14.7.22 (M)

Roll No. .....

91547

B. Sc. (Biotechnology) 2nd Sem. (Latest) Examination – July, 2022

BIO-STATISTICS

Paper : BT-201

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions. Question 1 is ***compulsory***. Select ***one*** question from each Unit.

1. All questions carry equal marks : $8 \times 1.25 = 10$

(i) What is the significance of statistical calculations ?

(ii) Give the relationship formula between mean, median and mode.

(iii) What is hypothesis testing ?

(iv) What is Kurtosis ?

(v) What do you understand by permutation ?

(vi) State any *two* laws of logarithm.

(vii) What do you understand by limit of a function ?

(viii) State the significance of trigonometric functions in biology.

UNIT – I

2. What are the relations between roots and coefficients of algebraic functions ? Explain with suitable examples. 7.5

3. Suppose you have 6 birthday cards for your friends and you want to send them to 4 of your friends. In how many ways can you send these cards to 4 of your friends ? 7.5

UNIT – II

4. Give a comparative account of differentiation and integration with suitable examples. 7.5

5. If $f'(x) = 4x^5 - 2x^3 + x - 2$, and $f(0) = 3$, determine the function equation for $f(x)$. 7.5

UNIT – III

6. Write short notes on following : $2.5 \times 3 = 7.5$

   (a) Measures of central tendency

   (b) Probability

   (c) Binomial distribution

7. Calculate the mean, median and mode for following data : 7.5

Age :	10-20	20-30	30-40	40-50	50-60
Persons :	8	15	43	24	9

UNIT – IV

8. Write notes on following with formula : $2.5 \times 3 = 7.5$

   (a) Testing of hypothesis

   (b) Standard error

   (c) t-test

9. What is ANOVA ? Explain the applications of ANOVA. 7.5

SECTION – D

8. (a) Explain the various allotropic forms of phosphorus. 4

(b) Describe different types of interhalogen compounds with examples. 4

9. (a) Explain the structure of various oxoacids of chlorine and compare their acidic strength. 4

(b) Describe the various oxides of nitrogen and draw their structure. 4

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B. Sc. (Bio-Technology) 2nd Semester (Latest) Examination – July, 2022

INORGANIC CHEMISTRY

Paper : BT-206

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) Why tendency of catenation decreases down the group ?

(b) What are Zeolites ?

(c) Why alkali metals shows photoelectric effect ?

(d) Why formic acid exist as dimer ?

(e) What is doping ?

(f) Why alkali metals are stored in Kerosene ?

(g) What is Marshall's acid ?

(h) Out of $HClO_3$ and $HClO_4$, which one is stronger acid. $1 \times 8 = 8$

SECTION – A

2. (a) Out of ice and water, which is lighter ? Explain your answer. 2

(b) At which temperature, water has maximum density ? Give reason for your answer. 2

(c) Differentiate between n-and p-type semiconductors. 4

3. Describe : 4, 4

(i) Bond theory of metallic bonding

(ii) Types of Vander Waals Forces

SECTION – B

4. (a) Describe the solvation and complexation tendencies of s-block elements. 4

(b) Give reason : 4

(i) Alkali metals are soft and have low melting point.

(ii) Li_2CO_3 is unstable while other alkoli metal carbonates are relatively stable.

5. (a) Describe the structure and bonding in : 4

(i) XeF_6

(ii) $XeOF_4$

(b) Give reason : 4

(i) Noble gases are not easily liquefied.

(ii) Xenon forms a large number of compounds as compared to other noble gases.

SECTION – C

6. (a) Describe the structure and chemical properties of borazine. 4

(b) Explain the relative strength of trihalides of boron as lewis acids. 4

7. (a) Describe the various types of silicates with their structures. 4

(b) Explain briefly : 4

(i) Carbides

(ii) Fluorocarbons

(b) Why terminal alkynes are acidic in nature ? 4

SECTION – D

8. (a) Discuss the important methods of generation of alkyl halides. 4

(b) Explain the mechanism of S_N2 reaction with potential energy diagram. 4

9. (a) Describe the benzyne mechanism of nucleophilic aromatic substitution. 4

(b) Explain : 4

(i) Gattermann reaction

(ii) Williamson's synthesis

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B. Sc. (Bio-Technology) 2nd Semester (Latest) Examination – July, 2022

ORGANIC CHEMISTRY

Paper : BT-207

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Section. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) What is Baeyer's test ?

(b) What product is obtained by reaction of ethane with cold alkaline $KMnO_4$?

(c) Why chlorination of toluene is easier than chlorobenzene ?

(d) How electrophile is generated during nitration of benzene ?

(e) How can you obtain acetylene from calcium carbide ?

(f) What happens when 1, 3-butadiene reacts with acrylonitrile ?

(g) Why tertiary halides generally undergoes SN_1 reoction ?

(h) What is Hunsdiecker reaction ? $1 \times 8 = 8$

SECTION – A

2. (a) Explain the factors affecting stability of alkenes. 3

(b) Differentiate the mechanism of Saytzeff and Hofmann elimination with example. 5

3. (a) Explain the mechanism of anti-Markovnikov's addition with suitable examples. 3

(b) Describe with mechanism : 5

(i) Oxymercuration-reduction of alkenes

(ii) Ozonolysis of alkenes

SECTION – B

4. (a) Give reason : 4

(i) All bond lengths are equal in benzene.

(ii) [10]-Annulene is non aromatic in nature

(b) Describe : 4

(i) Huckel rule of aromaticity

(ii) Meta-directing groups

5. (a) What are the limitations of Friedal-Crafts alkylation ? 2

(b) Describe with mechanism : 6

(i) Hologenation of benzene

(ii) Sulphonation of benzene

SECTION – C

6. (a) Complete the following reaction : 4

(i) $HC \equiv CH + H_2O \xrightarrow{H_2SO_4, HgSO_4} ?$

(ii) $H_3C - C \equiv C - CH_3 \xrightarrow{B_2H_6 / THF} ?$

(iii) $HC \equiv CH \xrightarrow{O_3 / CH_2Cl_2} ?$

(iv) $2\,CHCl_3 + 6Ag \xrightarrow{Heat} ?$

(b) Using molecular orbital theory, explain the stability of conjugated dienes. 4

7. (a) Describe the effect of temperature on 1, 2 and 1, 4-addition reaction of conjugated dieens. 4