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SA—311—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper XIV

(Software Testing)

(Tuesday, 29-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt all questions.

(ii) Assume suitable data if necessary.

1. (A) Distinguish between White Box and Black Box testing and explain in detail Basis path testing. 15

Or

- (B) What is software quality ? Explain Mc-Call's Quality Factors. 8

- (C) Describe the elements of quality assurance of software. 7

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2. (A) Explain validation testing and system testing in detail. 15

Or

(B) Describe the dimensions of quality for web apps. 8

(C) Explain the testing strategy for web app. 7

3. Write short notes on (any *two*) : 10

(A) Formal technical review

(B) Unit testing

(C) Testability

(D) Testing guidelines for mobile apps.





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FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper XV

(Relational Database Management System)

(Friday, 2-5-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt all questions.

(ii) Draw suitable diagrams, wherever necessary.

(iii) Assume suitable data, if necessary.

1. What is Database ? Explain database applications. 15

Or

(a) Describe in detail database schema. 8

(b) Explain relational query language. 7

2. Explain features of good relational design. 15

Or

(a) Explain basic structure of SQL Queries. 8

(b) Discuss views in detail. 7

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3. Write short notes on the following (any two). 10

(a) Database users

(b) Keys

(c) Normal forms

(d) Data definition language.

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SA—42—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

MARCH/APRIL, 2025

ZOOLOGY

Paper—XV(A)

(Applied Zoology—Aquaculture)

(Thursday, 17-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt *all* questions.

(ii) Illustrate your answers with suitably labelled diagrams.

1. Explain cage culture. 15

Or

(a) Monoculture 8

(b) Intensive aquaculture 7

2. Describe pearl oyster culture. 15

Or

(a) Chemical properties of water. 8

(b) Advantages and disadvantages of aquatic weeds. 7

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3. Attempt any *two* of the following :

10

(a) Scope and importance of aquaculture

(b) Domestic sewage

(c) Biological control of aquatic weeds

(d) Fish species for mariculture.

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SA-27-2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

MARCH/APRIL, 2025

ZOOLOGY

Paper-XIV

(Ethology, Biometry and Bioinformatics)

(Tuesday, 15-4-2025) Time : 10.00 a.m. to 12.00 noon

Time-2 Hours

Maximum Marks-40

N.B. :- (i) Attempt all questions.

(ii) Illustrate your answers with suitable labelled diagrams wherever necessary.

1. Describe inborn or stereotyped animal behaviour—Taxis and Instincts with examples. 15

Or

(a) Describe protective and aggressive colouration. 8

(b) Describe Auditory communication. 7

2. Describe internet and its uses. 15

Or

(a) Describe types of classification of qualitative and quantitative data. 8

(b) Describe Histogram with examples. 7

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3. Attempt any two of the following :

10

(a) Imprinting acquired animal behaviour

(b) Tactile communication

(c) Mean central tendency

(d) Search engines.

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SA—56—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

MATHEMATICS

Paper XVII

(Topology)

(Monday, 21-4-2025)

Time: 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (1) Attempt either (A) or (B) for Question Nos. 1 and 2.

(2) All symbols carry usual meanings.

(3) Figures to the right indicate full marks.

1. (A) Define Topology, discrete topology, indiscrete topology and finite complement topology. Hence if X be a set. Let λ_f be the collection of all subsets U of X such that $X-U$ either is finite or is all of X . Then show that λ_f is a topology on X .

15

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Or

(B) Attempt the following :

- (a) Let X be an ordered set in the order topology; let Y be a subset of X that is convex in X . Then prove that the order topology on Y is the same as the topology Y inherits as a subspace of X .

8

- (b) If β is a basis for the topology of X and C is a basis for the topology of Y , then the collection :

$$D = \{B \times C/B \in \beta \text{ and } C \in C\}$$

is a basis for the topology of $X \times Y$.

7

2. (A) Let X and Y be topological spaces, let $f : X \rightarrow Y$, then the following are equivalent :

15

- (1) f is continuous
(2) For every subset A of X , one has $f(\bar{A}) \subset \overline{f(A)}$.
(3) For every closed set B of Y , the set $f^{-1}(B)$ is closed in X .
(4) For each $x \in X$ and each neighbourhood V of $f(x)$, there is a neighbourhood U of x such that $f(U) \subset V$.

Or

(B) Attempt the following :

- (a) Let A be a subset of the topological space X ; Let A' be a set of all limit points of A . Then show that :

8

$$\bar{A} = A \cup A'.$$

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FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

MATHEMATICS

Paper—XVI

(Integral Transforms)

(Thursday, 17-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

1. If $L[f(t)] = F(s)$, then prove that :

$$L\left[\frac{1}{t}f(t)\right] = \int_s^\infty F(s)ds.$$

Hence find the Laplace transform of $\frac{\sin 2t}{t}$. 15

Or

(a) Using convolution theorem, find : 8

$$L^{-1}\left[\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right] a \neq b.$$

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(b) Obtain $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right)$. 7

2. Solve the initial value problem :

$$2y'' + 5y' + 2y = e^{-2t}, y(0) = 1, y'(0) = 1. \quad 15$$

Or

Derive the Fourier sine and cosine integrals :

$$(a) f(x) = \frac{2}{\pi} \int_0^\infty \sin ux du \int_0^\infty f(t) \sin ut dt \quad 8$$

$$(b) f(x) = \frac{2}{\pi} \int_0^\infty \sin ux du \int_0^\infty f(t) \cos ut dt \quad 7$$

3. Attempt any two of the following : 5 each

(a) Prove that :

$$L[f'(t)] = sL[f(t)] - f(0)$$

where $L[f(t)] = F(s)$.

(b) Find the inverse Laplace transform of

$$\frac{s}{s^2 + 4s + 13}$$

(c) Applying convolution solve the following initial value problem

$$y'' + y = \sin 3t$$

$$y(0) = 0, y'(0) = 0$$

(d) Find the Fourier sine transform of $\frac{1}{x}$.

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SA—26—2025

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

MATHEMATICS

(Complex Analysis-XV)

(Tuesday, 15-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

1. Explain the method to obtain n th root of complex number $z = re^{i\theta}$. Hence find square root of $2i$. 15

Or

- (a) Show that $u(x, y)$ is harmonic in some domain and find harmonic conjugate $v(x, y)$ when $u(x, y) = 2x(1 - y)$. 8

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- (b) Prove that if a function $f(z) = u(x, y) + iv(x, y)$ is analytic in a domain D , then its component functions u and v are harmonic in D . 7

2. Prove that any polynomial $P(z) = a_0 + a_1 z + a_2 z^2 + \dots + a_n z^n$ where $a_n \neq 0$ of degree $n(n \geq 1)$ has at least one zero. 15

Or

- (a) Let $w(t)$ be a continuous complex-valued function of t defined on an interval $a \leq t \leq b$. Then show that it is not necessarily true that there is a number C in the interval $a < t < b$ such that : 8

$$\int_a^b w(t) dt = w(c)(b - a)$$

- (b) Let $w(t)$ be a piece-wise continuous complex-valued function defined on an interval $a \leq t \leq b$, then prove that : 7

$$\left| \int_a^b w(t) dt \right| \leq \int_a^b |w(t)| dt$$

3. Attempt any two of the following :

- (a) Show that when a limit of a function $f(z)$ exists at a point z_0 , then it is unique. 5
- (b) If $f'(z) = 0$ everywhere in a domain D , then prove that $f(z)$ must be constant throughout D . 5

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FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

MARCH/APRIL, 2025

(CBCS/New Pattern)

BOTANY

Paper—XV

(Plant Pathology—II)

(Friday, 11-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt *all* questions

(ii) All questions carry equal marks.

(iii) Draw well labelled diagram wherever necessary.

1. Describe in detail post-infectious structural defense mechanism in plants.

15

Or

Write notes on :

(a) Scope and importance of aerobiology.

8

(b) Seed borne pathogens

7

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2. Describe symptoms, causal organism, disease cycle and control measures of Tikka disease of Groundnut.

15

Or

Write notes on :

(a) Leaf spot of cabbage

8

(b) Rust of soyabean

7

3. Write short notes on (any two) :

10

(a) Hot water treatment

(b) Cuticle

(c) Leaf curl of tomato

(d) Papaya mosaic disease.

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FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

PHYSICS

(Digital and Communication Electronics-XV)

(Friday, 11-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Use of non-programmable calculator is allowed.

1. What is gate ? Explain AND, OR and NOT gates with their logic symbols, Boolean equations and truth tables. 15

Or

- (x) Carry out the following arithmetic : 8

(a) $(0110111)_2 + (0011111)_2$

(b) $(10111)_2 - (01101)_2$

(c) $(110001)_2 \times (1110101)_2$

(d) $(1110101) + (1001)_2$

- (y) Discuss excess 3 code and gray code. 7

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2. What are the types of modulations ? Derive an expression for frequency modulated wave. 15

Or

- (x) Draw block diagram of basic communication system. Explain each block. 8

- (y) Explain characteristics of radio receiver : 7

(i) Selectivity

(ii) Sensitivity

(iii) Fidelity.

3. Write short notes on any two : 10

(a) Universal properties of NAND gate

(b) De-Morgan's theorems

(c) Essential elements of A.M. transmitter

(d) Linear diode A.M. detector.

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