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B.Sc. (Biotech) 2nd Semester (Latest)
(Full & Reappear)
Examination, May–2024
BIOSTATISTICS
Paper–BT-201

Time allowed : 3 hours] *[Maximum marks : 40*

Note: *Attempt **five** questions in all. **Question No. 1 is compulsory.** Attempt at least **one** question from each Unit.*

1. Write short notes on-

   (a) Permutation

   (b) Trigonometric identities

   (c) Limits of functions

   (d) Algebraic functions

   (e) Mode

   (f) Standard Deviation

   (g) Variance

   (h) Test of Significance

Unit-I

2. (a) Define algorithm and explain its various laws.

   (b) Explain the different types of Matrices. Find the product of the following matrices:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 1 \\ 1 & 2 & 5 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 2 & 1 \end{bmatrix}$$

3. (a) A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has

   (i) no girls

   (ii) at least one boy and one girl

   (iii) at least three girls

   (b) Explain binomial theorem of integer.

Unit-II

4. (a) Differentiate: $20x^{-4} + 9$

   (b) Integrate $(x+9)^3$

5. (a) Write a short note on application of integration.

   (b) Explain trigonometric functions and their applications.

Unit-III

6. (a) What are the types of data? Differentiate primary and secondary data.

   (b) What do you understand by Normal Distribution? Discuss properties of normal distribution.

7. (a) Write a short note on measures of skewness and kurtosis.

(b) Two coins are tossed 500 times, and we get:

Two heads: 105 times

One head: 275 times

No head: 120 times

Find the probability of each event to occur.

Unit-IV

8. (a) Write a note on large sample test and how do they differ from small sample test.

(b) Explain Confidence level and Critical region.

9. Write short notes on:

(a) t -test

(b) Chi-square test for goodness of fit

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B.Sc. (Biotechnology) 2th Semester (G-Scheme)
(Latest) (Full & Reappear)
Examination, May–2024
MICROBIOLOGY
Paper– BT-202

Time allowed : 3 hours] *[Maximum marks : 40*

Note: ***Question No. 1 is compulsory*** *and attempt* ***four*** *questions selecting* ***one*** *question from each unit given below. All questions carry equal mark.*

1. Write the short notes on the following: 4×2=8

   (a) Phylogeny

   (b) Inoculums

   (c) Conjugation

   (d) Yeast and Moulds

Unit-I

2. What is the virus? Describe the various similarities and differences between viruses and bacteria. 8

3. Write the notes on any **two:** 2×4

   (a) Economical importance of Protozoa

   (b) History and development of microbiology

   (c) Differences between Prokaryotic and Eukaryotic cells

Unit-II

4. What is culture media? Describe the procedure of sterilization of culture media. 8

5. Write the notes on any **two:** 2×4

   (a) Methods of bacterial isolation

   (b) Purification of microbes

   (c) Microbial preservation

Unit-III

6. Write the notes on any **two:** 2×4

   (a) Microbial growth

   (b) Transduction

   (c) Glycolysis

7. What is sporulation? Describe the various methods of sporulation in bacteria. 8

Unit-IV

8. What is food Microbiology? Describe the importance of microbes in the food process industries. 8

9. Write the notes on any **two:** 2×4

   (a) Waterborne diseases

   (b) Therapeutic Agents

   (c) Microbial deterioration of the materials

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B. Sc. (Bio- Tech.) 2nd Semester Full & Re-appear

(Latest) Examination, May-2024

GENETICS

Paper - BT-203

Time allowed : 3 hours] *[Maximum marks : 40*

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

1. Write note on the following : 8×1=8

   (a) Epistasis

   (b) Euploidy

   (c) Barr- body

   (d) Pseudo - allele

   (e) Giant Chromosome

   (f) Genetic Mapping

(g) Satellite DNA

(h) Receprocal Cross

Unit-I

2. Explain various stages of meiosis with the help of diagram and also write role of meiosis in life cycle. 8

3. Write note on : 2×4=8

(a) Reasons of Mendel's success

(b) Law of segregation and independent assortment.

Unit-II

4. Write note on : (Attempt any *two*) : 2×4=8

(a) Chromosomal Morphology

(b) VNTR's

(c) Test Cross

5. Write note on : 2×4=8

(a) One gene one peptide hypothesis

(b) Complementary gene

Unit-III

6. Explain in detail : 2×4=8

(a) Ames test for mutagenic agents

(b) Sex-linked inheritance

7. What is Mutation ? Describe its causes, type and cure in detail. 8

Unit-IV

8. What do you mean by extra nucler inheritance ? Write down its criteria. 8

9. Explain any two in detail : 2×4=8

(a) Hardy Weinberg law assumption

(b) Natural selection

(c) Cytoplasmic inheritance

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B.Sc. (Biotech) 2nd Semester Full & Reappear (Latest) Examination, May–2024

ANIMAL DIVERSITY & ECONOMIC ZOOLOGY

Paper–BT-204

Time allowed : 3 hours] *[Maximum marks : 40*

Note: *Attempt **five** questions in all. **Question No. 1 is compulsory.** Attempt at least **one** question from each Unit.*

1. Describe the following: 10×1=10

   (a) Protostomes

   (b) Choanoderm

   (c) Apolysis

   (d) Scientific name of earthworm

   (e) Arthrodial membrane

   (f) Stinging cells

   (g) Pneumostome

   (h) Retrogressive metamorphosis

   (i) Polymorphs in cnidaria

   (j) Larval stage of Platyhelminthes

Unit-I

2. Write a detailed note on the classification of non-chordates upto subclasses. 7½

3. Describe the following:

   (a) Life history of Paramoecium 4

   (b) Skeleton system in Porifera 3½

Unit-II

4. Explain general features and classification of Platyhelminthes. 7½

5. Explain the following:

   (a) Metagenesis 4

   (b) Pathogenic roundworms and their vectors 3½

Unit-III

6. Describe general the features and life history of earthworm. 7½

7. Write notes on the following:

   (a) Metamorphosis in insects 4

   (b) Sericulture 3½

Unit-IV

8. Explain the general features and classification of Echinoderms. 7½

9. Describe the following:

   (a) Life history of Pila 4

   (b) Affinities of Balanoglossus 3½

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B.Sc. (Bio-Technology) 2nd Semester
(Full & Reappear) (Latest)
Examination, May–2024
PHYSICAL CHEMISTRY
Paper– BT-205

Time allowed : 3 hours] *[Maximum marks : 40*

Instructions: *Attempt **five** questions in all, selecting one question from each section. **Q. No.1 is compulsory.** All questions carry equal marks.*

Compulsory Question

1. (a) What do you mean by the half-life period of a reaction? 1

   (b) Why reactions of higher order are rare? 1

   (c) Differentiate between rate law and law of mass action? 1

   (d) What is Boltzmann's fraction? 1

   (e) What is the conductivity of water? 1

   (f) Define ionic mobility. 1

   (g) What is relaxation effect? 1

   (h) Define molar-conductivity. 1

Section-A

2. (a) Define: 2

   (i) Specific reaction rate

   (ii) Order of a reaction

(b) Derive an expression for rate constant for first-order reaction. 3

(c) Explain the half-life period method for determination of the order of reaction. 3

3. (a) Derive integrated rate equation for second-order reaction. Describe its important characteristics. 4

(b) Describe the effect of temperature and catalyst on the rate of reaction. 4

Section-B

4. (a) Explain the transition state theory of reaction rate. What are the advantages of transition state theory over collision theory? 5

(b) Calculate the activation energy of a reaction whose reaction rate at 27°C gets doubled for 10°C rise in temperature. 3

5. (a) Derive Arrhenius equation. 4

(b) Describe Collision theory for unimolecular reactions.

Section-C

6. (a) Describe specific and equivalent conductivity. How they are related? 4

(b) Describe Arrhenius theory of ionization and its limitations. 4

7. (a) Define transport number. Describe Hittorf's method for the calculation of transport number. 4

(b) Explain Ostwald dilution law and its limitations. 4

Section-D

8. (a) Describe Kohlrausch's law. How it can be used for calculations of the conductance of weak electrolytes at infinite dilution? 4

(b) Explain types of buffer solutions. Derive Henderson's equation for acidic buffers. 4

9. (a) How conductivity measurements can be used to find the solubility of sparingly soluble salts? 3

(b) Describe different types of conductometric titrations. 3

(c) Differentiate between pH and pKa. 2

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B.Sc. (Bio Technology) 2nd Semester

Full & Reappear

Examination, May-2024

INORGANIC CHEMISTRY

Paper - BT-206

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt* **five** *questions in all, selecting* ***one*** *question from each section.* ***Q. No. 1 is compulsory.***

1. (a) What is doping?

   (b) What is intramolecular hydrogen bonding?

   (c) Why alkali metals are stored in kerosene?

   (d) What are interhalogen compounds?

   (e) What are fluorocarbons?

   (f) What is Borazine?

   (g) Draw the structure of orthophosporic acid .

   (h) Why noble gases has very high ionization energy?

$8 \times 1 = 8$

Section - A

2. (a) Explain bond theory of metallic bonding. 4

(b) What is hydrogen bonding? Discuss the effect of hydrogen bonding on properties of substances. 4

3. (a) Differentiate between n-type and p-type semiconductors with example. 4

Section - B

4. (a) What is diagonal relationship? Explain by taking example of lithium and magnesium. 4

(b) Describe the role of Na^+ and K^+ in biological system. 4

5. (a) Give reasons: 4

(i) Electron affinity of noble gases is zero.

(ii) Noble gases are not easily liquified.

(b) Describe the structure and bonding in: 4

(i) XeF_4 (ii) XeF_6

Section - C

6. (a) Describe various types of carbides with examples. 4

(b) Explain structure and bonding in diborane. 4

7. (a) Discuss the relative strength of trihalides of boron as Lewis acids. 4

(b) Explain the preparations and uses of Silicons? 4

Section - D

8. (a) Differentiate between white, red and black phosphorus. 4

(b) Describe the various oxyacids of chlorine and compare their acidic strength. 4

9. (a) Describe the various oxides of nitrogen with structure. 4

(b) Explain the various oxyacids of phosphorus with structure. 4

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B.Sc. (Bio-Technology) 2nd Semester
(Latest) (Full & Reappear)
Examination, May–2024
ORGANIC CHEMISTRY
Paper–BT-207

Time allowed : 3 hours] *[Maximum marks : 40*

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

Compulsory Question

1. (a) Why do trans alkenes have a higher melting point than cis alkenes? 1

   (b) Why alkenes are called olefins? 1

   (c) What are annulenes? 1

   (d) Why does benzene resist addition reaction? 1

   (e) What are [4+2] cycloaddition reactions? 1

   (f) Write preparation of ethyne from calcium carbide. 1

   (g) What is Walden inversion? 1

   (h) What is Sandmeyer reaction? 1

Section-A

2. (a) Describe with example: 2, 2

   (i) Markownikoffs rule

   (ii) Peroxide effect

(b) Describe dehydration of alcohols with mechanism. 4

3. (a) Describe: 3, 3

(i) Hydroboration oxidation of alkenes

(ii) Oxymercuration reduction of alkenes

(b) Explain Saytzeff's rule with example. 2

Section-B

4. Differentiate with examples: 4,4

(i) Antiaromatic and non-aromatic compounds

(ii) Activating and deactivating substituents

5. (a) Explain Huckel's rule of aromaticity with examples. 4

(b) Describe the mechanism of sulphonation of benzene with an energy profile diagram. 4

Section-C

6. Describe with examples: 4,4

(i) Classification of dienes

(ii) Diels-Alder reaction

7. (a) Why terminal alkynes are acidic in nature? 4

(b) Compare the 1, 2- and 1, 4 addition reactions of conjugated dienes. 4

Section-D

8. (a) Write important methods of preparation of alkyl halides. 4

   (b) Explain the addition elimination mechanism of nucleophilic aromatic substitution. 4

9. (a) Why allyl halides are more reactive than alkyl halides toward nucleophilic substitution reactions? 2

   (b) Describe: 3, 3

   (i) Hunsdiecker reaction

   (ii) Balz-Schiemann reaction