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SA—77—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

ZOOLOGY

Paper IV

(Developmental Biology of Vertebrates)

(Thursday, 24-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—Two Hours

Maximum Marks—40

Note :— (i) Attempt *all* questions.

(ii) Draw neat labelled diagram wherever necessary.

1. Explain the types of eggs on the basis of amount of egg and distribution of yolk. 15

Or

(a) What is cleavage ? Explain cleavage in frog. 8

(b) Describe the structure of sperm of frog. 7

2. Explain the structure and functions of extra embryonic membranes. 15

Or

(a) Describe causes of infertility in male and female. 8

(b) Describe Gamete Intra Fallopian Transfer (GIFT). 7

P.T.O.

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SA—77—2025

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

10

- (a) Spermiogenesis
- (b) Blastulation
- (c) Functions of placenta
- (d) IVF (In-vitro Fertilization).

SA—77—2025

2

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This question paper contains 2 printed pages]

NEPSA—4012—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (NEP) (First Year) (Second Semester) EXAMINATION

APRIL/MAY, 2025

COMPUTER SCIENCE

(SCSCCT-1151)

(Programming in C Language-II)

(Monday, 21-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Q. No. 1 is compulsory.

(ii) All questions carry equal marks.

(iii) Solve any three of the remaining five questions (Q. Nos. 2 to 6).

(iv) Figures to the right indicate full marks.

1. Solve the following questions : 10
 - (a) What is flowchart ? Explain.
 - (b) Explain Arithmetic operators in C.
 - (c) Explain while loop in C.
 - (d) Explain structure in C.
2. Solve the following questions : 10
 - (a) Explain the history of C programming.
 - (b) What is Algorithm ? Explain.

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3. Solve the following questions : 10
- (a) Explain data types in C.
 - (b) Explain C Tokens.
4. Solve the following questions : 10
- (a) Explain If-else statement in C.
 - (b) Write a program to print even numbers between 1 to 10.
5. Solve the following questions : 10
- (a) What is recursion ? Explain with example.
 - (b) What is union ? Explain with example.
6. Write short notes on (any two) : 10
- (a) Compilers and interpreters
 - (b) Console Input/output statements
 - (c) Arrays
 - (d) Function.



This question paper contains 3 printed pages]

NEPSA—3012—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

APRIL/MAY, 2025

(NEP 2020 Pattern)

MATHEMATICS

Paper SMATCT1151

(Analytical Geometry)

(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 carry equal marks.
 - (ii) Question no. 1 is compulsory.
 - (iii) Solve any *three* of the remaining *five* questions (Q. No. 2 to Q. No. 6).
 - (iv) Figures to the right indicate full marks.

1. Solve the following (2.5 marks each) : 10
- (a) If l, m, n are direction cosines of a line, then prove that $-l, -m, -n$ are also the direction cosines of that line.
 - (b) Write unsymmetrical form of equations of line and explain the terms involved.
 - (c) If $l_1, m_1, n_1; l_2, m_2, n_2; l_3, m_3, n_3$ are direction cosines of 3 mutually perpendicular lines, then write any 3 relations between these direction cosines.
 - (d) Write the characteristics of equation of a sphere.

P.T.O.

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2. (a) Prove that every equation of first degree in x, y, z represents a plane. 6
- (b) Find the angle between the pair of planes $3x - 4y + 5z = 0$ and $2x - y - 2z = 5$. 4
3. (a) Prove that the length of perpendicular from a point (x_1, y_1, z_1) to a line $\frac{x - \alpha}{l} = \frac{y - \beta}{m} = \frac{z - \gamma}{n}$ is square root of $(x_1 - \alpha)^2 + (y_1 - \beta)^2 + (z_1 - \gamma)^2 - [l(x_1 - \alpha) + m(y_1 - \beta) + n(z_1 - \gamma)]^2$. 6
- (b) Obtain the symmetrical form the equations of the line $x - 2y + 3z = 4$, $2x - 3y + 4z = 5$. 4
4. (a) If the directions of the axes are changed without changing the origin, so that $l_1, m_1, n_1; l_2, m_2, n_2; l_3, m_3, n_3$ are the respective direction cosines of new axes OX', OY', OZ' , then prove that the relation between the original co-ordinates (x, y, z) and new co-ordinates (x', y', z') of a point P are given by $x = l_1x' + l_2y' + l_3z'$, $y = m_1x' + m_2y' + m_3z'$, $z = n_1x' + n_2y' + n_3z'$. 6
- (b) Find the equation of the plane $2x + 3y + 4z = 7$ referred to the point $(2, -3, 4)$ as origin, directions of the axes remaining the same. 4
5. (a) Prove that the locus of intersection of a sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ and a line $\frac{x - \alpha}{l} = \frac{y - \beta}{m} = \frac{z - \gamma}{n}$ is a pair of two points $(\alpha + lr_1, \beta + mr_1, \gamma + nr_1)$ and $(\alpha + lr_2, \beta + mr_2, \gamma + nr_2)$. 6
- (b) Find the equation to the sphere through four points $(4, -1, 2)$, $(0, -2, 3)$, $(1, -5, -1)$, $(2, 0, 1)$. 4

6. Answer any *two* of the following (5 marks each) :

10

- (a) Show that the origin and the point $(2, -4, 3)$ lie on different sides of the plane $x + 3y - 5z + 7 = 0$.
- (b) Show that the line $\frac{1}{3}(x - 2) = \frac{1}{4}(y - 3) = \frac{1}{5}(z - 4)$ is parallel to the plane $2x + y - 2z = 3$.
- (c) If the origin O is changed to $O'(f, g, h)$ without changing the directions of the co-ordinate axes, then prove that the relation between the original co-ordinates (x, y, z) and new co-ordinates (x', y', z') of a point P are given by $x = x' + f$, $y = y' + g$, $z = z' + h$.
- (d) Find the equation of tangent plane to the sphere $3(x^2 + y^2 + z^2) - 2x - 3y - 4z - 22 = 0$ at the point $(1, 2, 3)$.



This question paper contains 2 printed pages]

NEPSA—3022—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (NEP) (First Year) (Second Semester) EXAMINATION

APRIL/MAY, 2025

ZOOLOGY

(SZOOC-1151)

(Biodiversity of Chordates)

(Thursday, 17-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Q. No. 1 is compulsory.

(ii) Out of remaining 5 questions (Q. Nos. 2 to 6) answer any 3 questions.

(iii) All questions carry equal marks.

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

1. Answer each of the following : 10

(a) General characters of chordates.

(b) Structure of Gill of Scoliodon.

(c) Non-poisonous snake.

(d) Medulla oblongata of Rat.

2. Describe general characters of Urochordates. 10

Or

Write notes on :

(a) General characters of Agnatha.

(b) General characters of Cyclostomata.

P.T.O.

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3. Describe respiratory system of Scoliodon.

10

Or

Write notes on :

(a) Aestivation in frog.

(b) Parental care in Amphibia.

4. Describe flight adaptation in Birds.

10

Or

Write notes on :

(a) General characters of Aves.

(b) General characters of Reptiles.

5. Describe external characters of Rat.

10

Or

Write notes on :

(a) Spinal cord of Rat.

(b) Hind-brain of Rat.

6. Answer each of the following :

10

(a) Ancestry of chordates

(b) Economic importance of fishes

(c) Longitudinal migration in Birds

(d) Structure of eye of Rat.



This question paper contains 2 printed pages]

SA—48—2025

FACULTY OF SCIENCE

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

MARCH/APRIL, 2025

(CBCS/New Pattern)

BOTANY

Paper-IV

(Taxonomy of Angiosperms)

(Saturday, 19-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

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

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

1. Describe salient features of Bentham and Hookers system of classification. Add a note on its merits and demerits. 15

Or

Describe in brief :

- (a) Important Herbaria of India 8
- (b) Typification. 7

P.T.O.

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2. Describe the vegetative and floral characters of family Lamiaceae. Give its floral formula and floral diagram. 15

Or

Describe in brief :

- (a) Types of placentation 8
- (b) Types of venation. 7
3. Write notes on (any two) : 10
- (a) Author citation
- (b) Phylogenetic classification
- (c) Composite fruit
- (d) Floral characters of Fabaceae.



This question paper contains 3 printed pages]

NEPSA—3012—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

APRIL/MAY, 2025

(NEP 2020 Pattern)

MATHEMATICS

Paper SMATCT1151

(Analytical Geometry)

(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 carry equal marks.
 - (ii) Question no. 1 is compulsory.
 - (iii) Solve any *three* of the remaining *five* questions (Q. No. 2 to Q. No. 6).
 - (iv) Figures to the right indicate full marks.

1. Solve the following (2.5 marks each) : 10
- (a) If l, m, n are direction cosines of a line, then prove that $-l, -m, -n$ are also the direction cosines of that line.
 - (b) Write unsymmetrical form of equations of line and explain the terms involved.
 - (c) If $l_1, m_1, n_1; l_2, m_2, n_2; l_3, m_3, n_3$ are direction cosines of 3 mutually perpendicular lines, then write any 3 relations between these direction cosines.
 - (d) Write the characteristics of equation of a sphere.

P.T.O.

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2. (a) Prove that every equation of first degree in x, y, z represents a plane. 6
- (b) Find the angle between the pair of planes $3x - 4y + 5z = 0$ and $2x - y - 2z = 5$. 4
3. (a) Prove that the length of perpendicular from a point (x_1, y_1, z_1) to a line $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$ is square root of $(x_1 - \alpha)^2 + (y_1 - \beta)^2 + (z_1 - \gamma)^2 - [l(x_1 - \alpha) + m(y_1 - \beta) + n(z_1 - \gamma)]^2$. 6
- (b) Obtain the symmetrical form the equations of the line $x - 2y + 3z = 4$, $2x - 3y + 4z = 5$. 4
4. (a) If the directions of the axes are changed without changing the origin, so that $l_1, m_1, n_1; l_2, m_2, n_2; l_3, m_3, n_3$ are the respective direction cosines of new axes OX', OY', OZ' , then prove that the relation between the original co-ordinates (x, y, z) and new co-ordinates (x', y', z') of a point P are given by $x = l_1x' + l_2y' + l_3z'$, $y = m_1x' + m_2y' + m_3z'$, $z = n_1x' + n_2y' + n_3z'$. 6
- (b) Find the equation of the plane $2x + 3y + 4z = 7$ referred to the point $(2, -3, 4)$ as origin, directions of the axes remaining the same. 4
5. (a) Prove that the locus of intersection of a sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ and a line $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$ is a pair of two points $(\alpha + lr_1, \beta + mr_1, \gamma + nr_1)$ and $(\alpha + lr_2, \beta + mr_2, \gamma + nr_2)$. 6
- (b) Find the equation to the sphere through four points $(4, -1, 2)$, $(0, -2, 3)$, $(1, -5, -1)$, $(2, 0, 1)$. 4

6. Answer any *two* of the following (5 marks each) :

10

- (a) Show that the origin and the point $(2, -4, 3)$ lie on different sides of the plane $x + 3y - 5z + 7 = 0$.
- (b) Show that the line $\frac{1}{3}(x - 2) = \frac{1}{4}(y - 3) = \frac{1}{5}(z - 4)$ is parallel to the plane $2x + y - 2z = 3$.
- (c) If the origin O is changed to $O'(f, g, h)$ without changing the directions of the co-ordinate axes, then prove that the relation between the original co-ordinates (x, y, z) and new co-ordinates (x', y', z') of a point P are given by $x = x' + f$, $y = y' + g$, $z = z' + h$.
- (d) Find the equation of tangent plane to the sphere $3(x^2 + y^2 + z^2) - 2x - 3y - 4z - 22 = 0$ at the point $(1, 2, 3)$.



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NEPSA—2022—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (NEP) (First Year) (Second Semester) EXAMINATION

APRIL/MAY, 2025

PHYSICS

(SPHYCT-1151)

(Fundamentals of Physics-II)

(Tuesday, 15-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Q. No. 1 is compulsory.

(ii) All questions carry equal marks.

(iii) Solve any *three* of the remaining five questions (Q. Nos. 2 to 6).

(iv) Figures to the right indicate full marks.

1. Solve the following questions (compulsory) (2.5 marks each) : 10
 - (a) Types of camera lenses and their use.
 - (b) Define self-inductance and write its units.
 - (c) Write the formula for resistances connected in series and parallel combination.
 - (d) Any *two* differences between solid, liquid and gaseous states of matter.
2. (a) Describe Huygens eyepiece and find the equivalent focal length of field lens and eye lens combination. 5
 - (b) Explain constant deviation spectrometer. 5

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3. (a) Derive formula for self-inductance of a coil. 5
- (b) Derive formula for self-inductance of a solenoid. 5
4. (a) State Thevenin's theorem and write steps to Thevenize a circuit. 5
- (b) Describe Kirchhoff's voltage law and current law with suitable diagram. 5
5. (a) Derive Charle's law and show that $V \propto T$. 5
- (b) What is kinetic model ? Write the postulates of kinetic theory of gases. 5
6. Write short notes on any two : 10
- (a) Objective and eyepiece
- (b) Mutual induction and inductance
- (c) Concept of R, L and C elements
- (d) Derive ideal gas equation $PV = RT$.



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NEPSA—2012—2025

FACULTY OF SCIENCE

B.Sc. (NEP) (First Year) (Second Semester) EXAMINATION

APRIL/MAY, 2025

BOTANY

(SBOTCT-1151)

(Fungi, Lichens and Mycorrhiza-II)

(Tuesday, 15-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Q. No. 1 is compulsory.

(ii) Of the remaining attempt any *three* questions.

(iii) Draw neat and labelled diagram wherever necessary.

1. Write brief notes on the following : 10
 - (a) Occurrence of eurotium.
 - (b) Systematic position of Agaricus.
 - (c) What are Lichens ?
 - (d) Nature of association in mycorrhiza.
2. Describe structure of mycelium and asexual reproduction in Albugo. 10
3. Explain in detail structure of basidiocarp with well labelled diagram. 10
4. Give an account on types of Lichen. 10
5. Give general characters and classification of Mycorrhiza. 10

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6. Write in brief :

10

- (a) Fungal Nutrition
- (b) Leaf spot of Tomato
- (c) Role of Lichen in soil formation
- (d) Economic importance of Mycorrhiza.

NEPSA—2012—2025

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NEPSA—1012—2025

FACULTY OF SCIENCE

B.Sc. (NEP) (First Year) (Second Semester) EXAMINATION

APRIL/MAY, 2025

CHEMISTRY

(SCHECT-1151)

(Physical and Inorganic Chemistry-II)

(Friday, 11-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Q. No. 1 is compulsory.

(ii) All questions carry equal marks.

(iii) Solve any three of the remaining five questions.

(iv) Figures to the right indicate full marks.

1. Solve the following questions (2.5 marks each) :

4×2.5=10

(a) Explain Hund's rule of maximum multiplicity.

(b) Calculate Root Mean Square (RMS) velocity of CO₂ molecule at 373 K.

(R = 8.314 JK⁻¹ mol⁻¹)

(c) Give the difference between adsorption and absorption.

(d) What are noble gases ? Give their position in periodic table.

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2. Solve the following questions : 10
- (a) State the postulates of kinetic theory of gases.
 - (b) Derive van der Waals equation.
3. Solve the following questions : 10
- (a) Discuss the factors affecting adsorption.
 - (b) Explain Tyndall effect and Brownian movement.
4. Solve the following questions : 10
- (a) Define oxidation, reduction, oxidizing agent and reducing agent with example according to classical concept.
 - (b) Give any *two* methods of preparation of XeF_2 and explain its structure.
5. Solve the following questions : 10
- (a) Derive an expression for the radius of n th Bohr's orbit of H-atom.
 - (b) Give the rules for assigning oxidation number.
6. Solve the following questions (2.5 marks each) : 10
- (a) Calculate the energy of an electron in first Bohr's orbit of H-atom.
 - (b) Derive the relationship between root mean square velocity and average velocity.
 - (c) Explain Hardy-Schulze rule.
 - (d) Give the uses of noble gases.