOLOGY)

(Marks : 75)

I. Answer any *four* of the following in not more than 5 lines each : **4 × 5 = 20**

1. Write the applications of ABO Blood groups.

2. Explain the functions of large intestine in man.

3. What are the significances of fertilization ?

4. Classify the proteins with suitable examples.

5. How is glucose level maintained in human blood ?

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

6. Draw a labelled sketch of Hen's egg. Explain its characteristics.

7. Draw a labelled sketch of nephron. Explain the function of nephron.

8. Explain the structure and functions of placenta of mammal.

9. Explain any three theories regarding the origin of life on Earth.

10. Explain the functions of blood.

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

$2 \times 14 = 28$

11. Draw a L.S. diagram of human brain and name the different parts. Explain the functions of various parts of the brain.

12. Explain the gastrulation in frog with neat labelled sketches.

13. Explain any four evidences in favour of evolution.

14. Explain with example, the dihybrid cross of Mendel.