21CSCC501   Reg No   :   ....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
COMPUTER SCIENCE
Programming in Python

Duration:2 Hours   **Max Marks:60**

PART A

Answer any FIVE questions: **(5×2= 10)**

1) Write any two characteristics of Python.

2) How do you write multi line comments in Python? Give an example.

3) What do you mean by arbitrary arguments? Give an example.

4) How do you convert lists to tuple? Give an example.

5) What is an exception? List any two.

6) How do you write data into a file? Give an example.

PART B

Answer any FIVE questions :   **(5×6= 30)**

7) Explain break and continue statement in Python with syntax and example.

8) Explain a) remove()   b) append()   c) tolist() methods of an array with an example.

9) Explain concatenation and comparison of strings with an example.

10) Explain with syntax and example   a) clear()   b) union()   c) issuperset() methods of sets.

11) Explain method overriding in multiple inheritance with an example.

12) Write a note on   a) NumPy   b) Pandas

PART C

Answer any TWO questions :   **(2×10= 20)**

13) Explain Arithmetic and Relational operators in Python with an example.

14) Explain a) max()   b) count()   c) insert()   d) pop()   e) sort() methods of lists with syntax and example.

15) Write a program in Python to create a database "library" and perform insert operation on the table "books" with columns: bookid, title and author

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21CSCC502   Reg No   :   ....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
COMPUTER SCIENCE
Computer Networks

Duration:2 Hours   **Max Marks:60**

PART A

Answer any FIVE questions: **(5×2= 10)**

1) Which are the two layers of the OSI model responsible for data encapsulation?

2) What is a MAN? Give an example of MAN implementation.

3) What is the composition and structure of a twisted pair cable?

4) What is count-to-infinite problem?

5) What is HTML?

6) What are Dynamic web pages?

PART B

Answer any FIVE questions :   **(5×6= 30)**

7) Write a real-world example of a star topology application.

8) Explain noisy channel and noiseless channel.

9) Explain Infrared transmission.

10) Briefly explain the approaches to congestion control.

11) Compare between Datagram subnets and Virtual Circuit Subnets.

12) Explain the solutions used in Error control and flow control in transport layer.

PART C

Answer any TWO questions :   **(2×10= 20)**

13) Explain client-sever model with a neat diagram.

14) Explain a) Parity check   b) Check sum   c) CRC with examples

15) Explain the types of Static routing protocol.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
CHEMISTRY
Inorganic and Physical Chemistry - III

Time: 2 Hrs.   Max. Marks: 60

PART – A

Answer any SIX of the following: 2×6=12

1. What is binding energy?
2. Define G value and write its equation.
3. What are carboranes?
4. Define Pearson's HSAB principle.
5. Write Schrodinger wave equation and explain the terms.
6. What are fast reactions? Give an example.
7. What is equivalent conductance? How does it vary with dilution?
8. Define Kohlraush's law?

PART – B

Answer any SIX of the following: 6× 8=48

9. a) What is the nature of radiation from radioactive element?
   b) Explain the application of radioisotope in the study of organic reaction mechanism. (3+5)
10. a) State the law of radioactive decay and derive an expression for $N = N_0 e^{\lambda t}$.
    b) Explain ceric sulphate dosimeter. (5+3)
11. a) Describe four types of silicates.
    b) Describe any two applications of HSAB Principle. (4+4)
12. a) Write a short note on phosphazenes.
    b) Discuss the effect of substituents on hardness and softness of an acid. (4+4)
13. a) What are the significance of quantum numbers?
    b) Define energy of activation and give its significance. (4+4)
14. a) Explain the Hamiltonian operator.
    b) Describe the transition state theory. (4+4)
15. a) How is transport number of an ion determined by Hittorf's method using non attackable electrodes?
    b) What are the advantages of conductometric titrations? (5+3)
16. a) Discuss the conductometric titration of a mixture of strong and weak acids against strong base.
    b) The speed ratio of Ag^+ to NO_3^- ions was found to be 0.916 during the electrolysis of $AgNO_3$ solution. Find the transport number of Ag^+ and NO_3^- ions. (4+4)

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21CHEC502   Reg. No.......................................

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
CHEMISTRY
Organic Chemistry and Spectroscopy - I

Time: 2 Hrs.   Max. Marks: 60

PART – A

**Answer any SIX of the following:**   2×6=12

1. Write the equation for the oxidation of fructose with conc HNO_3.
2. What is mutarotation?
3. How do you convert pyrrole to 2 formyl pyrrole?
4. Name the monomers used to synthesize Nylon 6, 6.
5. Give the selection rule for rotational transition.
6. N_2 is IR inactive. Give reason.
7. State rule of Mutual Exclusion principle.
8. Define chromophore. Give an example.

PART – B

Answer any SIX of the following: 6× 8=48

9. a) Explain the mechanism of osazone formation.
   b) Give the preparation of   i) Alizarin   ii) Methyl orange   (4+4)
10. a) What are dyes? Explain classification of dyes based on application.
    b) How do you convert Glucose to Mannose?   (5+3)
11. a) With an example, explain mechanism of nucleophilic substitution reaction in pyridine.
    b) With the help of molecular orbital picture explain the aromatic character of thiophene. (4+4)
12. a) Explain the mechanism of free radical polymerization.
    b) Compare the basicity of pyridine and piperidine.   (5+3)
13. a) How are moment of inertia and bond length of a diatomic molecule determined from rotational spectra.
    b) What is fingerprint region? How do you identify presence of aromaticity in compounds using IR spectroscopy?   (4+4)
14. a) Explain the different types of stretching and bending vibrations in a molecule.
    b) Mention three important characteristics of Electromagnetic Radiation.   (5+3)
15. a) List four applications of Raman spectroscopy.
    b) Calculate λ max for the following compounds.   (4+4)

   i)   ii)
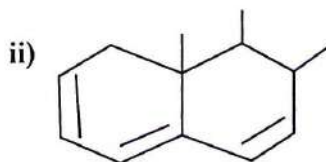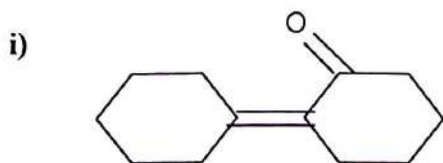
16. a) Give the instrumentation of Raman.
    b) What is hypsochronic shift? Explain with an example.   (5+3)

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21MATC501

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
MATHEMATICS
Real Analysis - II and Complex Analysis

Time: 2 Hrs.   Max. Marks: 60

PART – A

1. **Answer any SIX questions. Each question carries 2 marks:** $2 \times 6 = 12$

   a) Define norm of a partition of given interval $[a, b]$.

   b) State Darboux's condition of integrability.

   c) Show that $\int_1^\infty \frac{3dx}{e^x+5}$ converges.

   d) Evaluate $\int_0^\infty e^{-4x} x^{3/2} dx$.

   e) Find the domain of $f(z) = \frac{1}{1-|z|^2}$.

   f) Show that $f'(z)$ does not exist at any point for $f(z) = z - \bar{z}$.

   g) Show that $log(-1) = \pi i$.

   h) Evaluate $\int_0^1 (1 + it)^2 dt$.

PART – B

2. **Answer any TWO questions. Each question carries six marks:** $2 \times 6 = 12$

   a) Show that the constant function k is integrable and $\int_a^b f dx = k(b - a)$.

   b) Prove that the necessary and sufficient condition for a bounded function f to be integrable on $[a, b]$ is that to every $\epsilon > 0$ there exists a partition P of $[a, b]$ such that $U(p, f) - L(p, f) < \epsilon$.

   c) Compute Lower Sum $L(P, f)$ for the function $f(x) = x^2$ on $[0, 10]$ with the given partition $P = \{0, 2, 5, 6, 10\}$.

   d) If f is bounded and integrable on $[a, b]$ then prove that f^2 is also integrable on $[a, b]$.

PART – C

3. **Answer any TWO questions. Each question carries six marks:** $2 \times 6 = 12$

   a) Find the area under the curve $y = \frac{lnx}{x^2}$ from $x = 1$ to $x = \infty$.

   b) Evaluate $\int_{-1}^\infty \frac{d\theta}{\theta^2+5\theta+6}$.

   c) Show that $\int_0^1 x^{9/2} (1 - x)^{-1/2} dx = \frac{63\pi}{256}$.

   d) Prove that $\Gamma(n) = \lambda^n \int_0^\infty e^{-\lambda t} t^{n-1} dt$.

PART – D

4. **Answer any TWO questions. Each question carries six marks:** $2 \times 6 = 12$

   a) If $f(z) = \frac{i\bar{z}}{2}$ in the open disc $|z| < |$, then prove that $\displaystyle \lim_{z \to 1} f(z) = \frac{i}{2}$.

   b) Prove that $f(z) = |z|^2$ is not differentiable at $z \neq 0$.

   c) Suppose that $f(z) = u(x, y) + iv(x, y)$ and that $f'(z_0)$ exists at a point $z_0 = x_0 + iy_0$. Then prove that the first order partial derivatives exist and satisfy Cauchy-Riemann equations.

   d) If $f(z) = e^{-x}(cos x - i sin y)$, then show that $f(z)$ in analytic and find $f'(z)$.

PART – E

5. **Answer any TWO questions. Each question carries six marks:** $2 \times 6 = 12$

   a) If $u(x, y) = 2x(1 - y)$, show that $u(x, y)$ is harmonic in some domain and find its harmonic conjugate.

   b) Establish the identity $\cos(z_1 + z_2) = \cos z_1 \cos z_2 - \sin z_1 \sin z_2$.

   c) If m and n are integers, show that $\int_0^{2\pi} i^{im\theta} e^{-in\theta} \, d\theta = \begin{cases} 0 \text{ if } m = n \\ 2\pi \text{ if } m = n \end{cases}$.

   d) Evaluate : $\int_C \bar{z} \, dz$, where $C : z = 2e^{i\theta}, -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
MATHEMATICS VI
Advanced Algebra and Discrete Mathematics

Time: 2 Hrs.   Max. Marks: 60

PART – A

1. **Answer any SIX questions. Each question carries 2 marks:**   2×6=12

   a) If N is a normal subgroup of a group G, prove that product of 2 night cosets of N in G is again a night coset of N in G.

   b) Write the permentation $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 3 & 1 & 4 & 5 & 2 & 7 & 8 & 6 \end{pmatrix}$ as product of disjoint cycles.

   c) Prove that every field is an integral domain.

   d) If $\emptyset : R \to R'$ is defined by $\emptyset(x) = x \ \forall x \in R$, find $Ker\emptyset$ where $R \ and \ R'$ are rings $w.r.t$ addition and multiplication.

   e) Define regular graph and give an example.

   f) Define Hamiltonian path and Hamiltonian circuit in a graph.

   g) Write chromatic Polynomial of the graph
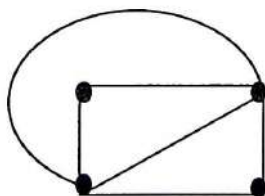
   h) In any simple connected graph with n vertices, e edges and f regions, prove that $e \leq 3n - 6$.

PART – B

2. **Answer any TWO questions. Each question carries six marks:**   2× 6=12

   a) Prove that any two right cosets of H in a group G are either identical or have no elements in common.

   b) If G is finite group and $a \in G$, prove that $0(a)$ divides $0(G)$.

   c) If G is a group and N is a normal subgroup of G and $\emptyset: G \to {}^{G}/_{N}$ is defined by $\emptyset(x) = Nx$ for every $x \in G$, prove that $\emptyset$ is a homomorphism from G onto ${}^{G}/_{N}$.

   d) If $\emptyset$ is a homomorphism of G into $\overline{G}$ with Kernel K, prove that K is normal subgroup of G.

PART – C

3. **Answer any TWO questions. Each question carries six marks:**   2× 6=12

   a) If p is a prime number, prove that Jp, the ring of integers modulo p is a fielol.

   b) If F is a field, prove that its only ideals are (0) $and \ F$ itself.

   c) If U is an ideal of a ring R & $1 \in U$ Prove that $U = R$.

   d) If R is a ring and U and V are ideals of R prove that $U + V = \{u + v/u \in U, v \in V\}$ is also an ideal of R.
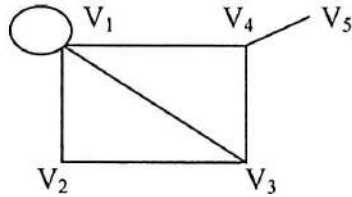
PART – D

4. **Answer any TWO questions. Each question carries six marks:** 2× 6=12

a) If G is a simple graph without parallel edges and self loops with n vertices and k components prove that G can have at most $\frac{(n-k)(n-k+1)}{2}$ edges.

b) Define walk, path and eccentricity of a vertex in a graph. Write all the paths from V_1 to other vertices and find Eccentricity of V_1.

c) Prove that a graph is a tree if and only if it is minimally connected.

d) i) Prove that in a binary tree with n vertices, number of pendant vertices is $p = \frac{(n+1)}{2}$.

ii) Define spanning tree of a graph. Write branches and chords of the graph G w.r.t spanning tree $T = \{a, c, d, f, g\}$
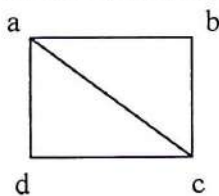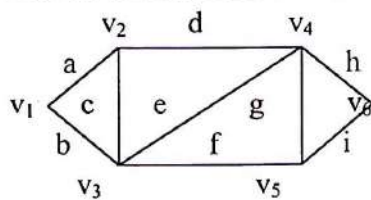

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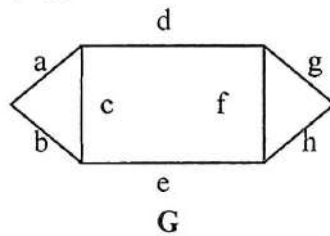
PART – E

5. **Answer any TWO questions. Each question carries six marks:** 2× 6=12

a) Prove that a graph with at least one edge is two chromatic if and only if it has no circuit of odd length.

b) A graph of n vertices is a complete graph if and only if its chromatic polynomial is $Pn(\lambda) = \lambda(\lambda - 1)(\lambda - 2) \dots \dots (\lambda - (n - 1))$.

c) End chromatic polynomial of the graph

d) Write all the cutsets of the following graph.

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Reg. No.....................................

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
ZOOLOGY
Non-chordates and Economic Zoology

Time: 2 Hrs.   Max. Marks: 60

SECTION – A

I. **Answer the following strictly observing the internal choice provided:**   4×5=20

  1. Enumerate the salient features of phylum Ctenophora with an example.

       OR

  2. Explain the External Features of *Taenia solium.*

  3. Draw a neat labeled diagram of nervous system of Palaemon.

       OR

  4. Explain the external features of Leech.

  5. With a neat labeled diagram, describe the morphology of Pila.

       OR

  6. Write any four characters of Phylum Echinodermata with one example.

  7. Write a note on preparation of bed for vermicomposting.

       OR

  8. Give an account of Indigenous Poultry Breeds.

SECTION – B

II. **Answer the following strictly observing the internal choice provided:**   4× 10=40

  9. Classify the Phylum Protozoa up to classes, giving two distinguishing characters and one example for each class.

       OR

  10. With a neat labeled diagram, explain the external features of Ascaris.

  11. Give an account of the general characters of the Phylum Annelida with any two examples.

       OR

  12. Describe the external features of Palaemon.

  13. Enumerate the general characters of Phylum Mollusca. Write any two examples.

       OR

  14. Explain water vascular system of Asterias with a neat labeled diagram.

  15. Write explanatory notes on Propagation and harvesting of Lac.

       OR

  16. Give an account on life cycle of termites and their control.

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21ZOOC502

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
ZOOLOGY
Chordates and Comparative Anatomy

Time: 2 Hrs.   Max. Marks: 60

SECTION – A

I. Answer the following strictly observing the internal choice provided: 4×5=20

UNIT – 1

1. Draw a neat labeled diagram of Herdmania. Explain its morphology.

OR

2. Explain the structure of Tornaria larva with a labeled diagram.

UNIT – 2

3. What is Paedogenesis? Explain with reference to Amphibians.

OR

4. Describe swim bladders in fishes.

UNIT - 3

5. Write a brief note on Accessary respiratiory organs in fish.

OR

6. Explain the Dentition in vertebrates with suitable example.

UNIT - 4

7. Define cranial nerves. Explain with reference to mammals.

OR

8. Write a short note on types of mammalian uteri.

SECTION – B

II. Answer the following strictly observing the internal choice provided: 4× 10=40

UNIT - 1

9. With a neat labeled diagram explain the digestive system of Branchiostoma.

OR

10. Discuss the affinities of Hemichordates.

UNIT – 2

11. Classify Subphylum Vertebrata up to classes giving an example for each.

OR

12. Give a detailed account on venomous and non-venomous snakes.

UNIT – 3

13. Give a brief comparative account of Axial endoskeleton in vertebrates.

OR

14. Explain integumentary system in vertebrates. Add a note on its functions.

UNIT - 4

15. Discuss the evolution of vertebrate heart with suitable illustrations.

OR

16. Describe the mechanism of vision in Humans.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
PHYSICS
Classical Mechanics and Quantum Mechanics

Duration:2 Hours   **Max Marks:60**

PART - A

Answer any five questions, selecting minimum of one question from every unit :   5×9=45

UNIT I

1   a) Write Lagrange's equation of motion for a linear harmonic oscillator.

     b) What is a constraint? Explain the type of constraints in detail.   **(2+7)**

2   a) What are generalized coordinates?

     b) Deduce Newton's equation of motion from Lagrange equation.   **(2+7)**

UNIT II

3   a) Deduce $[uv, w] = u[v, w] + v[u, w]$

     b) Prove that Poisson's bracket obyes commutative and distributive law.   **(2+7)**

4   a) Is it possible to derive Lagrangian equation from Hamilton's principle? If possible write its mathematical expression.

     b) Define Poisson's bracket and deduce any two properties of Poisson's bracket.

                                                     (2+7)

UNIT III

5   a) Draw a curve showing stopping potential against frequency of a photo sensitive material. How do you determine the threshold frequency with the help of the graph?

     b) State Heisenberg's uncertainty principle and derive it from a hypothetical gamma ray microscope.   **(2+7)**

6   a) Distinguish between electron microscope and optical microscope.

     b) Derive an expression for Compton shift and explain its significance.   **(2+7)**

21PHYC502

PART - A

Answer any five questions, selecting minimum of one question from every unit :   5×9=45

UNIT I

1 a) Explain Rutherford's atom model on the basis of scattering of α rays.

   b) With relevant diagram explain Franck and Hertz experiment.   **(2+7)**

2 a) State and explain the postulates of Sommerfeld's atom model.

   b) Derive an expression for the fraction of α particles experiencing scattering angles greater than θ. **(2+7)**

UNIT II

3 a) What is the significance of the orbital quantum number L?

   b) What is spin-orbit coupling? Explain the splitting of spectral lines due to spin orbit coupling.   **(2+7)**

4 a) Give the expression for Zeeman shift and explain the terms.

   b) With a relevant diagram explain Stern Gerlach experiment.   **(2+7)**

UNIT III

5 a) How does the study of Raman Effect help in determining molecular structure?

   b) What is coherent scattering? Explain the phenomena of scattering of light and hence explain the reason for the blue colour of the sky.   **(2+7)**

6 a) Give the applications of molecular spectra.

   b) Draw the energy level diagram for diatomic molecule. Show that in rotational spectra the energy levels are not equally spaced whereas the frequencies are equally spaced.   **(2+7)**

UNIT IV

7 a) Write a note of Holography.

b) Draw the diagram and explain the working of a Helium Neon Laser. **(2+7)**

8 a) What is optical pumping? How can it be achieved?

b) With relevant energy diagrams explain induced absorption and spontaneous emission. **(2+7)**

PART - B

Answer any three questions: **3×5= 15**

9 Show that the velocity of the electron in the first Bohr orbit is $(1/137)c$ where c is the velocity of light. $\epsilon_0 = 8.85 \times 10^{-12}$ F/m .

10 Calculate the wavelength separation between the two component lines which are observed in normal Zeeman effect. The magnetic field is 0.4 Wb/m^2.
$m = 9.1 \times 10^{-31}$Kg, $e = 1.6 \times 10^{-19}$C .

11 Calculate the frequency of oscillation of Hydrogen molecule if its force constant is 4800 N/m and mass of Hydrogen atom is 1.67×10^{-17} Kg.

12 A beam of Silver atoms in a Stern Gerlach experiment obtained from an oven heated to a temperature of 1000 K passes through a heterogeneous magnetic field having field gradient 200 T/m covers a distance 0.12m in the magnetic field. Calculate the seperation between the traces. Mass of Silver atom = 1.79×10^{-25} kg, Bohr magneton = 9.2×10^{-24} J/T, K = 1.38×10^{-23} J/K.

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21BOTC501 Reg No : ....

Duration:2 Hours **Max Marks:60**

I. Answer any Five of the following : (5×2= 10 Marks)

1. Mention the merits of Phylogenetic system of classification.

2. What is pistil? Mention its parts.

3. Explain verticillaster with an example.

4. Give botanical names of i) Oil palm ii) Sago

5. Write botanical names of any two economically important plants of Lamiaceae.

6. Mention any two International Botanical Gardens.

7. What are storage leaves? Give example.

8. Define Phenetics.

II. Answer any FOUR of the following : (4×5= 20 Marks)

9. Write a note on Cluster analysis

10. Write the functions of the following with one example each i) Prop roots
    ii) Napiform roots   iii) Pneumatophores

11. Explain the diagnostic features of family Anacardiaceae.

12. Explain the Inflorescences seen in family Euphorbiaceae.

13. Comment on the corolla of sub family Papilinoideae. Write the Botanical names of
    any 2 economically important plants of the family.

14. Define Binomial Nomenclature. Rewrite the following scientific names following the
    rules of binomial nomenclature i) Mangifera Indica   ii) Cocosnucifera
    iii) OryzaSativa   iv) gossipium Hirsutum

15. Mention the Division, Class, Subclass, Cohort and Family name of *Tridax
    procumbens*.

16. Mention the principles of numerical taxonomy.

III. Answer any THREE of the following :   **(3×10= 30 Marks)**

17. Write a short notes on i) Caryopsis ii) Jaculators iii) Quincuncial aestivation
    iv) Hermaphrodite flowers v) Sagittate stamens.

18. Write the distinguishing characters of the family Asteraceae. Mention two plants of
    economic importance.

19. Write the distinguishing characters of the family Apocynaceae. Mention two plants of
    economic importance.

20. Explain the Herbarium technique. Name any two national herbaria.

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Reg No : ....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
BOTANY
Genetics and Plant breeding

Duration:2 Hours   **Max Marks:60**

I. Answer any Five of the following :   **(5×2= 10 Marks)**

1. What is penetrance? Mention its types.

2. What is dominant and recessive trait?

3. Differentiate Hypoploidy and Hyperploidy.

4. What is genetic drift?

5. Mention the steps involved in sexual reproduction.

6. What is pure- line selection? Give example.

7. What is heterosis? How does hybrid vigour arise?

8. Mention any two disadvantages of mutation breeding.

II. Answer any FOUR of the following :   **(4×5= 20 Marks)**

9. Explain chloroplast mutation in four O' clock plant.

10. Write the genetic effect of duplication.

11. Explain the limitations of Vavilov's view.

12. Mention the application of polygenic inheritance in plant breeding.

13. Describe complementary gene interaction.

14. Explain the factors that influences mutation rate.

15. Explain DNA repair mechanism.

16. Explain ploidy breeding.

III. Answer any THREE of the following : (3×10= 30 Marks)

17. Explain incomplete dominance with example.

18. Explain the mechanism of crossing over.

19. Explain the advantages of hybridization in plants.

20. Explain the role of biotechnology in crop improvement.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
MICROBIOLOGY
Molecular Biology

Time: 2 Hrs.   Max. Marks: 60

SECTION – A

Answer the following strictly observing the internal choice provided: 4×5=20

UNIT – 1

1) Write briefly on different forms of DNA.
            OR
2) Write a short note on enzymes involved in DNA replication.

UNIT – 2

3) Outline the properties of RNA polymerase.
            OR
4) Write a note on the structure of mRNA

.

UNIT – 3

5) Write a note on shot gun method.
            OR
6) Write a note on plasmids.

UNIT – 4

7) Define mutation. Write briefly about spontaneous mutation.
            OR
8) Write a note on microlesion.

SECTION – B
Answer the following strictly observing the internal choice provided: 4× 10 = 40

UNIT – 1

9) Discuss Watson and Crick model of DNA.
            OR
10) Explain the mechanism of DNA replication.

UNIT – 2

11) Describe Griffiths transformation experiment.
            OR
12) Explain in detail types of transduction.

UNIT – 3

13) Explain the stages of protein synthesis.

OR

14) Explain in detail principles of genetic engineering.

UNIT – 4

15) Write in detail on induced mutations.

OR

16) Describe Lac Operon concept of regulatory mechanism in bacteria.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
MICROBIOLOGY
Food Microbiology

Time: 2 Hrs.　　　　　　　　　　　　　　　　　　　　Max. Marks: 60

SECTION – A

Answer the following strictly observing the internal choice provided:　　　　4×5=20

UNIT – 1

1) Write a note on Shigellosis.

OR

2) What are synbiotics? What are its benefits and side effects?

UNIT – 2

3) Write a note on chemical preservatives.

OR

4) Write a note on chemical properties of the food responsible for its spoilage.

UNIT – 3

5) Discuss preservation of milk by pasteurization.

OR

6) Write a note on gassy and stormy fermentation.

UNIT – 4

7) Write a note on good hygiene practices in food industry

OR

8) Discuss the characteristics of indicator organisms in food contamination.

SECTION – B

Answer the following strictly observing the internal choice provided:　　　　4× 10 = 40

UNIT - 1

9) Explain any two food borne infections.

OR

10) Estimate the microbial content in food by total viable count method.

UNIT – 2

11) Explain the types of food spoilage.

OR

12) Discuss the food preservation by temperature method.

UNIT – 3

13) Define milk. Write a note on the composition and sources of contamination of milk.

OR

14) Discuss the resazurin and phosphatase test for milk.

UNIT – 4

15) Define food safety. Write a note on hazards in food safety.

OR

16) Expand HACCP. Write the principles of HACCP.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023

STATISTICS

Matrix Algebra and Regression Analysis

Duration:2 Hours   **Max Marks:60**

Answer any THREE of the following :   **(3×2= 06)**

1. Define a lower triangular matrix with an example.

2. Mention any two Elementary Transformations of a matrix

3. State the Cayley-Hamilton Theorem and mention its application.

4. Give the test statistic for testing the significance of regression and how do you draw inference.

5. Define Prescriptive model with an example.

Answer any FOUR of the following in not more than a page each :   **(4×6= 24)**

6. If A is a square matrix, Prove that A.(Adj A) = Adj(A).A = |A|. I

7. Find a Basis for the column space of the matrix $A = \begin{bmatrix} 1 & 1 & 2 & 1 \\ 1 & 0 & 1 & 2 \\ 2 & 1 & 3 & 4 \end{bmatrix}$

8. Convert the following matrix to the row echelon form
$C = \begin{bmatrix} 1 & -2 & 1 & -1 \\ 3 & 0 & -2 & 3 \\ 5 & -4 & 0 & 1 \end{bmatrix}$

9. Explain the graphical method of solving an LPP.

10. Why TP is called a special case of LPP?

11. Derive the least squares estimators of the regression coefficients of the multiple regression model

Answer any THREE of the following in not more than two page each :   **(3×10= 30)**

12. Reduce the following matrix to its Canonical Form and find its rank.
$A = \begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix}$

13. Find the characteristic values and characteristic vectors of the following matrix

$$A = \begin{bmatrix} 1 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 1 \end{bmatrix}$$

14. FInd an orthogonal matrix P such that $P^{-1}AP$ is diagonal where

$$A = \begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ -1 & 2 & 5 \end{bmatrix}$$

15. a) Prove that if the kth constraint of the primal is an equality, then the kth dual variable is unrestricted in sign.(5)

b) What are the characteristics of duality.(5)

16. a) Explain AP and write its mathematical formulation.(5)

b) Explain the concept of travelling salesman problem.(5)

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. FIFTH SEMESTER DEGREE EXAMINATION NOVEMBER/DECEMBER 2023
STATISTICS
Analysis of variance and Design of Experiments

Duration:2 Hours   **Max Marks:60**

Answer any THREE of the following :   **(3×2= 06)**

1. Define one way ANOVA.

2. What are the least square estimates of the parameters μ ,αi and βj in the model of two way ANOVA?

3. What is randomization?

4. State an expression for estimating one missing observation in RBD.

5. Identify a situation for the application of 2^3 factorial experiment.

Answer any FOUR of the following in not more than a page each :   **(4×6= 24)**

6. Explain Two-way classified data with an example. Give the model for two way classified data and explain the components.

7. Briefly explain Tuckeys Method of pairwise testing in ANOVA.

8. Derive an expression for expected value of sum of squares due to Treatments and blocks in case of RBD.

9. What do you mean by LSD? Give the model of the design and explain the components.

10. Illustrate with an example the need for the factorial experiments and its advantages.

11. What do you mean by Confounding? Distinguish between Partial and complete confounding .

Answer any THREE of the following in not more than two page each :   **(3×10= 30)**

12. Illustrate the technique of ANOVA for Three-way classification, stating the breakdown of the total sum of squares, their distributions and the hypothesis that are usually tested. Also write down the ANOVA Table.

13. Describe the model, layout, hypothesis to be tested and analysis with ANOVA table in case of Completely Randomized Design.

14. Is Latin Square Design more efficient than Randomized Block Design? Justify.

15. What is a treatment contrast? When two such contrasts are said to be orthogonal? Show that in 2^3 factorial expriment main effect B and an interaction effect BC, ABC are mutually orthogonal.

16. What is complete Confounding? Explain how the complete confounding technique is applied with an example.

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