Shri Kumarswami Mahavidyalaya, Ausa

Department of Library

SRTMU, Nanded.

B. Sc. Second Year

3rd Semester Examination

November/December 2025

Question Papers

Total No. of Printed Pages:01

SUBJECT CODE NO- NEPGA-4010-301-2025
FACULTY OF SCIENCE AND TECHNOLOGY
EXAMINATION WINTER 2025
B.SC (SECOND YEAR) (SEM-III)
COMPUTER SCIENCE
DATA STRUCTURE USING C

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

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

N.B. i)Question number one is Compulsory.
iii)Attempt any two Questions from Q.No.2 to 5

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

A. Define Array and give one example.
B. Define Linked List.
C. Explain Stack with an example.
D. What is a Graph?

Q.2 A. Define Data Structure. Explain operations on data structures. **5**
B. Explain any one sorting technique. **5**

Q.3 A. Explain representation of Linked List in memory. **5**
B. Explain Traversing operation in Linked List. **5**

Q.4 A. What is Queue? Explain Insertion operation on a queue. **5**
B. Explain Array representation of Stack. **5**

Q.5 A. Define *Tree*. Explain *Binary*. **5**
B. Explain Representation of Graph. **5**

Total No. of Printed Pages:1

SUBJECT CODE NO:- NEPGA-4010-302-2025
FACULTY OF SCIENCE & TECHNOLOGY
EXAMINATION WINTER 2025
B.SC.(SECOND YEAR) (SEM –III)
COMPUTER SCIENCE
PROGRAMMING IN C++

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

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

N.B.
i) Q. 1 is compulsory,
ii) Attempt **any 02** questions from Q.2 to Q.5.
iii) Draw neat & labelled diagrams, wherever necessary.

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

a) Differentiate between top-down and bottom-up approach of languages.
b) Explain basic data types in C++.
c) What is Operator Overloading?
d) What is static data members? Explain.

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

a) Explain in detail structure of C++ program. **5**
b) What are the applications of OOP'S **5**

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

a) Write C++ programs to find the largest number between two numbers using if-else statement. **5**
b) Explain for-loop statements with example. **5**

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

a) Explain concept of call by value with example. **5**
b) Explain Inline function with Suitable example. **5**

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

a) Explain Concept of friend function with example. **5**
b) What is Constructer? Explain. **5**

This question paper contains 2 printed pages]

NEPGA—1010—302—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP-2020)

CHEMISTRY

Paper–SCHECT-1202

(Physical and Inorganic Chemistry)

(Thursday, 20-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—30

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

(*ii*) Question 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 : 4×2.5=10

(*a*) Define photoelectric effect. Write Einestein's photoelectric equation and mention terms involved in it.

P.T.O.

(*b*) Give limitations of valence bond theory.

(*c*) Define autocatalysis and enzyme catalysis with example.

(*d*) Carnot engine operates between 500K and 300K. Calculate its percent efficiency.

2. Solve the following : 2×5=10

(*a*) Derive an expression of Entropy change for an ideal gas as a function of volume and temperature.

(*b*) What is need for second law of thermodynamics ? Give any *two* statements of second law of thermodynamics.

3. Solve the following : 2×5=10

(*a*) Explain Acid-base catalysis with examples.

(*b*) Give characteristics of catalytic reactions.

4. Solve the following : 2×5=10

(*a*) (*i*) Distinguish between Sigma(σ) and Pi(π) bonds.

(*ii*) Calculate de-Broglie's wavelength of a body of mass 0.1 kg moving with velocity 100 m/s ($h = 6.626 \times 10^{-34}$ Js).

(*b*) State and explain Compton effect.

5. Solve the following : 2×5=10

(*a*) Explain formation of SF_6 on the basis of hybridization.

(*b*) What is hydrogen bonding ? Explain its types with examples.

X315YC87337X315YC87337X315YC87337X315YC87337

This question paper contains 4 printed pages]

NEPGA—1010—301—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP Pattern)

CHEMISTRY

Paper–SCHECT–1201

(Organic and Inorganic Chemistry)

(Tuesday, 18-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

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 questions : 4×2.5=10

(*a*) Write a note on structure of carbonyl group

(*b*) How will you prepare crotonic acid from ethyl acetoacetate ?

P.T.O.

(*c*) What are organolithium compounds ? How will you obtain the following compounds from methyl lithium ?

(*i*) Methane

(*ii*) Ethanol

(*d*) Define the following terms :

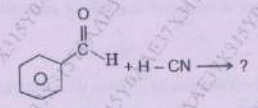
(*i*) Macro-qualitative analysis.

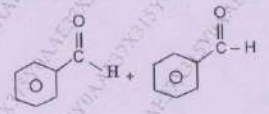
(*ii*) Basic radical.

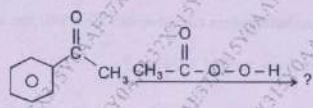
2. Solve the following : 2×5=10

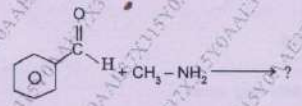
(*a*) Explain Mannich reaction with mechanism.

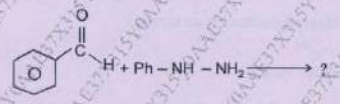
(*b*) Predict the product :

(*i*) 

(*ii*) 

(iii) 

(iv) 

(v) 

3. Solve the following : 2×5=10

(a) Describe the acidity of carboxylic acid. Give effect of substituents on acidic strength of carboxylic acid.

(b) How will you prepare succinic acid from ethylene dibromide and maleic acid ? Explain effect of heat and reaction of ammonia on succinic acid.

4. Solve the following : 2×5=10

(a) What are organozinc compounds ? Write the preparation of diethyl zinc from ethyl iodide. How will you obtain the following compounds from diethyl zinc ?

(i) Ethane

(ii) 2-butanol.

P.T.O.

(b) (i) How will you prepare the following compounds from methyl magnesium bromide ?

(i) Ethanol

(ii) Ethanoic acid.

(ii) Write a note on common ion effect.

5. Solve the following : 2×5=10

(a) What is solubility product ? Explain its role in the separation of III A and III B group radicals.

(b) What is HSAB principle ? Discuss its limitations.

Total No. of Printed Pages:1

SUBJECT CODE NO:- NEPGA-1010-303-20255
FACULTY OF SCIENCE & TECHNOLOGY
EXAMINATION WINTER 2025
B. SC. (SECOND YEAR) (SEM –III)
BASIC CHEMISTRY-I (NEP) (SCHEMT-1201)
PHYSICAL AND INORGANIC CHEMISTRY (THEORY)

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

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

N.B.
1) All questions carry equal marks.
2) Question No. 1 is compulsory.
3) Solve ANY TWO of the remaining four questions No. 2 to Question No. 5.

Q.1 Solve the following (2.5 marks each) **10**

a) Write a note on positive and negative catalysis.
b) What is ionic product of water?
c) Give a brief note on hardness of water.
d) Differentiate between determinate and indeterminate errors.

Q.2 Solve the following **10**

a) Write a note on auto-catalysis with a suitable example.
b) Explain types of catalysis with an example.

Q.3 Solve the following **10**

a) Define p^{H} and p^{OH}. Give the relationship between p^{H} and p^{OH}.
b) What is dissociation constant? Explain factors affecting it.

Q.4 Solve the following **10**

a) Write a note on water pollutants.
b) Explain soil pollution.

Q.5 Solve the following **10**

a) What is the F-test? Give its applications.
b) Explain the types of errors.

This question paper contains 3 printed pages]

GA—08—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(CBCS/New)

CHEMISTRY

Paper-VI

(Organic & Inorganic Chemistry)

(Saturday, 15-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— Attempt *all* questions.

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

(*a*) What is solubility product ? Explain its role in separation of III A and III B group radicals.

(*b*) Explain the following physical properties of solvents :

(*i*) Dielectric constant

(*ii*) M.P. and B.P.

P.T.O.

(*c*) Explain the following reactions in liq. NH_3 :

(*i*) Precipitation

(*ii*) Ammonolysis.

(*d*) How Fe^{+3} and Al^{+3} ions are separated from each other in the analysis of basic radical ?

(*e*) Explain the role of 8-hydroxy-quinoline in qualitative analysis.

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

(*a*) Explain Perkin's reaction with mechanism.

(*b*) How will you synthesise phthalic acid from :

(*i*) O-xyline

(*ii*) Naphthalene.

(*c*) What are organomagnesium compounds ? How will you synthesis the following from :

(*i*) Acetic acid

(*ii*) Acetone.

(*d*) Explain Bayer-Villiger oxidation with mechanism.

(*e*) How will you prepare ethyl acetoacetate by Claisen condensation reaction ? Explain with mechanism.

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

(*a*) Explain Mervin-Pondorf-Verly reduction with mechanism.

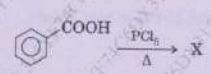
(*b*) Write notes on :

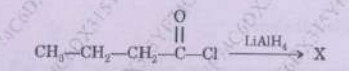
(*i*) Hydrolysis of oil and fats

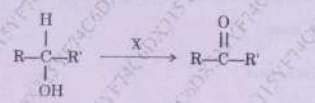
(*ii*) Hydrogenation of oil.

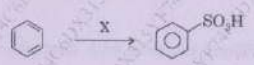
(*c*) What are synthetic detergents ? Explain different types of detergents.

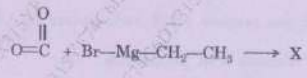
(*d*) Predict the X in the following reactions :

(*i*) 

(*ii*) 

(*iii*) 

(*iv*) 

(*v*) 

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NEPGA—2010—303—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP 2020 Pattern)

BOTANY

Paper–SBOTMT-1201

(Diversity of Cryptogams)

(Saturday, 22-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

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 well labelled diagram wherever required.

1. Write brief notes on the following : 10

(*a*) Graphic life cycle of Riccia. 2½

(*b*) Structure of Antheridium in Funaria. 2½

(c) Structure of Equisetum cone. 2½

(*d*) Economic importance of Pteridophytes. 2½

P.T.O.

2. Describe external and internal structure of Riccia thallus. 10

3. Describe sexual reproduction in Funaria. 10

4. Give an account of systematic position, occurrence and external features of Equisetum sporophyte. 10

5. Describe T.S. of Marsilea petiole. 10

This question paper contains 2 printed pages]

GA—46—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

BOTANY

Paper-VII

(Plant Physiology and Biochemistry)

(Saturday, 22-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 Hours *Maximum Marks—40*

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

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

1. Define transpiration. Describe mechanism of opening and closing of stomata in context with starch-sugar theory. 15

Or

Describe in brief :

(*a*) Source and deficiency symptoms of N & P. 8

(*b*) Mechanism of passive absorption of salt. 7

P.T.O.

2. Give an account on chemical, nature and practical applications of Auxin. 15

Or

Write in brief :

(*a*) Structure and classification of carbohydrates. 8

(*b*) Primary and secondary structure of protein. 7

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

(*a*) Diffusion

(*b*) Hydroponic technique

(*c*) L.D.P

(*d*) Alkaloids.

This question paper contains 2 printed pages]

NEPGA—2010—302—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(NEP 2020 Pattern)

BOTANY

Paper–SBOTCT-1202

(Cell Biology)

(Thursday, 20-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

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*) Functions of Endoplasmic reticulum.

(*b*) Types of chromosomes (based on position of centromere)

(*c*) Metaphase of mitosis.

(*d*) Draw neat and labelled diagram of double helical structure of DNA.

P.T.O.

2. Describe ultrastructure and functions of Golgi complex. 10

3. Define giant chromosomes. Describe structure of lampbrush chromosomes. 10

4. Define meiosis. Describe Prophase-I of Meiosis-I. 10

5. Explain structure and functions of tRNA. 10

This question paper contains 2 printed pages]

GA—28—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

BOTANY

Paper VI

(Plant Anatomy)

(Thursday, 20-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (1) Attempt *All* questions.

(2) Draw well labelled diagram wherever necessary.

1. Define meristem. Describe the classification of meristem based on origin and position. 15

Or

Write notes on :

(*a*) Simple tissues. 8

(*b*) Latex cell and Latex vessels. 7

P.T.O.

2. What is anomalous secondary growth ? Explain in detail anomalous growth in Bignonia stem. 15

Or

Write notes on :

(*a*) T.S. of Dicot leaf (Sunflower). 8

(*b*) T.S. of Maize stem. 7

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

(*a*) Apical cell theory

(*b*) Digestive gland

(*c*) Types of vascular bundles

(*d*) Wood elements.

This question paper contains 2 printed pages]

NEPGA—2010—301—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(NEP Pattern)

BOTANY

Paper–SBOTCT-1201

(Taxonomy of Angiosperms)

(Tuesday, 18-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

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*) Binomial nomenclature. 2½

(*b*) Artificial classification. 2½

(*c*) Function of root. 2½

(*d*) Inflorescence of Lamiaceae. 2½

P.T.O.

2. Explain in detail types and use of keys in plant identification. 10

3. Describe in detail Bentham and Hooker's system of classification of Angiosperms. Add a note on its merits and demerits. 10

4. Define fruit and explain in detail simple fruit. 10

5. Write in detail vegetative and floral characters of Malvaceae. Add a note on its economic importance. 10

Total No. of Printed Pages:01

SUBJECT CODE NO- NEPGA-3020-303-2025
FACULTY OF SCIENCE AND TECHNOLOGY
EXAMINATION WINTER 2025
B.SC (SECOND YEAR) (SEM-III)
ZOOLOGY
DEVELOPMENTAL BIOLOGY

[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. Solve **any two** questions from Q. No. 2 to Q. No. 5.
3. Each question carries 10 marks.

Q.1 Write short notes on the following: 10

A. Telolecithal Egg

B. Frog Embryo Second Cleavage

C. Cotyledonary Placenta

D. GIFT

Q.2 Describe Oogenesis in mammals. 10

Q.3 Explain gastrulation in frog. 10

Q.4 Structure and functions of Yolk Sac; Allantois 10

Q.5 Write a note infertility in humans – causes, diagnosis, and treatment. 10

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

NEPGA—3020—302—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

ZOOLOGY

Paper–SZOOCT-1202

(Biochemistry)

(Thursday, 20-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

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.

1. Write short notes on the following : 10

(*a*) Monosaccharides

(*c*) Effect of temperature on enzymes

(*c*) Glycogenesis

(*d*) Ketosis

P.T.O.

2. Describe in detail classification of lipids. 10

3. Explain in detail electrochemical properties of water. 10

4. Explain in detail Glycolysis. 10

5. Describe in detail β-oxidation pathway. 10

This question paper contains 2 printed pages]

NEPGA—3020—301—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

ZOOLOGY

(SZOOCT-1201)

(Animal Physiology)

(Tuesday, 18-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

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.

1. Write short notes on the following : 10

   (*a*) Kinds of respirations

   (*b*) E.C.G.

   (*c*) Structure of smooth muscle

   (*d*) T.S. of ovaries

P.T.O.

2. Describe respiratory system in man. 10

3. Describe working of Human Heart. 10

4. Describe Ultra structure of Skeletal muscles. 10

5. Describe structure and functions of Thyroid gland. 10

This question paper contains 2 printed pages]

GA—47—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper-VII

(Statistical Physics, Electromagnetics and Theory of Relativity)

(Saturday, 22-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

1. Derive an expression for Fermi-Dirac distribution. 15

Or

(*a*) Define probability. A coin is thrown 3 times. What is the probability that at least one head is obtained ? 8

(*b*) Explain in detail thermodynamic probability. 7

2. Derive Maxwell's equations. Explain each of the four Maxwell's equations in detail and discuss their significance in electromagnetic theory. 15

Or

(*a*) Derive an expression for time dilation. 8

(*b*) Explain in detail length contraction. 7

P.T.O.

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

(*a*) Micro and Macro state.

(*b*) Electron gas

(*c*) Ampere's Law

(*d*) Frame of reference.

This question paper contains 2 printed pages]

NEPGA—2020—303—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper–SPHYMT-1201

(General Properties of Matter)

(Saturday, 22-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—30

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

(*ii*) Question number 1 is compulsory.

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

1. Solve the following questions : 10

(*a*) Define compound pendulum.

(*b*) Define molecular forces.

(*c*) What is critical velocity ?

(*d*) Define Hooke's law.

P.T.O.

2. (*a*) Explain the experiment with the bar pendulum. 5

(*b*) Explain Bessel's contribution for computed time. 5

3. (*a*) Explain surface tension with units and dimensions. 5

(*b*) Explain Ferguson method for determination of surface tension. 5

4. (*a*) Explain Reynold's number with its significance. 5

(*b*) Explain experimental determination of coefficient of viscosity by Poisseulli's method. 5

5. (*a*) Derive an expression for torsional pendulum. 5

(*b*) Explain bending of beam. 5

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

GA—29—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper VI

(Waves and Oscillations)

(Thursday, 20-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

1. Explain in detail analytical treatment of stationary waves for open end organ pipe. 15

Or

(*a*) Explain energy of a plane progressive wave. 8

(*b*) Obtain differential equation of wave motion. 7

2. What is reverberation ? Derive Sabine's formula for reverberation time. 15

Or

(*a*) Explain sharpness of resonance. 8

(*b*) Explain Damped vibrations in detail. 7

P.T.O.

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

(*a*) Conditions for good acoustical designs of an auditorium

(*b*) Free vibrations and forced vibrations

(*c*) Energy is not transferred in stationary waves

(*d*) Differential equation of wave motion.

This question paper contains 2 printed pages]

NEPGA—2020—302—2025

FACULTY OF SCIENCE

B.Sc. (NEP) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper–SPHYCT-1202

(Waves and Oscillations)

(Thursday, 20-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

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 the remaining four questions (Q. No. **2** to Q. No. **5**).

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

1. Solve the following questions (Compulsory) : 10

(*a*) Write down general equation of simple harmonic wave.

(*b*) Define nodes in stationary waves.

(*c*) Define undamped vibrations.

(*d*) Define reverberation time.

P.T.O.

2. (*a*) Derive the relation between the wave velocity and particle velocity. 10

(*b*) Derive differential equation of wave motion.

3. Derive an expression for analytical treatment of stationary waves in closed end organ pipe. 10

4. (*a*) Define damped vibrations. Derive differential equation for damped vibrations.

(*b*) Explain phase of resonance. 10

5. What are conditions for good acoustical designs of an auditorium ? 10

This question paper contains 2 printed pages]

NEPGA—2020—301—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(NEP Pattern)

PHYSICS

Paper-I-SPHYCT-1201

(Mathematical Methods and Applications in Electricity and Magnetism)

(Tuesday, 18-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—30

N.B. :— (*i*) Each question carries equal marks.

(*ii*) First question is compulsory.

(*iii*) Solve any *two* from question numbers **2** to **5**.

1. Attempt *all* four questions (2.5 mark each) : 10

(*a*) If $Z_1 = 3 + 2i$ and $Z_2 = 4 + 3i$, find $Z_1 + Z_2$ and $Z_1 - Z_2$.

(*b*) State and define gradient of scalar field.

(*c*) Explain the concept of 'j-operator'.

(*d*) Define magnetic flux.

P.T.O.

2. Explain the graphical representation of quotient (Division) of the complex number. 10

3. Define divergence of vector field and explain its physical significance. 10

4. Explain L-C-R circuit in series and find the resonance frequency. 10

5. Derive an expression for torque on current loop in a magnetic field. 10

Total No. of Printed Pages:01

SUBJECT CODE NO- NEPGA-4010-303-2025
FACULTY OF SCIENCE AND TECHNOLOGY
EXAMINATION WINTER 2025
B.SC (SECOND YEAR) (SEM-III)
COMPUTER SCIENCE
PROGRAMMING LOGIC CONCEPT

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

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

N.B. (i) Question No. 1 is compulsory.

(ii) Attempt **any two** questions From Q. No. 2 to Q. No. 5.

Q.1 Attempt the following: 10

a. What is Algorithm?

b. Explain Flowchart.

c. What is Array?

d. Concept of sorting

Q.2 a. Explain the concept of top-down design. 5

b. Explain the concept of problem solving aspect. 5

Q.3 a. Write an algorithm to calculate factorial of number. 5

b. Write an algorithm for summation set of numbers. 5

Q.4 a. Write an algorithm to find smallest divisor of an integer. 5

b. Write an algorithm to find the maximum number in a set. 5

Q.5 a. Explain Binary Search method. 5

b. Explain Insertion Sort techniques. 5

Total No. of Printed Pages:1

SUBJECT CODE NO:- NEPGA-4010-302-2025
FACULTY OF SCIENCE & TECHNOLOGY
EXAMINATION WINTER 2025
B.SC.(SECOND YEAR) (SEM –III)
COMPUTER SCIENCE
PROGRAMMING IN C++

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

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

N.B.
i) Q. 1 is compulsory.
ii) Attempt **any 02** questions from Q.2 to Q.5.
iii) Draw neat & labelled diagrams, wherever necessary.

Q.1 Attempt the following: 10

a) Differentiate between top-down and bottom-up approach of languages.
b) Explain basic data types in C++.
c) What is Operator Overloading?
d) What is static data members? Explain.

Q.2 Attempt the following: 10

a) Explain in detail structure of C++ program. 5
b) What are the applications of OOP'S 5

Q.3 Attempt the following: 10

a) Write C++ programs to find the largest number between two numbers using if-else statement. 5
b) Explain for-loop statements with example. 5

Q.4 Attempt the following: 10

a) Explain concept of call by value with example. 5
b) Explain Inline function with Suitable example. 5

Q.5 Attempt the following: 10

a) Explain Concept of friend function with example. 5
b) What is Constructer? Explain. 5

Total No. of Printed Pages:01

SUBJECT CODE NO- NEPGA-4010-301-2025
FACULTY OF SCIENCE AND TECHNOLOGY
EXAMINATION WINTER 2025
B.SC (SECOND YEAR) (SEM-III)
COMPUTER SCIENCE
DATA STRUCTURE USING C

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

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

N.B. i)Question number one is Compulsory.
iii)Attempt any two Questions from Q.No.2 to 5

Q.1 Attempt the following: 10

A. Define Array and give one example.
B. Define Linked List.
C. Explain Stack with an example.
D. What is a Graph?

Q.2 A. Define Data Structure. Explain operations on data structures. 5
B. Explain any one sorting technique. 5

Q.3 A. Explain representation of Linked List in memory. 5
B. Explain Traversing operation in Linked List. 5

Q.4 A. What is Queue? Explain Insertion operation on a queue. 5
B. Explain Array representation of Stack. 5

Q.5 A. Define *Tree*. Explain *Binary*. 5
B. Explain Representation of Graph. 5

Total No. of Printed Pages:01

SUBJECT CODE NO:-CA-02-2025
FACULTY OF SCIENCE AND TECHNOLOGY
EXAMINATION WINTER 2025
B.A/B.Com/B.Sc (NEP) (SEM-III)
English-Compulsory-(Compulsory English)
Comprehension & Grammar-I

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

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

N.B. 1) Solve all Questions.
2) Question 1 is Compulsory
3) Solve any Two questions from Q.2 to Q.5

Q.1 Attempt the following short notes: **10**
a) Agarwal
b) Swami's fabricated tales
c) Choices and perplexity in The Road Not Taken.
d) Different forms of 'Tobe'

Q2 How does Dilip Chitre bring out the bitter sense of loneliness and generation gap in the poem Father Returning Home? **10**

Q3 Write in your own words the complexities of the parent-child relationship in the short story 'Father's Help.' **10**

Q4 Discuss The Road Not Taken as a metaphor of decision-making and cover its consequences in life. **10**

Q5 Write a detailed note on main verbs. **10**

This question paper contains 3 printed pages]

GA—08—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

(CBCS/New)

CHEMISTRY

Paper-VI

(Organic & Inorganic Chemistry)

(Saturday, 15-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— Attempt *all* questions.

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

   (*a*) What is solubility product ? Explain its role in separation of III A and III B group radicals.

   (*b*) Explain the following physical properties of solvents :

   (*i*) Dielectric constant

   (*ii*) M.P. and B.P.

P.T.O.

   (*c*) Explain the following reactions in liq. NH_3 :

   (*i*) Precipitation

   (*ii*) Ammonolysis.

   (*d*) How Fe^{+3} and Al^{+3} ions are separated from each other in the analysis of basic radical ?

   (*e*) Explain the role of 8-hydroxy-quinoline in qualitative analysis.

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

   (*a*) Explain Perkin's reaction with mechanism.

   (*b*) How will you synthesise phthalic acid from :

   (*i*) O-xyline

   (*ii*) Naphthalene.

   (*c*) What are organomagnesium compounds ? How will you synthesis the following from :

   (*i*) Acetic acid

   (*ii*) Acetone.

   (*d*) Explain Bayer-Villiger oxidation with mechanism.

   (*e*) How will you prepare ethyl acetoacetate by Claisen condensation reaction ? Explain with mechanism.

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

(*a*) Explain Mervin-Pondorf-Verly reduction with mechanism.

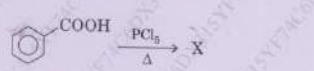
(*b*) Write notes on :

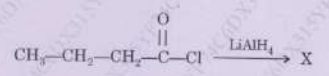
(*i*) Hydrolysis of oil and fats

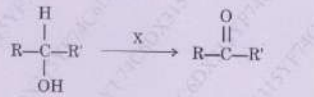
(*ii*) Hydrogenation of oil.

(*c*) What are synthetic detergents ? Explain different types of detergents.

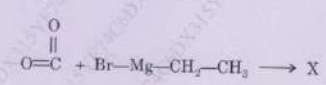
(*d*) Predict the X in the following reactions :

(*i*) 

(*ii*) 

(*iii*) 

(*iv*) 

(*v*) 

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GA—319—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

COMPUTER SCIENCE

Paper VI

(Operating System)

(Monday, 15-12-2025) **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 operating system ? Why is it called as resources manager ? 15

Or

(*a*) What is Process ? Explain the operations on process. 8

(*b*) Explain the concept of interprocess communication. 7

P.T.O.

2. What is a system call ? Explain in detail system calls. 15

Or

(*a*) Explain the concept of segmentation. 8

(*b*) Explain in detail memory swapping. 7

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

(*a*) Storage management

(*b*) Operations on process

(*c*) Virtual machine

(*d*) File system structure.

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This question paper contains 2 printed pages]

GA—325—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper VII

(Programming in C++)

(Wednesday, 17-12-2025) **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. (*a*) What is OOPs ? Explain basic concept of OOPs and write difference between procedure-oriented language and object-oriented language. 15

Or

(*b*) Write a program to find maximum number among three numbers using Nested if else. 8

(*c*) Write a program on default arguments. 7

P.T.O.

2. (*a*) What is Constructor ? Explain different type of constructors and destructors with example. 15

Or

(*b*) Write a program on function overloading. 8

(*c*) Write a program on static member function. 7

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

(*a*) Structure a C++

(*b*) Data types

(*c*) Friend function

(*d*) Inheritance.

Shri Kumarswami Mahavidyalaya, Ausa

Department of Library

SRTMU, Nanded.

B. Sc. Second Year

4th Semester Examination

November/December 2025

Question Papers

This question paper contains 4 printed pages]

GA—12—2025

FACULTY OF SCIENCE

B.Sc. (Fourth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

CHEMISTRY

Paper-VIII

(Organic and Inorganic Chemistry)

(Monday, 17-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— Attempt *all* questions.

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

   (*a*) Give the electronic configuration of third transition series elements.

   (*b*) What are the applications of lanthanides ?

   (*c*) Explain catalytic properties of transition series element with suitable example.

   (*d*) Explain extraction of uranium from pitchblend method.

   (*e*) Give the general characteristics of *d*-block elements.

P.T.O.

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

   (*a*) Define stereoisomerism. Explain types of stereoisomerism with example.

   (*b*) Define geometrical isomerism. Give E & Z form of the following :

   (*i*) Maleic acid

   (*ii*) 3-Hexene

   (*iii*) 2-Pentene

   (*iv*) Crotonic acid.

   (*c*) Define Aniline. Give the method of preparation of Aniline from :

   (*i*) Chlorobenzene

   (*ii*) Phthalamide

   (*iii*) Phenol

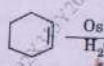
   (*iv*) Nitrobenzene.

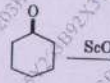
   (*d*) Predict the products :

   (*i*)  $\xrightarrow{SeO_2}$?

   (*ii*) $CH_3COOH + CH_2 = CH_2 \xrightarrow{BF_3}$?

(iii) $R - CH = CH_2 \xrightarrow[H_2O]{O_3} ?$

(iv)  $\xrightarrow[H_2O_2]{OsO_4} ?$

(v)  $\xrightarrow{ScO_2} ?$

(e) What is carbohydrate ? Give its classification.

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

(a) How will you convert glucose to mannose ?

(b) Explain oxidation and reduction of glucose with example.

(c) Define the following terms :

(i) Asymmetric Carbon

(ii) Resolution

(iii) Racemic mixture

(iv) Plane of symmetry

(v) Optical isomerism.

(d) What is action of the following on urea ?

(i) Acetyl chloride

(ii) Heat

(iii) Nitrous acid

(iv) Hydrolysis

(v) Formaldehyde.

This question paper contains 2 printed pages]

GA—23—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

CHEMISTRY

Paper IX

(Physical and Inorganic Chemistry)

(Wednesday, 19-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (1) Attempt *all* questions.

(2) Use of logarithmic table and calculator is allowed.

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

(*a*) What are interhalogen compounds ? Give structure of XY_7 type of interhalogen compounds.

(*b*) What are polyhalides ? Give the structure and properties of ICl_4^-.

(*c*) Explain strength and stability of oxyacids of halogens.

(*d*) What are zeolites ? Give their classification.

(*e*) Write a note on pyrosilicate and orthosilicate.

P.T.O.

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

(*a*) Derive the equation for rate constant of second order reaction for equal concentration of the reactants.

(*b*) For a first order reaction the half life period is 10 minutes. How long will it take for 70% completion of reaction ?

(*c*) Define the terms specific conductance and equivalent conductance. Explain the effect of dilution and temperature on it.

(*d*) State Kohlrausch's law. Explain its applications in the determination of absolute ionic mobility and in the determination of ionic product of water.

(*e*) State and explain Grothus-Drapper law and Stark-Einstein law of photochemical equivalence.

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

(*a*) What is the rate of reaction ? Explain different factors affecting the rate of chemical reaction.

(*b*) Explain Debye-Huckel theory of strong electrolytes.

(*c*) Explain the conductometric titration of weak acid and weak base. Give advantages of conductometric titration.

(*d*) When photochemical reaction mixture was exposed to light, 0.002 moles of it get reacted in 10 minutes, then 2×10^{16} photons of light was absorbed. Calculate the quantum yield for the process. ($N = 6.023 \times 10^{23}$).

This question paper contains 2 printed pages]

GA—53—2025

FACULTY OF SCIENCE

B.Sc. (Fourth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(New)

PHYSICS

Paper-IX

(Basic Electronics)

(Monday, 24-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :—Attempt *all* questions.

1. Explain C-E transistor input and output characteristics with necessary diagrams. 15

Or

(*a*) Explain varactor diode with its V-I characteristics. 8

(*b*) Explain photodiode and V-I characteristics for it. 7

2. Explain Colpitt's oscillator in detail and obtain necessary condition for oscillation. 15

Or

(*a*) Explain Op-AMP as non-inverting amplifier. 8

(*b*) State ideal characteristics of operational amplifier. 7

P.T.O.

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

(*a*) Light Emitting diode

(*b*) Transistor Connection (C-C)

(*c*) CMRR and Slew rate

(*d*) Barkhausen criterion.

This question paper contains 2 printed pages]

GA—52—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

BOTANY

Paper-IX

(Plant Metabolism and Biotechnology)

(Monday, 24-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

(*iii*) Illustrate your answers with suitable diagram.

1. Describe in detail Kreb's cycle in respiration. 15

Or

(*i*) Explain mechanism of enzyme action. 8

(*ii*) Explain nitrification and denitrification in nitrogen metabolism. 7

P.T.O.

2. What is recombinant DNA technology ? Explain its tools and techniques in *r*-DNA technology. 15

Or

(*i*) Explain anther culture and production of haploid in plant tissue culture. 8

(*ii*) Explain in detail somatic hybridization. 7

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

(*i*) Structure and functions of ATP

(*ii*) Nitrogen cycle

(*iii*) Cloning vectors

(*iv*) C-DNA library.

This question paper contains 2 printed pages]

GA—82—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

ZOOLOGY

Paper IX

(Evolutionary Biology and Genetic Engineering)

(Saturday, 29-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. Explain types of natural selection. 15

Or

(*a*) Describe adaptive radiation in Darwin's finches. 8

(*b*) Hardy-Winber equilibrium. 7

P.T.O.

2. Describe the process of construction of *r*-DNA. 15

Or

(*a*) Genetic code. 8

(*b*) Restriction endonuclease. 7

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

(*a*) Isolating mechanism

(*b*) Sympatric speciation

(*c*) Cosmid vector

(*d*) Transgenic cattle.

This question paper contains 2 printed pages]

GA—82—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(New/CBCS Pattern)

ZOOLOGY

Paper IX

(Evolutionary Biology and Genetic Engineering)

(Saturday, 29-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. Explain types of natural selection. 15

Or

(*a*) Describe adaptive radiation in Darwin's finches. 8

(*b*) Hardy-Winber equilibrium. 7

P.T.O.

2. Describe the process of construction of *r*-DNA. 15

Or

(*a*) Genetic code. 8

(*b*) Restriction endonuclease. 7

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

(*a*) Isolating mechanism

(*b*) Sympatric speciation

(*c*) Cosmid vector

(*d*) Transgenic cattle.

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

GA—69—2025

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2025

ZOOLOGY

Paper-VIII

(Cell Biology and Genetics)

(Thursday, 27-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Illustrate your anwers with suitable and labelled diagrams wherever necessary.

1. Describe in detail structure and functions of plasma membrane. 15

Or

(*a*) Explain Mendel's law of segregation with suitable example. 8

(*b*) Inhibitory factor ratio. 7

2. Explain in detail chromosomal mutations with suitable example. 15

Or

(*a*) Bridges ratio theory of genic balance. 8

(*b*) Alkaptonuria. 7

P.T.O.

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

(*a*) Nucleolus

(*b*) Duplicate gene

(*c*) Erythroblastosis faetalis

(*d*) Hypertrichosis.

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This question paper contains 4 printed pages]

GA—68—2025

FACULTY OF SCIENCE AND ARTS

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

NOVEMBER/DECEMBER, 2025

(CBCS/New)

MATHEMATICS

Paper IX

(Real Analysis-II)

(Thursday, 27-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (1) Attempt *all* questions.

(2) Figures to the right indicate full marks.

1. If f is a bounded function on $[a, b]$, then prove that to every $\varepsilon > 0$, there corresponds $\delta > 0$ such that : 15

(i) $U(p, f) < \int_a^b f\,dx + \varepsilon$,

(ii) $L(p, f) > \int_a^b f\,dx - \varepsilon$,

for every partition P of $[a, b]$ with norm $\mu(p) < \delta$.

P.T.O.

Or

(a) If $f_1 \in R$ and $f_2 \in R$ over $[a, b]$, and c_1, c_2 any two constants, then prove that $c_1f_1 + c_2f_2 \in R$ over $[a, b]$. Also, prove that : 8

$$\int_a^b (c_1f_1 + c_2f_2)\,dx = c_1\int_a^b f_1dx + c_2\int_a^b f_2dx.$$

(b) Prove that a function f is integrable over $[a, b]$ if and only if for $\varepsilon > 0$, $\exists\ \delta > 0$ such that if p, p' are any two partitions of $[a, b]$ with mesh less than δ, then 7

$$|S(p, f) - S(p', f)| < \varepsilon.$$

2. If f and g are two positive functions in $[a, b]$ such that : 15

$$\lim_{x \to a+0} \frac{f(x)}{g(x)} = l,$$

where l is a non-zero finite number, then prove that the two integrals

$$\int_a^b f dx \text{ and } \int_a^b g dx$$

converge or diverge together at a. Also, test the convergence of

$$\int_0^{\pi/2} \frac{\sin x}{x^p}\,dx.$$

Or

(*a*) Show that the improper integral 8

$$\int_a^{\infty} \frac{C}{x^n}\, dx;\ a > 0,$$

where C is a positive constant, converges if and only if $n > 1$.

(*b*) If ϕ is bounded and monotonic in $[a, \infty[$ and tends to 0 as $x \to \infty$, and 7

$$\int_a^X f\, dx$$

is bounded for $X \geq a$, then prove that

$$\int_a^{\infty} f\phi\, dx$$

is convergent at ∞.

3. Attempt any *two* of the following :

(*a*) Show that the function f defined by 5

$$f(x) = \begin{cases} 0, & \text{when } x \text{ is rational,} \\ 1, & \text{when } x \text{ is irrational} \end{cases}$$

is not integrable on any interval.

P.T.O.

(*b*) Prove that every continuous function is integrable. 5

(*c*) Examine the convergence of 5

$$\int_0^1 \frac{dx}{\sqrt{1-x}}.$$

(*d*) Examine the convergence of 5

$$\int_1^{\infty} \frac{dx}{x\sqrt{x^2+1}}.$$

This question paper contains 3 printed pages]

GA—81—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

MATHEMATICS

(Ring Theory-X)

(saturday, 29-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(2) Figures to the right indicate full marks.

1. If f is an isomorphism of a ring R onto a ring R′, then prove that : 15

(*i*) The image of the zero of R is the zero of R′.

(*ii*) The image of the negative of an element of R is the negative of the image of that element i.e. $f(-a) = -f(a)$, $\forall\ a \in R$.

(*iii*) If R is commutative ring, then R′ is also a commutative ring.

P.T.O.

(*iv*) If R is without zero divisors, then R′ is also without zero divisors.

(*v*) If R is with unit element, then R′ is also with unit element.

Or

(*a*) Prove that every field is an integral domain. 8

(*b*) Prove that if $a, b \in R$, then $(a + b)^2 = a^2 + ab + ba + b^2$, where by x^2 we mean xx. 7

2. Let R be a Euclidean ring and a and b be any two elements in R, not both of which are zero. Then prove that a and b have a greatest common divisor d which can be expressed in the form $d = \lambda a + \mu b$ for some $\lambda, \mu \in R$. 15

Or

(*a*) Add and multiply the following polynomials over the ring $(I_6, +_6, \times_6)$

$f(x) = 2x^0 + 5x + 3x^2$, $g(x) = 1x^0 + 4x + 2x^3$. 8

(*b*) If R is a commutative ring, then prove that : 7

(*i*) $a \mid b$ and $b \mid c \Rightarrow a \mid c$

(*ii*) $a \mid b$ and $a \mid c \Rightarrow a \mid (b + c)$

(*iii*) $a \mid b \Rightarrow a \mid bx$ for all $x \in R$.

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

(*a*) Define skew field and prove that a skew field has no divisors of zero.

(*b*) Prove that the intersection of any two left ideals of a ring is again a left ideal of the ring.

(*c*) Prove that the polynomial domain F[*x*] over a field F is not a field.

(*d*) If an ideal U of a ring R contains a unit of R, then prove that U = R.

This question paper contains **3** printed pages]

GA—81—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

MATHEMATICS

(Ring Theory-X)

(saturday, 29-11-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(2) Figures to the right indicate full marks.

1. If f is an isomorphism of a ring R onto a ring R', then prove that : 15

(*i*) The image of the zero of R is the zero of R'.

(*ii*) The image of the negative of an element of R is the negative of the image of that element i.e. $f(-a) = -f(a)$, $\forall\ a \in R$.

(*iii*) If R is commutative ring, then R' is also a commutative ring.

P.T.O.

(*iv*) If R is without zero divisors, then R' is also without zero divisors.

(*v*) If R is with unit element, then R' is also with unit element.

Or

(*a*) Prove that every field is an integral domain. 8

(*b*) Prove that if $a, b \in R$, then $(a + b)^2 = a^2 + ab + ba + b^2$, where by x^2 we mean xx. 7

2. Let R be a Euclidean ring and a and b be any two elements in R, not both of which are zero. Then prove that a and b have a greatest common divisor d which can be expressed in the form $d = \lambda a + \mu b$ for some $\lambda, \mu \in R$. 15

Or

(*a*) Add and multiply the following polynomials over the ring $(I_6, +_6, \times_6)$ $f(x) = 2x^0 + 5x + 3x^2$, $g(x) = 1x^0 + 4x + 2x^3$. 8

(*b*) If R is a commutative ring, then prove that : 7

(*i*) $a \mid b$ and $b \mid c \Rightarrow a \mid c$

(*ii*) $a \mid b$ and $a \mid c \Rightarrow a \mid (b + c)$

(*iii*) $a \mid b \Rightarrow a \mid bx$ for all $x \in R$.

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

(*a*) Define skew field and prove that a skew field has no divisors of zero.

(*b*) Prove that the intersection of any two left ideals of a ring is again a left ideal of the ring.

(*c*) Prove that the polynomial domain F[*x*] over a field F is not a field.

(*d*) If an ideal U of a ring R contains a unit of R, then prove that U = R.

This question paper contains 2 printed pages]

GA—326—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper IX

(Programming in Java)

(Saturday, 20-12-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Assume suitable data, if necessary.

1. (*a*) Explain the terms JVM, WWW and web browser. 15

Or

(*b*) Explain scope of variables. 7

(*c*) Explain Java I/O statements. 8

P.T.O.

2. What is Constructor ? Explain static members with suitable example. 15

Or

(*a*) Explain method overloading with suitable example. 8

(*b*) Explain final variable and methods. 7

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

(*a*) Java program structure

(*b*) Operators

(*c*) Creating objects

(*d*) Implementing interface.

This question paper contains 2 printed pages]

GA—323—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper VIII

(Computer Networks)

(Tuesday, 16-12-2025) **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. (*a*) What is computer network ? Discuss its applications and explain in detail OSI model. 15

Or

(*b*) Explain in detail wireless transmission. 8

(*c*) Explain E-mail structure. 7

P.T.O.

2. (*a*) What is a topology ? Explain network topologies in detail and also distinguish between hub and switch. 15

Or

(*b*) Explain any *two* network protocols. 8

(*c*) Describe the domain name system. 7

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

(*a*) Service primitives

(*b*) Gateways and router

(*c*) Bluetooth

(*d*) UG technology.