বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

Question Paper

B.Sc. Honours Examinations 2022

(Under CBCS Pattern)

Semester - IV

Subject: CHEMISTRY

Paper : SEC 2-T

Full Marks : 25

Time : 2 Hours

Candiates are required to give their answer in their own words as far as practicable.
The figures in the margin indicate full marks.

(Basic Analytical Chemistry)

Group - A

Answer any ***two*** questions : 5×2=10

1. (a) Calculate the standard deviation for the following results from the analysis of a water sample.

   Iron content (%) : 7.08, 7.21, 7.12, 7.09, 7.16, 7.14, 7.07, 7.14, 7.18, 7.11. 3

   (b) Mention two micronutrient of soil. 2

2. (a) Explain the separation of Lanthanides by ion exchange method. 3

   (b) What do you mean by sampling ? 2

3. (a) Discuss the functions of the following substances in food industry : citric acid, sodium benzoate, follic acid. 3

   (b) Distinguish between accuracy and precision. 2

Group - B

Answer any ***one*** question : 15×1=15

4. (a) A loss of 0.4 mg of Al occurs in the course of analysis of the element. Calculate the percentage error due to this loss, if the weight of Al in the sample is 400 mg. 4

   (b) Mention two applications of TLC. 3

   (c) How can you detect the alkaline nature of a soil sample ? How can it be neutralised ? 3

   (d) Mention two sources responsible for contaminating water. 2

   (e) Express the result with significant figures : 25.4623 + 0.620 – 8.14302 2

   (f) What is relative error ? 1

5. (a) R_f values of three amino acids A1, A2 and A3 are 0.15, 0.34 and 0.67 respectively. Discuss the position of these amino acids during TLC separation. 3

   (b) Name two materials with which column bed (stationary phase) is prepared. 3

   (c) Discuss the principle of deterination of ion-exchange capacity of cation exchange resin. 3

   (d) What is standard deviation ? 3

   (e) What is meant by DO of an water sample ? 3

Or,

(Chemistry of Cosmetics and Perfumes)

Group - A

Answer any ***two*** questions : 5×2=10

1. Define SPF. Write any one method to measure SPF. 5

2. Describe the steps involved in the manufacturing of soaps. 5

3. Write short notes (any *two*) :

   (a) Antidandruff shampoo

   (b) Importance of eucalyptus oil and rose oil

   (c) Preparation of face powders 2×2.5=5

Group - B

Answer any ***one*** question : 15×1=15

4. (a) Discuss the raw materials used in the formulation of skin care cosmetic products.

   (b) What are hair dyes ? Classify and write its ideal properties.

   (c) What are the properties of a good hair remover ? 8+5+2=15

5. (a) Classify rheology modifiers and humectants used in cosmetics. Write its applications.

   (b) List the chemicals used in the coloring of hair and discuss their chemistry.

   (c) Differentiate between vanishing creams and cold creams. Write their preparation. 8+3+4=15

Or,

(Pesticide Chemistry)

Group - A

A. Attempt any ***two*** of the following questions : 5×2=10

1. (i) What are natural and synthetic pesticides ? Give one example of each. (2+1)

   (ii) What are the environmental effects of pesticides ? 2

2. (i) Why do we need pesticides ? 2

   (ii) Draw the chemical structures of two organochlorine pesticides. 2

   (iii) Write down the name of the first organic pesticide, used commercially. 1

3. (i) What is meant by a botanical pesticide ? 2

   (ii) What are DDD and DDE ? 2

   (iii) Write down chemical structure of Gammaxene. 1

Group - B

B. Attempt any ***one*** of the following questions : 1×15=15

1. (i) Write down the uses of Alachlor. 3

   (ii) How would you prepare Butachlor from 2, 6-diethylaniline ? 3

(iii) Discuss the major alternatives to traditional pesticides. 8

(iv) What is LD_{50} ? 1

2. (i) What are the benefits of pesticides toward human civilization ? 6

(ii) What is biopesticide ? 2

(iii) Which chemical properties of DDT and its metabolites are responsible for their presence in arctic air, water and organism ? 2

(iv) Organophosphates are called synaptic poisons. Justify this name. 2

(v) Briefly describe the chemical synthesis of Parathion. 3

Or,

(Fuel Chemistry)

Full Marks : 40 Time : 2 Hours

Group - A

Answer any ***four*** questions : 5×4=20

1. (a) Compare two advantages and disadvantages of solid, liquid and gaseous fuels. 3

(b) What is benzol ? Mention its use. 2

2. (a) Why should coal be gasified ? 2

(b) What is bio-gas ? Write the composition of bio-gas ? 3

3. (a) What is carbonization of coal ? Differentiate between high temperature carbonization (HTC) and low temperature carbonization (LTC). 3

(b) What is C.N.G. ? Give its use. 2

4. (a) Define cloud point and pour point of a lubricant. 2

(b) Mention three types of semisolid lubricants briefly. 3

5. (a) What is meant by reforming of petroleum ? 2

(b) Write the composition of water gas ? Mention the byproducts of coking of coal. 3

6. (a) What is calorific value ? Mention the C.G.S. and S.I. units of calorific value of gaseous fuel. 3

(b) Why net calorific value is less than gross calorific value ? 2

Group - B

Answer any ***two*** questions : 10×2=20

7. (a) MoS_2 is a solid lubricant-discuss its structure and uses. 3

(b) Name two additives which improve the quality of lubricants. 2

(c) What is coal tar ? Mention two chemicals and their uses which are obtained during fractionation of coal tar ? 3

(d) What are the criteria for selection of coal for metallurgical purposes ? 2

8. (a) Discuss about different fractions obtained from fractional distillation of crude petroleum mentioning their composition, boiling range and uses. 5

(b) What is oil gas ? Mention its use. 2

(c) Describe the manufacture of bio-gas from waste materials. 3

9. (a) Why is calorific value of coal gas higher than that of producer gas ? 2

(b) Name two lead-free anti-knock compounds. 2

(c) What is gasohol ? 2

(d) Why a good solid fuel must have low ash content ? 2

(e) What are the main constituents of L.P.G. ? 2

10. Write notes on :

(a) catalytic cracking

(b) octane number

(c) proximate analysis

(d) renewable energy 2½×4