Shri Kumarswami Mahavidyalaya, Ausa

Department of Library

SRTMU, Nanded.

B. Sc. First Year

1st Semester Examination

November/December 2025

Question Papers

Total No. of Printed Pages:1

SUBJECT CODE NO:- NEPGA-4010-101-2025
FACULTY OF SCIENCE & TECHNOLOGY
EXAMINATION WINTER 2025
B.SC.(FIRST YEAR) (SEM –I)
COMPUTER SCIENCE
FUNDAMENTAL OF COMPUTER SCIENCE

[Time: 2:00 Hours] **[Max.Marks:30]**

"Please check whether you have got the right question paper."

N.B. 1. Q. NO. 1 is compulsory
2. Attempt any two forms Q. NO. 2 to 05

Q.1 Attempt the following **10**

a) Define computer?
b) Explain key board
c) Explain ASCII code
d) Features of windows

Q.2 a) Draw and Explain Block diagram of computer **05**
b) What is Flow Chart & Explain it's Symbols **05**

Q.3 a) What is input device? Explain any two input devices **05**
b) Explain different types of printers **05**

Q.4 a) What is Number system? Explain decimal and Hexadecimal number system **05**
b) What is software? Explain types of Software's. **05**

Q.5 a) Define Operating System? and explain it's functions. **05**
b) Explain any five DOS Internal commands. **05**

This question paper contains 2 printed pages]

GA—55—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

ZOOLOGY

(Biodiverity of Invertebrates-I)

(Tuesday, 25-11-2025) **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. Explain in detail account of life cycle of Plasmodium vivax. 15

Or

(*a*) General characters of Coelenterata. 8

(*b*) Describe pathogenicity and control measures of Ascaris lumbricoides. 7

2. Explain in detail nervous system of cockroach. 15

Or

(*a*) General characters of Echinodermata with suitable examples. 8

(*b*) Affinities of Hemichordata with Annelida. 7

P.T.O.

3. Write short notes on any *two* of the following : 10

(*a*) Control measures of Plasmodiam vivax

(*b*) Structure of Taenia solium

(*c*) Economic importance of insects

(*d*) General characters of Mollusca.

This question paper contains 3 printed pages]

GA—05—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

CHEMISTRY

Paper I

(Organic and Inorganic Chemistry)

(Saturday, 15-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—Two Hours *Maximum Marks*—40

N.B. :— Attempt *all* questions.

1. Solve any *three* of the following : 3×5=15

   (*a*) Define electronegativity. Explain factors affecting on electronegativitiy.

   (*b*) Write a note on general characteristics of *d*-block elements.

   (*c*) What is modern periodic law ? Explain cause of periodicity.

   (*d*) Explain any *two* preparations and structure of XeF_2.

   (*e*) Write electronic configuration of Noble gas elements.

2. Solve any *three* of the following : 3×5=15

   (*a*) What is functional group ? Give classification of organic compound on the basis of functional group.

P.T.O.

   (*b*) How will you differentiate between electrophile and nucleophile ?

   (*c*) Write short notes on :

   (*i*) Pyrrolysis

   (*ii*) Aromatization.

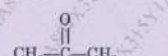
   (*d*) How will you convert the following :

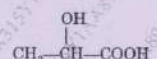
   (*i*) Adipic acid to cyclopentane

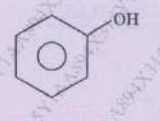
   (*ii*) Benzene to cyclohexane.

   (*e*) Write IUPAC names of the following :

   (*i*) 

   (*ii*) 

   (*iii*) 

   (*iv*) 

   (*v*) $CH_3—CH_2—NH_2$.

3. Solve any *two* of the following : 2×5=10

(*a*) What is carbocation ? Explain structure and stability of carbocation.

(*b*) How will you prepare the following ?

(*i*) But-1-ene from But-1-yne

(*ii*) But-2-ene from Butan-2-ol

What is the action of Br_2 on ethene ?

(*c*) Explain inductive effect with suitable example.

(*d*) Predict the product of the following :

(*i*) $CaC_2 \xrightarrow{2H_2O} ?$

(*ii*) $CH_2 = CH—CH = CH_2 \xrightarrow{Br_2} ?$

(*iii*)  $\xrightarrow{\Delta} ?$

(*iv*) $CH_2(OH)—CH_2—CH_2—CH_2(OH) \xrightarrow{Conc.H_2SO_4} ?$

(*v*)  $\xrightarrow{R\text{-}CO_3H} ?$

This question paper contains 2 printed pages]

GA—54—2025

FACULTY OF SCIENCE/ARTS

B.Sc./B.A. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

MATHEMATICS

Paper–I

(Calculus)

(Tuesday, 25-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time— Two Hours *Maximum Marks*—40

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

(*ii*) Figures to the right indicate full marks.

1. Find the nth derivative of 15

$$y = e^{ax} \sin (bx + c)$$

Also find the nth derivative of $y = \cos^4 x$.

Or

(*a*) State and prove Taylor's Theorem. 8

(*b*) Expand $\log(x + a)$ in powers of x by Taylor's Theorem. 7

P.T.O.

X315Y286172X315Y286172X315Y286172X315Y286172

2. State and prove Lagrange's Mean Value Theorem. Also in the statement of Cauchy's Mean Value Theorem if $f(x) = e^x$ and $F(x) = e^{-x}$, show that c is arithmetic mean between a and b. 15

Or

(*a*) State and prove Euler's theorem on homogeneous functions. 8

(*b*) If $u = \log\left[\frac{(x^4 + y^4)}{(x + y)}\right]$, show that by Euler's Theorem $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 3$. 7

3. Attempt any *two* of the following : 5 each

(*i*) Find derivative of $y = \tanh x$; $x \in R$.

(*ii*) Find the equations of tangent and normal at any point (x, y) of the curve :

$$\frac{x^m}{a^m} + \frac{y^m}{b^m} = 1$$

(*iii*) Verify Rolle's Theorem for $F(x) = x^2$ in $[-1, 1]$.

(*iv*) If $u = \log(\tan x + \tan y + \tan z)$, prove that :

$$(\sin 2x)\frac{\partial u}{\partial x} + (\sin 2y)\frac{\partial u}{\partial y} + (\sin 2z)\frac{\partial u}{\partial z} = 2.$$

X315Y286172X315Y286172X315Y286172X315Y286172

This question paper contains 2 printed pages]

GA—13—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

CHEMISTRY

Paper-II

(Physical and Inorganic Chemistry)

(Tuesday, 18-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) Use of logarithmic table and non-programmable calculator is allowed.

1. Solve any *three* of the following : 15

(*a*) Discuss the basic strength of oxides of IA and IIA group.

(*b*) (*i*) Write a note on flame colouration of IA group elements.

(*ii*) Write a note on complex of calcium with EDTA.

(*c*) Write general characteristics of S-block elements.

(*d*) Write the rules for assigning oxidation number.

(*e*) Define oxidation, reduction, oxidixing agent and reducing agent according to electronic concept.

P.T.O.

2. Solve any *three* of the following : 15

(*a*) State and explain 'Permuation'. Evaluate the value of $^5P_4$.

(*b*) What is adsorption isotherm ? Explain Langmuir adsorption isotherm.

(*c*) Derive an expression for critical constants in terms of van der Waals' constants.

(*d*) Explain the crystal structure of sodium chloride (NaCl) by Bragg's X-ray diffraction method.

(*e*) State the postulates of kinetic theory of gases.

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

(*a*) Explain the law of rational indices and write a note on 'Miller Indices'

(*b*) Discuss the factors affecting adsorption.

(*c*) What are Ideal and Non-ideal gases ? Calculate Root Mean Square (RMS) velocity of N_2 molecule at 100°C. ($R = 8.314\ JK^{-1}mol^{-1}$)

(*d*) Prove that, pH + pOH = 14

Calculate pH of 0.04 M NaOH solution.

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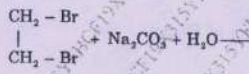
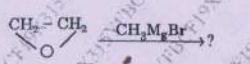
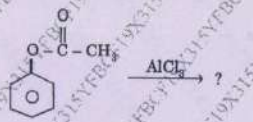
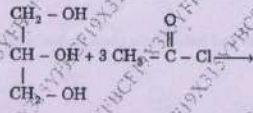
(ii) 

(iii) 

(iv) 

(v) 

(b) Explain Kolbe's carboxylation reaction with mechanism.

5. Solve the following : 10

(a) Write general characteristics of *s*-block elements.

(b) Define electron affinity. Explain the factor affecting on it.

This question paper contains 2 printed pages]

GA—25—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper I

(Mechanics and Properties of Matter)

(Thursday, 20-11-2025) **Time : 10.00 a.m. to 12.00 Noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— *All* questions are compulsory.

1. Explain surface tension by Jaeger's method. 15

Or

(*a*) Explain work energy theorem. 7

(*b*) Explain motion of a body near the surface of earth. 8

2. Describe in detail experimental determination of coefficient of viscosity by Poiseuille's method. 15

Or

(*a*) Explain twisting couple on a cylinder. 7

(*b*) Explain cantilever when weight of beam is ineffective. 8

P.T.O.

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

(*a*) Newton's laws of motion

(*b*) Pressure difference across a curved surface

(*c*) Reynolds' number

(*d*) Poisson's Ratio.

This question paper contains 2 printed pages]

NEPGA—2010—101—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP Pattern)

BOTANY

SBOTCT-1101

(Viruses, Bacteria and Algae)

(Thursday, 20-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) Question No. 1 is compulsory.

(*ii*) Of the remaining, attempt any *two* questions.

(*iii*) Draw neat and labelled diagram wherever required.

1. Write brief notes on the following : 10

   (*a*) Classification of viruses on the basis of host. 2½

   (*b*) General characters of Bacteria. 2½

   (*c*) Akinete. 2½

   (*d*) Structure of Globule in Chara. 2½

P.T.O.

2. Give an account of general characters of viruses and add a note on transmission of viruses. 10

3. Describe the process of conjugation in Bacteria. 10

4. Give an account of general characters of Algae and add a note on thallus organization in Algae. 10

5. Write systematic position, occurrence and describe thallus structure of Ectocarpus. 10

This question paper contains **2** printed pages]

GA—24—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

BOTANY

Paper I

(Viruses, Bacteria, Algae, Fungi, Lichens and Mycorrhiza)

(Thursday, 20-11-2025) **Time : 10.00 a.m. to 12.00 Noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (1) Attempt *All* questions.

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

1. Describe thallus structure and Macrandrous types of sexual reproduction in Oedogonium. 15

Or

(*a*) General characters of Bacteria. 8

(*b*) Yellow vein mosaic of Bhendi. 7

2. General characters and types of Lichens. 15

P.T.O.

Or

(*a*) General characters of Fungi. 8

(*b*) Basidiocarp of Agaricus. 7

3. Write short notes on any *two* of the following : 10

(*a*) TMV

(*b*) Economic importance of Algae

(*c*) Economic importance of Fungi

(*d*) Types of Mycorrhiza.

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This question paper contains 2 printed pages]

GA—39—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

BOTANY

Paper II

(Plant Ecology, Phytogeography & Env. Biology)

(Saturday, 22-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) *All* questions are compulsory.

(*iii*) Draw well labelled diagram wherever necessary.

1. Describe morphological and anatomical adaptations in Hydrilla plant. 15

Or

Write in brief :

(*a*) Light as a climatic factor 8

(*b*) Soil profile. 7

2. What is Ecosystem ? Describe in detail forest ecosystem. 15

Or

Write in brief :

(*a*) Causes, effects and control measures of air pollution. 8

(*b*) Chipko movement. 7

P.T.O.

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

(*a*) Soil pH

(*b*) Pneumatophores

(*c*) Density

(*d*) Afforestation and deforestation.

This question paper contains 2 printed pages]

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NEPGA—2020—101—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(NEP 2020 Pattern)

PHYSICS

Paper–SPHYCT-1101

(Fundamental of Physics-I)

(Thursday, 20-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) *All* questions carry equal marks.

(*ii*) Question No. 1 is compulsory.

(*iii*) Solve any *two* of the remaining four questions.

(*iv*) Figures to the right indicate full marks.

1. Attempt *all* : 10

(*a*) Give statement of Newton's Law of Gravitation.

(*b*) State Pascal's principle in fluid mechanics.

(*c*) Define ultrasound and infrasound.

(*d*) What are intrinsic semiconductors ?

P.T.O.

2. State and explain the intensity of a gravitational field. Derive the formula for gravitational intensity at a point in the gravitational field. 10

3. Define gauge pressure and absolute pressure. Describe the method for measuring pressure using barometers. 10

4. State and explain Newton's formula for the velocity of sound. Derive Laplace correction to the formula. 10

5. With a neat schematic diagram explain the construction and working of a PN junction diode. 10

This question paper contains 2 printed pages]

GA—40—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper II

(Mathematical Method in Physics)

(Saturday, 22-11-2025) **Time : 10.00 a.m. to 12.00 Noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. — (1) *All* questions are compulsory.

(2) Non-programmable calculators are allowed.

(3) Figures to the right indicate full marks.

(4) Symbol have their usual meanings.

1. Explain triple vector product of three vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$ prove that : 15

$$\vec{A} \times (\vec{B} \times \vec{C}) = \vec{B}(\vec{A} \cdot \vec{C}) - \vec{C}(\vec{A} \cdot \vec{B}).$$

Or

(*a*) Explain multiplication of two complex number by using an Argand diagram. 8

(*b*) Explain properties of Moduli and Arguments of complex number. 7

P.T.O.

2. Define Fourier series and evaluate the coefficient a_0, a_n and b_n in Fourier series. 15

Or

(*a*) Explain change of variable from Cartesian to polar co-ordinate. 8

(*b*) Explain the term total differentiation. If F = F(x, y), then show that total differentials of F is : 7

$$dF = Fxdx + Fydy.$$

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

(*a*) Explain argand division for two complex numbers.

(*b*) State Gauss divergence theorem and Stoke's theorem.

(*c*) Explain chain rule.

(*d*) Explain cosine series in Fourier series.

X315Y458E6AX315Y458E6AX315Y458E6AX315Y458E6A

This question paper contains 2 printed pages]

NEPGA—3020—101—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

ZOOLOGY

(SZOOCT-1101)

(Biodiversity of Non-chordates)

(Saturday, 22-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Solve any *two* questions out of Q. No. **2** to Q. No. **5**.

(*iii*) **10** marks for each question.

(*iv*) Draw well labelled diagram wherever necessary.

1. Write short notes on the following : 10

(*a*) Components of canal system in *Sycon*.

(*b*) Control measures of *Ascaris lumbricoides*.

(*c*) Vermiculture

(*d*) Economic importance of Mollusca.

P.T.O.

2. Describe control measures of Malaria. 10

3. Describe life cycle of *Taenia solium*. 10

4. Describe metamorphosis in Insects. 10

5. Describe general characters of phylum Echinodermata. 10

X315Y47474DX315Y47474DX315Y47474DX315Y47474D

This question paper contains 3 printed pages]

NEPGA—3010—101—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.A./B.Sc. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(NEP-2020 Pattern)

MATHEMATICS

Paper–SMATCT-1101

(Topics in Algebra-I)

(Saturday, 22-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) Question No. 1 is compulsory.

(*ii*) *All* questions carry equal marks.

(*iii*) Solve any *two* of the remaining four questions (Q. No. 2 to Q. No. 5)

(*iv*) Figures to the right indicate full marks.

1. Attempt the following : 10

(*a*) Define intersection of sets with suitable example.

P.T.O.

(*b*) Define composition of functions.

(*c*) State elementary row operations.

(*d*) State Cayley-Hamilton theorem.

2. Attempt the following : 10

(*a*) If A = {1, 2, 3} and B = {*a*, *b*}, then whether A × B = B × A ?

(*b*) If X is a non-empty set, N is an equivalence relation on X and $y \in [x]$, then prove that [x] = [y].

3. Attempt the following : 10

(*a*) For the functions $f : X \to Y$, $g : Y \to Z$ and $h : Z \to W$, prove that :

$$ho(gof) = (hog)of.$$

(*b*) If the function $F : (0, 1] \to \mathbf{R}$ is defined by

$$f(x) = \frac{1}{x}, \forall\, x \in (0, 1],$$

then show that f is one-one.

4. Attempt the following : 10

(*a*) Reduce to a row reduced echelon form the matrix :

$$A = \begin{bmatrix} 0 & 0 & -2 & 3 & 1 \\ 2 & 4 & 1 & 4 & 3 \\ 1 & 2 & -3 & 1 & 2 \\ 4 & 8 & 2 & 3 & 5 \end{bmatrix}$$

Also find its row rank.

(*b*) Reduce to a row echelon form the matrix :

$$A = \begin{bmatrix} 3 & 4 & 1 & 2 \\ 3 & 2 & 1 & 4 \\ 7 & 6 & 2 & 5 \end{bmatrix}$$

Also find its row rank.

5. Attempt the following : 10

(*a*) If $AX = 0$ is a homogenous system of equations in n unknowns and $X_1 = (x_1, x_2, x_3, \ldots\ldots, x_n)$ and $X_2 = (y_1, y_2, y_3, \ldots\ldots, y_n)$ are two solutions of this system, then prove that

$$X_1 + X_2 = (x_1 + y_1, x_2 + y_2, x_3 + y_3, \ldots\ldots, x_n + y_n)$$

is also a solution. Also if λ is a scalar, then prove that $\lambda X_1 = (\lambda x_1, \lambda x_2, \lambda x_3, \ldots\ldots, \lambda x_n)$ is also a solution.

(*b*) Find the characteristic roots and the spectrum of the matrix :

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

Shri Kumarswami Mahavidyalaya, Ausa

Department of Library

SRTMU, Nanded.

B. Sc. First Year

2nd Semester Examination

November/December 2025

Question Papers

This question paper contains 4 printed pages]

GA—09—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

CHEMISTRY

Paper-III

(Organic and Inorganic Chemistry)

(Monday, 17-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) Figures to the right indicate full marks.

1. Answer any *three* of the following : 3×5=15

(*a*) Explain the variation in oxidizing and reducing properties of p-block elements.

(*b*) Discuss the variation in acidic and basic character of hydroxides of p-block elements.

(*c*) Explain Cady-Elsey and Vsanovich concept for acids and bases with example.

P.T.O.

(*d*) Discuss electronic and pi-bonding theory of hardness and softness.

(*e*) State and explain SHAB principle with its applications.

2. Attempt any *three* of the following : 3×5=15

(*a*) Predict the product of the following reactions :

(*i*) $H_3C-\overset{O}{\overset{\|}{C}}-OH + SOCl_2 \longrightarrow ?$

(*ii*) $\begin{array}{l} CH_2-OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} \xrightarrow{3HNO_3} ?$

(*iii*) $H_2C=CH-CH_2-I \xrightarrow{NaOH} ?$

(*iv*) $2H_2C=CH_2 + O_2 \xrightarrow[250°C]{Ag} ?$

(*v*) $H_3C-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow{H_2O} ?$

(*b*) State Huckel's rule. Explain the aromaticity of the following compounds :

(*i*) Naphthalene

(*ii*) Furan.

(c) Explain Friedel-Craft acylation reaction of benzene with mechanism.

(d) Discuss Kolbe's reaction of phenol with mechanism.

(e) How will you prepare :

(i) Ethylene glycol from :

(1) 1, 2-Dihaloalkane

(2) Alkene.

(ii) Glycerol from :

(1) Oils and fats

(2) Propene.

3. Answer any *two* of the following : 2×5=10

(a) Discuss the orientation effect of –Cl with example.

(b) How will you synthesize chlorobenzene from :

(i) Hunsdiecker reaction

(ii) Gattermann reaction.

(c) (1) What is the action of the following on Ethyl acetate :

(i) Water

(ii) Methylamine.

P.T.O.

(2) How will you convert :

(i) Acetic anhydride to acetamide

(ii) Acetyl chloride to acetic acid.

(d) What are aromatic compounds ? Discuss the stability of benzene on the basis of resonance.

This question paper contains 2 printed pages]

NEPGA—1010—201—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(NEP Pattern)

CHEMISTRY

Paper–SCHECT–1151

(Physical and Inorganic Chemistry)

(Wednesday, 19-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) *All* questions carry equal marks.

(*ii*) Question No. 1 is compulsory.

(*iii*) Solve any *two* of the remaining four questions.

(*iv*) Figures to the right indicate full marks.

(*v*) Use of calculator and logarithmic table is allowed.

1. Solve the following questions (2.5 marks each) : 10

(*a*) Explain Aufbau Principle

(*b*) Calculate root mean square velocity of Nitrogen (N_2) molecule at 100°C

($R = 8.314\ JK^{-1}mol^{-1}$)

P.T.O.

(*c*) Explain Brownian movement in colloids.

(*d*) Define oxidation and reduction on the basis of oxidation number concept.

2. Solve the following questions : 10

(*a*) Derive an expression for radius of *n*th Bohr orbit of H-atom. Calculate the radius of second Bohr orbit of H-atom.

(*b*) What are quantum numbers ? Explain quantum numbers in brief.

3. Solve the following questions : 10

(*a*) Derive van der Waals equation.

(*b*) (*i*) State postulates of kinetic theory of gases.

(*ii*) Give the uses of Helium and Neon.

4. Solve the following questions : 10

(*a*) What are emulsions ? How are they classified ? Give their preparations.

(*b*) Discuss the factors affecting adsorption.

5. Solve the following questions : 10

(*a*) Give the preparation, properties and structure of Xenon difluoride (XeF_2)

(*b*) Define oxidation, reduction, oxidizing agent and reducing agent according to classical concept.

This question paper contains 2 printed pages]

GA—20—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(CBCS/NEW Pattern)

CHEMISTRY

Paper-IV

(Physical & Inorganic Chemistry)

(Wednesday, 19-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) Use of logarithmic table and calculator is allowed.

1. Solve any *three* of the following : 3×5=15

(*a*) Define and explain sigma and pi-bond with example.

(*b*) Define hydrogen bonding. Explain types of hydrogen bonding.

(*c*) Explain geometry and bond angle in H_2O and NH_3. Write limitations of VSEPR theory.

P.T.O.

(*d*) Define hybridization. Explain sp^3d hybridization with example PCl_5.

(*e*) Define polarizing power and polarisability and explain Fajan's rule.

2. Solve any *three* of the following : 3×5=15

(*a*) Define catalysis. Give characteristics of catalytic reactions.

(*b*) What are sols ? Give any *two* properties of sols.

(*c*) Derive an expression for velocity of electron for Hydrogen atom.

(*d*) What is viscosity ? How will you determine the viscosity of liquid by Ostwald's Viscometer method ?

(*e*) (*i*) Explain Hund's rule of maximum multiplicity.

(*ii*) What is autocatalysis ? Explain with suitable example.

3. Solve any *two* of the following : 2×5=10

(*a*) Explain Enzyme catalysis with example.

(*b*) What are emulsions ? Explain the preparation of emulsions.

(*c*) Explain various intermolecular forces in liquids.

(*d*) (*i*) Calculate the radius of the third orbit of Hydrogen atom. (r = 0.529Å).

(*ii*) Give the postulates of Bohr's atomic theory of Hydrogen atom.

This question paper contains **2** printed pages]

NEPGA—2020—201—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP-2020)

PHYSICS

Paper–SPHYCT-1151

(Fundamental of Physics-II)

(Friday, 21-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) *All* questions carry equal marks.

(*ii*) Question No. **1** is compulsory.

(*iii*) Solve any *two* from remaining four questions (Q. No. **2** to Q. No. **5**)

(*iv*) Figures to the right indicate full marks.

1. Attempt *all* questions : 4×2.5=10

(*a*) What is reflecting telescope ? Give its one example.

(*b*) State Faraday's law of electromagnetic induction.

(*c*) State Ohm's law and write its expression.

(*d*) Write any *one* postulate of kinetic model.

P.T.O.

2. Explain the working principle of Ramsden eyepiece with neat labelled ray diagram. Discuss its merits and demerits. 10

3. What is mutual inductance ? Explain mutual inductance of a pair of co-axial solenoid. 10

4. State Norton's theorem. Explain maximum power transfer theorem. 10

5. Derive an expression for the pressure exerted by a gas in detail. 10

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This question paper contains 2 printed pages]

GA—31—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper III

(Heat and Thermodynamics)

(Friday, 21-11-2025) **Time : 10.00 a.m. to 12.00 Noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— *All* questions are compulsory.

1. Describe Joule-Thomson porous plug experiment in detail. 15

Or

(*a*) Explain different types of thermometers. 8

(*b*) Differentiate between Centigrade and Fahrenheit scale. 7

2. Derive the expression for Clausius Clapeyron latent heat equations and Gibb's function. 15

Or

(*a*) Give an expression for coefficient of viscosity of gases. 8

P.T.O.

(*b*) Derive an expression for interrelations between three transport coefficients. 7

3. Write short notes on any *two* (each of 5 marks) : 10

(*a*) Seebeck effect

(*b*) Critical constants

(*c*) Molecular collisions

(*d*) Carnot's theorem.

This question paper contains 2 printed pages]

GA—30—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

BOTANY

Paper III

(Bryophytes, Pteridophytes, Gymnosperms and Paleobotany)

(Friday, 21-11-2025) **Time : 10.00 a.m. to 12.00 Noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (1) Attempt *All* questions.

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

1. Describe thallus structure of Funaria. Add a note on internal structure of axis (T.S.). 15

Or

(*a*) General characters of Bryophytes. 8

(*b*) L.S. of Lycopodium Prothallus. 7

P.T.O.

2. Describe internal structure of Cycas Pinna. Add a note on anatomical adaptations in Cycas Pinna. 15

Or

(*a*) Classification of Gymnosperms as per K.R. Sporne (1964). 8

(*b*) Types of fossils. 7

3. Write short notes on any *two* of the following (Each of **5** marks) : 10

(*a*) Gemma Cup of Marchantia

(*b*) Structure of Marsilea Sporocarp

(*c*) General characters of Pteridophytes

(*d*) Bennettites flower.

This question paper contains 2 printed pages]

NEPGA—2010—201—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP-2020 Pattern)

BOTANY

Paper–SBOTCT-1151

(Fungi, Lichens and Mycorrhiza)

(Friday, 21-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) Question No. 1 is compulsory.

(*ii*) Of the remaining, attempt any *two* questions.

(*iii*) Draw neat and labelled diagram wherever required.

1. Write brief notes on the following : 10

(*a*) Systematic position and occurrence of Albugo.

(*b*) Application of fungi in Agriculture.

(*c*) Nature of association of algal and fungal partners.

(*d*) Economic importance of Mycorrhiza.

P.T.O.

2. Describe structure of mycelium and asexual reproduction in Eurotium. 10

3. Explain with details structure of Basidiocarp of Agaricus. 10

4. What are Lichens ? Describe types of Lichens. 10

5. Describe types of mycorrhiza in detail. 10

This question paper contains 2 printed pages]

GA—61—2025

FACULTY OF SCIENCE/ARTS

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

NOVEMBER/DECEMBER, 2025

MATHEMATICS

Paper–III

(Calculus–II)

(Thursday, 27-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time— Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) Figures to the right indicate full marks.

1. Find reduction formula for, $\int x^n \cdot e^{ax} \cdot dx$ and integrate x^3e^{2x}. 15

Or

(*a*) Evaluate $\int \frac{1}{\sqrt{ax^2+bx+c}}\,dx$ when a is positive. 8

(*b*) Integrate $\frac{x+1}{\sqrt{x^2-x+1}}$. 7

2. Integrate $\sin^m x \cdot \cos^n x$, if m or n is an odd positive integer or if $(m + n)$ is an even negative integer. 15

P.T.O.

Or

(*a*) Prove that $\int_0^\infty e^{-x^{\frac{1}{n}}} \cdot dx = n\lfloor n$. 8

(*b*) Prove that : 7

$$\beta(m,n) = \frac{\lfloor m \cdot \lfloor n}{\lfloor (m+n)}.$$

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

(*a*) Evaluate $\int_0^\infty \frac{dx}{(x^2+1)^2}$.

(*b*) Integrate $\frac{1}{\sqrt{2x^2-x+2}}$.

(*c*) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx$.

(*d*) Evaluate $\int_0^a \int_0^b (x^2+y^2)\,dx\,dy$.

This question paper contains 2 printed pages]

GA—62—2025

FACULTY OF SCIENCE

B.Sc. (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

ZOOLOGY

Paper-III

(Comparative Anatomy of Vertebrates)

(Thursday, 27-11-2025) **Time : 10.00 a.m. to 12.00 Noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) Illustrate your answer with suitable well labelled diagrams wherever necessary.

1. Give comparative account of Limbs. 15

Or

Write short notes on :

(*a*) Describe alimentary canal. 8

(*b*) Explain brief account of different respiratory organs in vertebrates. 7

P.T.O.

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2. Describe single and double blood circulation in vertebrate groups. 15

Or

Write short notes on :

(*a*) Explain comparative account of brain of vertebrates. 8

(*b*) Decribe phonoreceptors. 7

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

(*a*) General structure of integument

(*b*) Accesory respiratory organs

(*c*) Evolution of excretory system in vertebrates

(*d*) Photoreceptors.

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SUBJECT CODE NO- NEPGA-4010-201-2025

FACULTY OF SCIENCE AND TECHNOLOGY

EXAMINATION WINTER 2025

B.SC (FIRST YEAR) (SEM-II)

COMPUTER SCIENCE

PROGRAMMING IN C LANGUAGE

[Time: 2:00 Hours] **[Max.Marks:30]**

"Please check whether you have got the right question paper."

N.B.
1. Question 1 is compulsory.
2. Attempt any 2 questions from Questions 2 to 5.
3. Draw neat and labelled diagrams wherever necessary.

Q.1 Attempt the following: **10**

a) What is algorithm?

b) Explain character set of C.

c) Explain if statement in C.

d) What is function?

Q.2 Attempt the following: **10**

a) Differentiate between Compiler and Interpreter.

b) What is flowchart? Explain flowcharting symbols.

Q.3 Attempt the following: **10**

a) Explain structure of C program.

b) Explain operators used in C.

Q.4 Attempt the following: **10**

a) Write a C program to check whether a given number is positive or negative using if-else statement.

b) Differentiate between while and do-while loops.

Q.5 Attempt the following: **10**

a) What is recursion? Explain with example.

b) What is union in C? Explain with example.

This question paper contains 2 printed pages]

GA—48—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

BOTANY

Paper-IV

(Taxonomy of Angiosperms)

(Monday, 24-11-2025) **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 Hooker's system of classification with its merits and demerits. 15

Or

Describe in brief :

(*a*) Binomial Nomenclature 8

(*b*) Botanical gardens in India. 7

P.T.O.

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 fruits. 8

(*b*) Structure of Typical flower (Hibiscus). 7

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

(*a*) Aim of Taxonomy

(*b*) Taxonomic Ranks

(*c*) Structure of stamen

(*d*) Flower of Solanaceae.

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This question paper contains 2 printed pages]

GA—49—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper IV

(Electricity and Magnetism)

(Monday, 24-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *all* questions.

(*ii*) Draw diagram wherever necessary.

1. Give in brief diamagnetic, paramagnetic and ferromagnetic phenomenon and explain I-H curve by magnetometer method. 15

Or

(*a*) Explain motion of charged particles in uniform electric field. 8

(*b*) State Ampere's ciscuital law and deduce its differential form. 7

2. Explain principle, working and types of transformers with figures. 15

Or

(*a*) Explain self-induction of a solenoid. 8

(*b*) Define electromagnetic induction and explain Faraday's law of electromagnetic induction. 7

P.T.O.

WT (2) GA—49—2025

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

(*a*) Biot-Savart's Law

(*b*) Hysteresis Curve

(*c*) Lenz's Law

(*d*) Efficiency of transformer.

This question paper contains 3 printed pages]

NEPGA—3010—201—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP-2020)

MATHEMATICS

Paper–SMATCT-1151

(Analytical Geometry)

(Monday, 24-11-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 Hours *Maximum Marks—30*

N.B. :— (*i*) *All* questions carry equal marks.

(*ii*) Question No. **1** is compulsory.

(*iii*) Solve any *two* of the remaining four questions (Q. No. **2** to Q. No. **5**).

(*iv*) Figures to the right indicate full marks.

1. Solve the following (2.5 marks each) : 10

(*a*) If 6, 2, 3 are proportional to the direction cosines of a line. What are their actual values ?

P.T.O.

(*b*) Find k so that the lines $\frac{x-1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2}$, $\frac{x-1}{3k} = \frac{y-5}{1} = \frac{z-6}{-5}$ are perpendicular to each other.

(*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*) Find the centre and radius of the sphere :

$$x^2 + y^2 + z^2 + 2x - 4y - 6z + 5 = 0.$$

2. (*a*) Prove that every equation of first degree in x, y and z represents a plane. 5

(*b*) Find the equation of the plane through P(2, 2, −1), Q (3, 4, 2), R (7, 0, 6). 5

3. (*a*) Find the length of the perpendicular from P (x_1, y_1, z_1) to the line

$$\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}.$$ 5

(*b*) Obtain the symmetrical form of the equations of the line :

$$x - 2y + 3z = 4,\ 2x - 3y + 4z = 5.$$ 5

4. (*a*) 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-ordiantes (x, y, z) and new co-ordinates (x', y', z') of a point P are given by $x = x' + f$, $y = y' + g$, $z = z' + h$. 5

(*b*) Find the equation of the plane $2x + 3y + 4z = 7$ referred to the point $(1, -2, 3)$ as origin; direction of the axes remaining the same. 5

5. (*a*) Obtain the equation of the sphere described on the line joining the points $A(x_1, y_1, z_1)$, $B(x_2, y_2, z_2)$ as diameter. 5

(*b*) Find the equation of the sphere through the circle $x^2 + y^2 + z^2 = 9$, $2x + 3y + 4z = 5$ and the point $(1, 2, 3)$. 5