21CSCC301 Reg No : .....

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME**

**B.Sc. THIRD SEMESTER DEGREE EXAMINATION** OCTOBER 2025

**COMPUTER SCIENCE**

**Computer Science Theory - III: Object Oriented Programming Concepts & Java**

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

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## PART A

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

1) What are separators in java?
2) What are instance variables?
3) List the different forms of inheritance in java.
4) What do you mean by runnable state in the life cycle of a thread?
5) Name the two categories of errors.
6) What is a constant? Give an example.

## PART B

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

7) Explain simple if and if else statements with syntax and example.
8) Explain how to declare, define and initialize an array with the help of a program code.
9) How can you extend interfaces from other interfaces? Explain with the help of an example.
10) How to design and execute applets?
11) What is World Wide Web? What is the contribution of java to the WWW?
12) Write a program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted, starting with the $n^{th}$ character.

## PART C

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

13) a) What is Object Oriented Programming? How is it different from the procedure-oriented programming?
14) Explain with syntax and example the following: a) While loop b) do...while loop
15) Explain abstract methods and abstract classes with an example.

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2976

21CHEC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.Sc. THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

CHEMISTRY

Analytical and Organic Chemistry - II

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

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## PART - A

**I. Answer any Six from the following:** **(2×6= 12 Marks)**

1. What is eluent and eluate?
2. Define molar extinction coefficient.
3. Why is alcohol not used as a solvent in solvent extraction?
4. Write the significance of $R_f$ value.
5. How is the intermediate Spirodienone formed?
6. Give one method of formation of carbene.
7. Draw the Newman staggered conformation for ethane.
8. Draw the structure of maleic acid and fumaric acid.

## PART - B

**II. Answer any SIX of the following choosing at least one question from each unit:**

**(6×8= 48 Marks)**

### UNIT I

9. a. Explain the instrumentation and working of a double beam spectrophotometer.
   b. Derive Beer-Lambert's law. (5+3)

10 a. With the neat diagram explain the instrumentation of Nephelometry.
   b. Explain the relationship between frequency, wavelenth and energy of electromagnetic radiations. (5+3)

### UNIT II

11. a. Explain the mechanism of anion exchange resin.
    b. Explain the criteria for the selection of mobile phase. (4+4)

12 a. How are compounds separated by paper chromatography?
   b. Briefly explain solvent extraction. (4+4)

## UNIT III

13. a. Explain the mechanism of pinacol- pinacolone rearrangement?
    b. How are carbocations formed? (5+3)

14 a. Write the mechanism of Aldol condensation.
    b. Explain Perkin reaction with an example. (5+3)

## UNIT IV

15. a. Explain optical activity in tartaric acid.
    b. What are enantiomers? Explain with an example. (4+4)

16 a. Explain any two methods of separation of a Racemic mixture.
    b. Explain C.I.P rules for naming enantiomers with an example. (4+4)

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21ZOOC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.Sc. THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

ZOOLOGY

Molecular Biology, Bio instrumentation and Techniques in Biology

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

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## SECTION - A

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

### UNIT 1

1) Define genetic code. List any five characteristics of genetic code.

OR

2) Describe the steps in the elongation process of transcription in eukaryotes.

### UNIT 2

3) Write a note on trp operon in E.coli.

OR

4) Explain the importance of capping and polyadenylation.

### UNIT 3

5) Write a short note on the high performance liquid chromatography and mention its applications.

OR

6) Mention the principle of centrifugation. Give a short note on ultracentrifugation.

### UNIT 4

7) Write a brief note on the steps of DNA fingerprinting.

OR

8) Write the methodology of autoradiography.

## SECTION - B

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

### UNIT 1

9) Describe the similarities and dissimilarities between Chromosomes and Genes.

OR

10) Write a comparative account of the elongation process of translation in Prokaryotes and Eukaryotes.

## UNIT 2

11) Explain post-translational modifications. What are its purpose, advantage and significances?

OR

12) What is ubiquitination? Give a detailed explanation on its role in intracellular protein degradation.

## UNIT 3

13) Give a detailed account on light microscopy.

OR

14) Give a detailed account on electron microscopy.

## UNIT 4

15) Explain the principle and working of spectrophotometer. Add a brief note on its uses.

OR

16) Give a detailed account of DNA sequencing.

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21STAC301 Reg No : .....

**CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME**

**B.Sc THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025**

**STATISTICS**

**Calculus and Probability**

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

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

1. Find the derivative of sin(x) at x=0 from the first principle.
2. If the cumulative Distribution Function is F(x) then what is the cumulative distribution function of Y=aX?
3. Define Sampling Distribution.
4. Explain Correlogram.
5. What is deseasonalized data?

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

6. Find $\lim_{x\to 0} f(x)$ and $\lim_{x\to 1} f(x)$, where

$$f(x) = \begin{cases} 2x+3 & \text{if } x \leq 0 \\ 3(x+1) & \text{if } x > 0 \end{cases}$$

7. Deduce the p.d.f of Y=X(n)=Max(x1,x2,....,xn) when X~ U(0,$\theta$) .
8. When X~$\chi^2(n)$ prove that $\frac{X}{2}$ ~ Gama($\frac{n}{2}$).
9. Derive an expression for the mean of F Variate with $n_1$ and $n_2$ degrees of freedom.
10. Derive normal equations for fitting a linear trend using the method of least squares.
11. What do you mean by weighted moving average method? Explain

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

12. Solve $\int_0^a x^4 \sqrt{(a^2 - x^2)}\, dx$

13. If X and Y are the independent Gamma variates with parameters μ and ƛ respectively. . Then show that U=X+Y and Z=$\frac{X}{X+Y}$ are independent. And also show that U~Gama(μ+ƛ) and Z~$\beta 1$(μ,ƛ).

14. Derive an expression for the mean and variance of t Variate with n degrees of freedom.

15. Establish the relationship between t, F and Chi Square distribution.

16. Briefly explain the steps on Monte Carlo simulation.

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22NHEC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.A. & B.Sc THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

NUTRITION AND HEALTH EDUCATION

Introduction to Food Safety

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

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## SECTION - A

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

### UNIT 1

1) Explain the concept of cross-contamination in food safety.

OR

2) Describe personal hygiene practices that are crucial to maintaining food safety.

### UNIT 2

3) Define "critical limit" in the context of HACCP and explain its significance.

OR

4) What are the different ways to store food?

### UNIT 3

5) How do labels help in making informed choices?

OR

6) Give three commonly consumed food items and give the test to detect the adulterants that could be found in them.

### UNIT 4

7) Describe the Codex Alimentarius and its role in international food standards.

OR

8) Write a brief note on i) PFA ii) BIS

## SECTION - B

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

### UNIT 1

9) Define biological hazards and provide detailed examples of foodborne pathogens, their sources, and associated illnesses.

OR

10) Explain the role of packaging materials and storage conditions in preventing contamination and extending the shelf life of food products.

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## UNIT 2

11) What are the factors affecting food safety.

OR

12) Explain the difference between natural and synthetic food additives. Discuss the advantages and disadvantages.

## UNIT 3

13) Explain the causes and symptoms of Aflatoxin intoxication. What preventive measures can be taken to avoid this?

OR

14) What is PFA Act? Give its importance.

## UNIT 4

15) Write on the role of FSSAI in maintaining the food safety and standard.

OR

16) Write in detail on i) Fruit Products Order (FPO) ii) Meat Products Order (MPO)

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24BOTC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM

B.Sc THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

BOTANY

Phanerogams and Plant systematics

**Duration:3 Hours** **Max Marks:80**

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

1. Write a short note on features of stem in Cycas.
2. Differentiate bulb and corm with examples.
3. What is papilionaceaous corolla? What is the aestivation of the same?
4. What are the features of androecium in family Cucurbitaceae?
5. What are the features of calyx in Solanaceae?
6. Give any two economic importance of family Rubiaceae.

**II. Answer any FIVE of the following :** **(5×6= 30 Marks)**

7. With a neat labelled diagram describe the features of female cone in *Pinus*.
8. Differentiate cyathium, hypanthodium and verticellaster with examples.
9. Write the floral features of Annonaceae.
10. Discuss the merits and demerits of the artificial and natural systems of classification.
11. Differentiate the features of Orchidaceae and Liliaceae.
12. Explain the floral features of family Poaceae.

**III. Answer any FOUR of the following :** **(4×10= 40 Marks)**

13. What is placentation? Explain any five types of placentation with the diagram.
14. Exaplain in deatil any ten adventitious root modifications seen in angiosperms.
15. What is herbarium? What are its role? Differentiate Regional & E-herbarium. Mention any two important hebaria of the world.
16. Describe in detail about features and economic importance of family Acanthaceae
17. Describe in detail about features and economic importance of family Amaranthaceae.

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24CHEC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM

B.Sc THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

CHEMISTRY

General Chemistry-III

**Duration:3 Hours** **Max Marks:80**

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## PART - A

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

1 Give reason: $NF_5$ is not known while $PF_5$ is well known.

2 Write the electronic configuration of arsenic (33) and sulphur (16).

3 Write two differences between ideal gas and real gas.

4 What is continuity of state?

5 Formaldehyde gives Cannizzaro reaction while acetaldehyde does not. Give reason.

6 Give an example for acid catalysed ring opening reaction of epoxides.

## PART - B

**II.Answer any seven of the following choosing at least TWO from each Unit: (10×7= 70 Marks)**

### UNIT I

7 a. Explain the Lewis acid character of trihalides of boron.
b. Explain any two types of carbides.
c. Write a note on the types of halides formed by elements of group 15. (4+3+3)

8 a. Explain the preparation of $XeF_2$ and $XeF_4$.
b. Write a note on oxides of group 13 to group 17. (5+5)

9 a. Explain the classification of silicates with examples.
b. Explain the formation of hydrides in group 13.
c. Explain the structure and bonding in diborane. (4+3+3)

## UNIT II

10 a. Derive expressions for critical constants in terms of Van der Waals constants a and b.

b. Write short note on Xray diffraction by crystals.

c. The Van der Waal's constants of a gas are a = 0.751 $dm^6$ atm $mol^{-2}$ & b=0.0226 $dm^3$/mol. Calculate the critical constants. (4+3+3)

11 a. With the help of a neat diagram explain Linde's method for liquefaction of gases.

b. Calculate the Miller indices of a plane which has intercepts 1a,3b and is parallel to the third axis.

c. How is crystal structure determined by rotating crystal method? (4+3+3)

12 a. Explain the different types of liquid crystals.

b. Derive Braggs equation. (5+5)

## UNIT III

13 a. Explain the following reactions of amides

i) Hoffmanns degradation reaction ii) reaction with nitrous acid.

b. Benzaldehyde does not undergo aldol condensation.Give reason.

c. Explain the nucleophilic addition reaction of acetaldehyde with sodium bisulphite and water. (4+3+3)

14 a. Explain the action of heat on alpha and beta hydroxy acids.

b. Explain the auto oxidation of ethers.

c. Give any two methods of preparation of acid anhydride. (4+3+3)

15 a. Explain the action of heat on i) oxalic acid ii) Succinic acid.

b. Explain the preparation of glutaric acid from 1,3 dibromopropane.

c. Explain the mechanism of Benzoin condensation reaction. (4+3+3)

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24CSCC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM

B.Sc THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

COMPUTER SCIENCE

Object Oriented Programming Concepts and Programming in Java

Duration:3 Hours Max Marks:80

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

1. Write the general form of if....else statement.
2. List the relational operators in Java.
3. List any four string methods of the class String.
4. List any two restrictions associated with static methods.
5. What are literals in Java? List any two types of literals.
6. What is concurrency?

**II. Answer any FIVE of the following : (5×6= 30 Marks)**

7. What are labelled loops in Java? Explain with the help of an example.
8. What is typecasting? Explain with examples.
9. What are the unique advantages of an object-oriented programming paradigm?
10. Explain multilevel inheritance with the help of an example.
11. How can you extend interfaces from other interfaces? Explain with the help of an example.
12. Explain the basic concepts of exception handling with syntax.

**III. Answer any FOUR of the following : (4×10= 40 Marks)**

13. Explain: a) Java's interaction with the web b) Java development tools
14. Write a program to search for a given number in a one dimensional array using binary search.
15. With an example, explain how to create, access and use a user defined package.
16. Explain: a) The different attributes of an APPLET tag.
    b) How can you pass parameters to applets?
17. Explain abstract methods and abstract classes with an example.

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24MATC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM

B.Sc. THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

MATHEMATICS

Sequences, Series and Differential Equations

Duration:3 Hours Max Marks:80

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I. Answer any EIGHT of the following : (8×3= 24 Marks)

a. Write the first four terms of the sequence $\{\frac{(-1)^{n+1}}{2n-1}\}$.

b. Find the limit points,limit superior and limit inferior of the sequence $\{1+(-1)^n\}$. Also discuss the convergence of the sequence.

c. Check the convergence of the series (i) $\sum_{n=1}^{\infty} \frac{1}{n+4}$ (ii) $\sum_{n=1}^{\infty}(\frac{3}{2})^n$.

d. Determine whether the series $\sum_{n=1}^{\infty}(-1)^{n+1}\frac{n}{n+1}$ is absolutely convergent or conditionally convergent or divergent.

e. 1. Define order of a differential equation.

2. Find the order of the differential equation: $(\frac{d^2y}{dx^2})^3 + x(\frac{dy}{dx})^5 + y = x^2$.

f. Check if the function $f(x,y) = e^x$ is homogenous.

g. Solve $\frac{dy}{dx} = xy^2$.

h. Check whether $(3x^2 + ycosx)dx + (sinx - 4y^3)dy = 0$ is exact.

i. Solve $(D^3 - 2D^2 - D + 2)y = 0$.

j. Solve $(D^2 + 8)y = cos8x$.

II. Answer any EIGHT of the following : (8×7= 56 Marks)

a. Prove that every bounded sequence has a limit point.

b. State and prove Sandwich Theorem.

c. Check the convergence of the series $\sum_{n=1}^{\infty}\frac{tan^{-1}x}{x^2+1}$ using the Integral test.

d. Check the convergence of $\sum_{n=1}^{\infty}(-1)^n\frac{n!}{2^{n+1}}$.

e. Solve $y(x+y)dx + (x+2y-1)dy = 0$.

f. Solve $(r + sin\theta - cos\theta)dr + r(sin\theta + cos\theta)d\theta = 0.$

g. Solve $\frac{dy}{dx} + 2y = x.$

h. Solve $(3D^2 + D - 14)y = 13e^{2x}.$

i. Solve $(D^2 + 5D + 6)y = e^{-2x} + sin4x.$

j. Solve $(D^2 + 1)y = cotx$ using variation of parameters method.

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24MICC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM

B.Sc. THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

MICROBIOLOGY

Microbial Growth and Biochemistry

**Duration:3 Hours** **Max Marks:80**

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

1. Expand DMC.
2. What are acidophiles?
3. What are buffers? Give an example.
4. What are pyrimidines?
5. What is a substrate?
6. Write the nomenclature of enzymes with an example.

**II. Answer any FIVE of the following :** **(5×6= 30 Marks)**

7. Write a short note on autotrophs.
8. Write a short note on growth curve.
9. Write a note on Disaccharides.
10. Explain the structure of ATP in brief.
11. Write a note on oxidoreductases and transferases.
12. Write a note on the thermolability of enzymes.

**III. Answer any FOUR of the following :** **(4×10= 40 Marks)**

13. Explain the modes of cell reproduction in bacteria.
14. Explain the modes of transport of nutrients in bacteria with diagram.
15. Discuss the principle of macromolecular separation by electrophoresis.
16. Describe the classification of lipids based on composition.
17. Describe Fischer's lock and key model of enzyme action.

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24NHEC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.A/B.Sc. THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

NUTRITION AND HEALTH EDUCATION

Introduction to Food Safety

Duration:3 Hours Max Marks:80

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Section A

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

1. State one difference between contamination and spoilage.
2. Define Good Manufacturing Practices (GMP).
3. Brief note on Aflatoxins.
4. Write a short note on CODEX.
5. Why are food additives used in food products?
6. Define Biological hazards with example.

Section B

II.Answer any Five of the following: (5×5= 25)

7. State any five key terms related to food safety.
8. Describe how microbiological standards are applied in dairy products.
9. Discuss the reasons why food producers may adulterate commonly consumed food items.
10. Write on the role of FAO in maintaining food standard.
11. What happens if the food manufacturers provides false or misleading information on their product labels?
12. What are the functions and responsibilities of the AGMARK?

Section C

III. Answer any Three of the following: (3×15= 45)

13. Give the importance of proper personal hygiene and sanitation for food handlers and workers in a food production facility. How can these measures minimize the risk of contamination?

14. What is HACCP. What are its 7 principles? Add a note on each of their importance.

15. Write in detail on

    i) Fruit Products Order (FPO) (7)

    ii) Milk and Milk Product Order (MMPO) (8)

16. What is Adulteration? Explain its types with suitable example and what are the consquences of adulterating a food.

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24PHYC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.Sc THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

PHYSICS

Acoustics & Optics

**Duration:3 Hours** **Max Marks:80**

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Part A

**Answer any seven questions:** **(7×10= 70)**

1. a) Define velocity, phase and wavelength in wave motion.
   b) Derive an expression for the differntial equation of simple harmonic oscillator. (3 + 7)

2. a) Define air wedge and state two uses of amplitude.
   b) Derive an expression for fringe width in an air wedge experiment.

3. a) What is a diffraction grating and define grating element.
   b) Explain the theory of the plane transmission grating.

4. a) How does humidity and temperture affect the velocity of sound .
   b) With the help of diagram explain the frequency of vibrations in a rod clamped at its centre. (3 + 7)

5. a) What is a plane wavefront and cylindrical wavefront. Give an example for each.
   b) Derive the expression for amplitude of the resultant wave when two waves interfere. Draw the energy distribution curve.

6. a) Explain forced oscillation with example.
   b) Obtain an expression for amplitude of forced oscillation. (3 + 7)

7. a) Explain why Newton's rings are circular and not straight. Why the central spot is dark in Newton's rings
   b) Explain the determination of refractive index of a liquid using Newton's rings.

8. a) Define zone plate. Write one application of zone plate. What is the principle of zone plate?
   b) Derive the expression for the focal length of a zone plate.

9. a) Explain how Michelson interferometer is used in measuring wavelength of light.
   b) Explain the principle, construction, and working of Michelson interferometer.

## Part B (Numerical)

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

10. Specific rotation of sugar solution is 0.01 radm$^2$/kg. A sugar solution of length 0.2 m produces an optical rotation of 25°. Calculate the mass of sugar dissolved in 100 cc of water to make the solution.

11. A stretched wire emits a note of fundamental frequency 38 Hz. When the tension is increased by 0.6 kg wt the frequency of the fundamental raises to 45 Hz. Find the initial tension and also the length of the wire. Given the linear density is 1.33 x 10-3 kg/m.

12. A soap film of refractive index 1.333 and of thickness $5\times10^{-7}$ m is illuminated by white light incident at an angle of 76°. Find the wavelength of the light in the visible spectrum that are absent.

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24ANMC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM

B.Sc and B.A THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

COMPUTER ANIMATION

2D Animation

Duration:3 Hours Max Marks:80

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

1. What is the standard frame rate used in 2D animation?
2. Name any two traditional animation techniques.
3. What is the purpose of in-between frames in animation?
4. How does a storyboard help in 2D animation production?
5. What do you mean by interactive designs?
6. What are the uses of Line tool in CC Animate?

II. Answer any FIVE of the following : (5×6= 30 Marks)

7. Explain "layers" in animation software.
8. Explain the difference between 2D and 3D animation with examples.
9. Explain the techniques for timing and spacing actions.
10. Discuss the contribution of the Indian animation industry to 2D animated films and television.
11. Explain in detail the concept of persistence of vision.
12. Compare traditional and digital 2D animation in terms of process, tools, and output.

III. Answer any FOUR of the following : (4×10= 40 Marks)

13. Give a detailed breakdown of key elements and techniques to animate facial expressions to convet emotions.
14. Briefly explain different types of camera angles.
15. Explain Traditional Ink and Paint with its essential features.
16. Explain advantages and disadvantages of 2D animation.
17. Explain the usage of animation in:
    a) Healthcare and Medicine
    b) Corporate training
    c) Social Media and Web
    d) Art and Creative expression.

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24STAC301 Reg No : .....

**CHOICE BASED CREDIT SYSTEM**

**B.Sc THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025**

**STATISTICS**

**Estimation Theory & Time series Analysis**

**Duration:3 Hours** **Max Marks:80**

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

1. State Chebyshev's inequality and explain its significance.
2. Define Fisher's t statistic.
3. Distinguish between efficiency and relative efficiency of an estimator.
4. What is the Moment Estimator of θ when X~ U(0, θ)?
5. What are the components of Time series data?
6. Define autocorrelation function.

**II. Answer any FIVE of the following :** **(5×6= 30 Marks)**

7. State and prove reciprocal property of F distribution.
8. Let $T_n$ be an estimator of θ based on a sample of size n. If $\lim_{n\to\infty} E(T_n)=\theta_n\to\theta$ as $n\to\infty$ and if $\lim_{n\to\infty} V(T_n)=\sigma_n^2\to 0$ as $n\to\infty$ then prove that $T_n$ is consistent for θ.
9. If $X_1, X_2, \ldots, X_n$ is a random sample from $N(\mu, \sigma^2)$, find a sufficient statistic for $\mu$.
10. Deduce 100(1-α)% Confidence Interval for the Population mean of a Normal population when the variance $\sigma^2$ is unknown.
11. What do you mean by "stationary time series of order m"? Explain.
12. Briefly explain seasonal component of time series data with examples.

**III. Answer any FOUR of the following :** **(4×10= 40 Marks)**

13. If $X_1$ and $X_2$ are independent chisquare variates with $n_1$ and $n_2$ d.f respectively, then show that $\frac{X_1}{X_2} \sim \beta_2(\frac{n_1}{2}, \frac{n_2}{2})$.

14. Obtain unbiased estimators of $\theta$ and $\theta^2$ in case of Binomial distribution with parameters n and $\theta$ .

15. Obtain the MLE of the parameter theta from N($\theta$, $\theta$) based on a random sample of size n.

16. Explain the various methods of smoothing.

17. Derive normal equations for fitting a linear and quadratic trend using the method of least squares.

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24ZOOC301 Reg No : .....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME

B.Sc. THIRD SEMESTER DEGREE EXAMINATION OCTOBER 2025

ZOOLOGY

Physiology, Biochemistry and Immunology

Duration:3 Hours Max Marks:80

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

1. What is physiology?
2. Define effective filtration pressure.
3. Name the proteins found in thick filament.
4. Define a sarcomere.
5. What are T cells?
6. What are fat soluble vitamins?

II. Answer any FIVE of the following : (5×6= 30 Marks)

7. Define osmoregulation. List out the adaptations of camel for desert life.
8. What is the prosthetic group of the following respiratory pigments?
   i) Haemoerythrin ii) Haemoglobin iii) Haemocyanin.
9. Define B.P. Write a note on hypertension & hypotension.
10. Explain the mechanism of synaptic transmission.
11. Write a note on Derived proteins.
12. Write an explanatory notes on unsaturated fatty acids.

III. Answer any FOUR of the following : (4×10= 40 Marks)

13. With a neat labelled diagram give an account of osmoregulation in marine teleosts.
14. Explain the physiology of transport of carbon dioxide by blood.
15. Explain the chemical process of digestion in man.
16. Give an account on echolocation.
17. Give an account of innate immunity.

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