



This question paper contains 2 printed pages]

SA—82—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

ZOOLOGY

Paper IX

(Evolutionary Biology and Genetics Engineering)

(Thursday, 24-4-2025)

Time : 2.00 p.m. to 4.00 p.m.

Time—Two Hours

Maximum Marks—40

Note :— (i) Attempt *all* questions.

(ii) Illustrate your answer with well labelled diagram wherever necessary.

1. Describe in detail evolutionary theory of Lamarckism. 15

Or

(a) Explain allopatric and sympatric modes of speciation. 8

(b) Describe Hardy Weinberg equilibrium principle. 7

2. Describe structure, types and functions of DNA. 15

Or

(a) What is Transgenesis ? Explain with examples of transgenic animals. 8

(b) Explain DNA fingerprinting. 7

P.T.O.

X315YEAD86AX315YEAD86AX315YEAD86AX315YEAD86A

WT

(2)

SA—82—2025

3. Write short notes on any *two* of the following :

10

- (a) Homology and Analogy
- (b) Mass extinction causes
- (c) Genetic code
- (d) Construction of *r*-DNA.

SA—82—2025

2

X315YEAD86AX315YEAD86AX315YEAD86AX315YEAD86A



This question paper contains 2 printed pages]

SA—81—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

(New/CBCS Pattern)

MATHEMATICS

Paper X

(Ring Theory)

(Thursday, 24-4-2025)

Time : 2.00 p.m. to 4.00 p.m.

Time—2 Hours

Maximum Marks—40

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

(ii) Figures to the right indicate full marks.

1. If R is a ring, then for all $a, b, c, \in R$ prove that the following : 15

(i) $a0 = 0a = 0$

(ii) $a(-b) = -(ab) = (-a)b$

(iii) $(-a)(-b) = ab$

(iv) $a(b - c) = ab - ac$

(v) $(b - c)a = ba - ca$.

Or

(a) Prove that the intersection of two subrings is a subring. 7

P.T.O.

X315Y1C9D77X315Y1C9D77X315Y1C9D77X315Y1C9D77

- (b) If U is an ideal of a ring R with unity and $1 \in U$, then prove that $U = R$. If R is a ring and $a \in R$, let $T = \{x \in R \mid ax = 0\}$, then prove that T is a right ideal of R . 8

2. Prove that the set $R[x]$ of all polynomials over an arbitrary ring R is a ring with respect to addition and multiplication of polynomials. 15

Or

- (a) Prove that the homomorphism ϕ of a ring R into a ring R' is an isomorphism of R into R' if and only if $I(\phi) = 0$, where $I(\phi)$ denotes the kernel of ϕ . 8

- (b) Let R be the ring of all real valued continuous functions defined on the closed interval $[0, 1]$. Let $M = \{f(x) \in R : f(1/3) = 0\}$, then show that M is a maximal ideal of R . 7

3. Attempt any *two* of the following : 10

- (a) Prove that the set of integer R , where $R = \{0, 1, 2, 3, 4\}$ forms a ring under multiplication modulo 5.
- (b) Prove that the intersection of two ideals of R is an ideal of R .
- (c) Add and multiply the following polynomials over the ring $(I_6, +_6, \times_6)$
 $f(x) = 2x^0 + 5x + 3x^2$, $g(x) = 1x^0 + 4x + 2x^3$.
- (d) If f is a homomorphism of a ring R into a ring R' with kernel S , then prove that S is an ideal of R .

This question paper contains 2 printed pages]

SA—37—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

(CBCS/New Pattern)

BOTANY

Paper—VIII

(Plant Embryology)

(Wednesday, 16-4-2025)

Time : 2.00 p.m. to 4.00 p.m.

Time—2 Hours

Maximum Marks—40

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

(ii) Draw neat and well labelled diagrams wherever necessary.

(iii) All questions carry equal marks.

1. What is Pollination ? Describe in detail the types of pollination. 15

Or

Write in brief :

(a) T.S. of Anther 8

(b) Contribution of E. Strasburger in Embryology. 7

2. Define Fertilization. Explain in detail about double fertilization and give its significance. 15

P.T.O.

X315Y51B9B5X315Y51B9B5X315Y51B9B5X315Y51B9B5



WT

(2)

SA—37—2025

Or

Write on :

(a) L.S. of orthotropous ovule 8

(b) Endospermic and Non-endospermic seeds. 7

3. Attempt any two out of four : 10

(a) Pollen storage

(b) Dichogamy

(c) Helobial endosperm

(d) Parthenocarpy.

SA—37—2025

2

X315Y51B9B5X315Y51B9B5X315Y51B9B5X315Y51B9B5



This question paper contains 2 printed pages]

SA—326—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

COMPUTER SCIENCE

(Programming in Java-IX)

(Friday, 9-5-2025)

Time : 2.00 p.m. to 4.00 p.m.

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt all questions.

(ii) Assume suitable data, if necessary.

1. What is Java ? Explain in detail Java program structure with example.

15

Or

(a) Explain data types used in Java.

8

(b) Write a java program to calculate the square of a number.

7

2. What is Interface ? Explain in detail implementing interface.

15

Or

(a) Explain in detail method overloading.

8

(b) Explain in detail accessing class members.

7

P.T.O.

X315YF0C8ADX315YF0C8ADX315YF0C8ADX315YF0C8AD

WT

(2)

SA—326—2025

3. Write short notes on (any two) :

10

(a) Java support system

(b) Command Line Argument

(c) Class and object.

(d) Arrays.

SA—326—2025

2

X315YF0C8ADX315YF0C8ADX315YF0C8ADX315YF0C8AD



This question paper contains 2 printed pages]

SA—38—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

PHYSICS

Paper—VIII

(Optics and Lasers)

(Wednesday, 16-4-2025)

Time : 2.00 p.m. to 4.00 p.m.

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt *all* questions.

(ii) Log table is allowed.

1. Describe the Ramsden's eyepiece with a neat labelled diagram and explain its cardinal points. 15

Or

- (a) Describe Fraunhofer's diffraction due to double slit 8
(b) Explain resolving power of grating. 7

2. Explain working and construction of Nicol prism as an analyser. 15

Or

- (a) Explain He-Ne laser with a neat labelled diagram. 8
(b) Explain population inversion in laser. 7

P.T.O.

X315Y35A02FX315Y35A02FX315Y35A02FX315Y35A02F

WT

(2)

SA—38—2025

3. Write short notes on (any two) :

10

- (a) Huygen's eyepiece
(b) Newton's rings
(c) Malu's Law
(d) Properties of Lasers.

SA—38—2025

2

X315Y35A02FX315Y35A02FX315Y35A02FX315Y35A02F