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

AC—42—2025

FACULTY OF ARTS/COMMERCE/SCIENCE

B.A./B.Com./B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

ENGLISH (Compulsory)

Paper III

(AECC–English Communication)

(Friday, 4-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—50

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

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

1. Discuss in detail the appropriateness of the title, "The Model Millionaire". 10

Or

How does the story "The Lost Child" depicts The Child-Psychology ?

2. Write a critical appreciation of the poem, "The Gift of India". 10

Or

Discuss the theme of the poem "Desiderata".

3. Sketch the character of Subhas Chandra Bose as occurred in 'At School'. 10

Or

Explain the success story of Milkha Singh in your own words.

P.T.O.

4. What message do you think Oscar Wilde conveys through the character of Hughie Erskine ? 10

Or

Analyze the theme of loss and separation in the story "The Lost Child" by Mulk Raj Anand.

5. (A) Rewrite the following sentences in to indirect speech (any *five*) : 5

(*i*) He said to his wife, "I am meeting my sister tomorrow."

(*ii*) He says, "I like going on a jungle trip."

(*iii*) He said to him, "Please give me that inkpot."

(*iv*) He said, "How cold the night is !"

(*v*) He said Neeta, "Is it your house ?"

(*vi*) He said to her friend, "Let me go home now."

(*vii*) Lear said, "How ugly the scene is !"

(B) Write short answer of the following (any *one*) : 5

(*i*) Write a note on print media.

(*ii*) Direct mail.

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

AC—12—2025

FACULTY OF ARTS/SCIENCE/COMMERCE

B.A./B.Sc./B.Com. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

HINDI (S.L.)

(कथेत्तर गद्य-III)

(Wednesday, 2-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—50

N.B. :— (1) **सभी** प्रश्न अनिवार्य हैं।

(2) **सभी** प्रश्नों के आगे अंक दिए गए हैं।

1. 'नाखून क्यों बढ़ते हैं ?' इस निबंध में व्यक्त विचारों को स्पष्ट कीजिए। 10

अथवा

हरिवंशराय बच्चनजी की कौनसी चारित्रिक विशेषताएँ 'प्रवास की डायरी' में व्यक्त हुई हैं ? स्पष्ट कीजिए।

2. स्वामी विवेकानंदजी ने 'युवाओं से' इस संबोधन में युवाओं को कौनसा संदेश दिया है ? 10

अथवा

'रसायन और हमारा पर्यावरण' में व्यक्त संदेश को बताइए।

3. 'औरंगजेब के जीवन की अंतिम रात उनके पश्चाताप की रात है।' एकांकी के द्वारा विशद कीजिए। 10

अथवा

रामरती की प्रामाणिकता, समर्पण भाव, संघर्ष को 'एक थी रामरती' के आधार पर स्पष्ट कीजिए।

P.T.O.

4. 'वीरांगना कनकलता बरुआ' का चरित्र-चित्रण कीजिए। 10

अथवा

पुलिस विभाग की भ्रष्ट प्रशासकीय व्यवस्था को पठित व्यंग्य रचना 'इंस्पेक्टर मातादीन चाँद पर' के आधार पर समझाइए।

5. टिप्पणी लिखिए :

(अ) 'काशी के नाम' रचना का संदेश। 5

अथवा

जीनत का चरित्र-चित्रण।

(ब) विज्ञापन में स्त्री। 5

अथवा

स्वामी विवेकानंद का परिचय।

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

AC—13—2025

FACULTY OF ARTS/COMMERCE/SCIENCE

B.A./B.Com./B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

MARATHI (S.L.)

Paper III

(अक्षरविद्या)

(Wednesday, 2-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—50

N.B. :— (1) **सर्व** प्रश्नांना समान गुण आहेत.

(2) **सर्व** प्रश्न सोडविणे अनिवार्य आहे.

1. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) संत गाडगेबाबा यांनी सर्वसामान्य माणसाला प्रज्ञावंत होण्याच्या दृष्टीने 'शिक्षणविषयक कीर्तन' या पाठातून कोणता उपदेश केला आहे ? ते साधार स्पष्ट करा.

(*ii*) राजा ढाले यांनी 'थेरबन' या पाठातून बौद्ध धम्माच्या कोणत्या पाऊलखुणा आधोरेखित केल्या आहेत ? ते लिहा.

2. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) भ्रष्ट प्रशासकीय व्यवस्थेविरुद्ध उद्योगपतीने दिलेल्या लढ्याचे चित्र विदूर महाजन यांनी आपल्या लेखातून कसे मांडले आहे ?

(*ii*) डॉ. करुणा जमदाडे यांच्या 'यशोधराचा निर्धार' या पाठाचा कथाशय तुमच्या शब्दांत लिहा.

P.T.O.

3. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) विलास वैद्य यांच्या 'कुठे दबा धरून बसले आहे तुफान' या कवितेचा आशय स्पष्ट करा.

(*ii*) भाऊ-बहिणीच्या नातेसंबंधाचा भावस्पर्शी वेध हनुमंत चांदगुडे यांच्या 'किनकीन घुंगराची' या कवितेतून कसा उमटला आहे ? ते लिहा.

4. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) 'विज्ञान वंदना' या कवितेत विज्ञानाची महती व मानवी बदलाचा वेध आ.य. पवार यांनी कसा घेतला आहे ? ते स्पष्ट करा.

(*ii*) भारतीय समाजव्यवस्थेत लोकशाहीमूल्ये अनूनही रुजली नसल्याची खंत शेषराव धांडे यांनी 'संविधानिक मूल्ये' या कवितेतून कशी मांडली आहे ? ते विशद करा.

5. पुढीलपैकी 'अ' व 'ब' गटातील प्रत्येकी **एक** टीप लिहा : 10

(अ) (*i*) अर्थदर्शक चिन्हे

(*ii*) स्वल्पविराम

(ब) (*i*) यमक अलंकार

(*ii*) श्लेष अलंकार

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

SA—28—2025

FACULTY OF SCIENCE

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

MARCH/APRIL, 2025

BOTANY

Paper–VI

(Plant Anatomy)

(Tuesday, 15-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. Describe in detail the secondary growth in Bignonia. 15

Or

Explain in brief :

(*a*) Anatomy of monocot leaf. 8

(*b*) Types of vascular bundles. 7

P.T.O.

2. What is simple tissue ? Describe the types of parenchyma and collenchyma. 15

Or

Write in brief :

(*a*) Organization of shoot apical meristem 8

(*b*) Tunica corpus theory. 7

3. Attempt any *two* out of the four (each of **5** marks) : 10

(*a*) Scope of plant anatomy

(*b*) Hydathodes

(*c*) Primary growth in roots

(*d*) Heart wood and Sap wood.

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

SA—46—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

MARCH/APRIL, 2025

(New/CBCS Pattern)

BOTANY

Paper–VII

(Plant Physiology and Biochemistry)

(Thursday, 17-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. What is ascent of sap ? Write a note on transpiration pull theory. 15

Or

Describe in brief :

(*a*) Munch-Mass flow hypothesis 8

(*b*) Ion Exchange Theory. 7

P.T.O.

2. Define seed dormancy. Explain in detail different methods of breaking seed dormancy. 15

Or

Describe in brief :

(*a*) Biological functions of terpenoids 8

(*b*) Biological functions of proteins 7

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

(*a*) Diffusion

(*b*) Foliar nutrition

(*c*) Long day plants

(*d*) Secondary structure of proteins.

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

SA—08—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(CBCS/New Pattern)

CHEMISTRY

Paper-VI

(Organic and Inorganic Chemistry)

(Tuesday, 8-4-2025) **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*) Discuss precipitation reaction of liquid NH_3.

   (*b*) How will you separate Cu^{++} and Cd^{++} ions in qualitative analysis ?

   (*c*) Explain the role of 8-hydroxyqunoline in qualitative analysis.

   (*d*) What are interfering radicals ? Explain the removal of phosphate and oxalate.

   (*e*) What are non-aqueous solvents ? Give classification of solvents.

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

   (*a*) Explain Benzoin Condensation reaction with mechanism.

P.T.O.

(*b*) How will you prepare :

(*i*) Benzoic acid from Toluene

(*ii*) Anthranilic acid from Phthalimide.

(*c*) Describe Baeyer Villiger oxidation reaction with mechanism.

(*d*) How will you synthesize Ethyl acetoacetate by Claisen condensation reaction ? Explain with mechanism.

(*e*) What are synthetic detergents ? How are they classified ?

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

(*a*) Explain reduction of aldehydes or ketones with $LiAlH_4$ with mechanism.

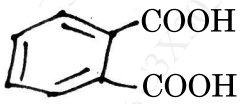
(*b*) How will you prepare Methyl magnesium bromide ? How will you obtain the following from methyl magnesium bromide :

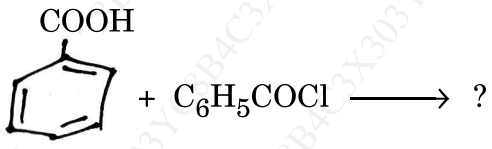
(*i*) Ethanoic acid

(*ii*) Acetonitrile.

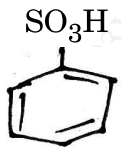
(*c*) Explain Trans-Esterification and Hydrolysis reactions of oils or fats.

(*d*) Complete the following reactions :

(*i*) 

(*ii*) 

(*iii*)  + Conc $H_2SO_4 \longrightarrow$?

(*iv*) 

$\xrightarrow[(ii)\ C_2H_5OH]{(i)\ PCl_5}$?

(*v*) 

+ $HNO_2 \longrightarrow$?

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

SA—19—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

CHEMISTRY

(Physical and Inorganic Chemistry-VII)

(Friday, 11-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

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

(*a*) Write applications of radioisotopes in medicine and agricultural field.

(*b*) Define Radioactivity. Give the characteristics of β-particles.

(*c*) Explain stability of nucleus on the basis of :

(*i*) Odd and even number of protons and neutrons

(*ii*) N/Z ratio.

(*d*) What are the types of precipitates ? Explain factors affecting on precipitation.

P.T.O.

(*e*) Explain the following steps involved in gravimetric analysis :

(*i*) Filtration and washing

(*ii*) Ignition and incineration.

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

(*a*) Calculate the de-Broglie wavelength of electron moving with a velocity of 3×10^8 m/s.

(Given : $me = 9.11 \times 10^{-31}$ kg and $h = 6.626 \times 10^{-34}$ Js)

(*b*) Explain photoelectric effect on the basis of quantum theory.

(*c*) State third law of thermodynamics. Write any *three* statements of second law of thermodynamics.

(*d*) Derive an expression for entropy change of an ideal gas as a function of pressure and temperature.

(*e*) Describe the phase diagram of sulphur system.

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

(*a*) Derive Schrodinger's wave equation.

(*b*) Explain Joule's law and explain Joule-Thomson effect.

(*c*) Discuss entropy change for phase transfer from one crystalline form to another. Calculate entropy change when are mole of rhombic sulphur to monoclinic sulphur.

The heat of transition of process carried out reversibly its 322.17 $Jmol^{-1}$ at transition temperature 95.6°C.

(*d*) Define phase, component and degree of freedom with suitable example.

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

SA—319—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper VI

(Operating System)

(Tuesday, 6-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. What is operating system ? Why is it called as resource manager ? 15

Or

(*a*) What is a system call ? Explain types of system calls. 8

(*b*) Explain user operating system interface. 7

2. What is a process ? Explain in detail process scheduling. 15

Or

(*a*) Explain contiguous memory allocation. 8

(*b*) What is paging ? Explain structure of page table. 7

P.T.O.

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

(*a*) Distributed systems

(*b*) Operations on process

(*c*) Virtual machines

(*d*) File system mounting.

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

SA—325—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper VII

(Programming in C++)

(Thursday, 8-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

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

1. What is OOPs ? Explain principles of OPPs with advantages and disadvantages of POP and OOP. 15

Or

(*a*) Explain the looping statement in C++ with example. 8

(*b*) Write a program on factorial number of given integer number. 7

P.T.O.

2. What is Inheritance ? Explain different types of inheritance with example. 15

Or

(*a*) Write a program on static data member. 8

(*b*) Write a program on Friend function. 7

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

(*a*) Object oriented language

(*b*) Operator in C++

(*c*) Function overloading

(*d*) Destructor.

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

SA—112—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

ELECTRONICS

Paper VI

(Amplifiers)

(Tuesday, 29-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

(*ii*) Illustrate your answers with suitably labelled diagrams, wherever necessary.

1. Explain the different biasing techniques used for transistors : 15

(*a*) Base bias with emitter feedback

(*b*) Base bias with collector feedback

Or

(*a*) Draw neat circuit diagram of CE-amplifier. Derive an expression for voltage gain and current gain. 8

(*b*) Explain *h*-parameter equivalent circuit for the transistor with neat diagram. 7

P.T.O.

2. Discuss the block diagram of an operational amplifier (op-amp) and explain its ideal characteristics. 15

Or

(*a*) Explain the working of an op-amp as a comparator with neat circuit diagram. 8

(*b*) Explain the circuit configuration of an adder using an op-amp. 7

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

(*a*) Explain stability factor for CB and CE circuits.

(*b*) Give various *h*-parameters in two-part network.

(*c*) Explain virtual ground concept in op-amp.

(*d*) Describe op-amp as integrator.

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

SA—156—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

ELECTRONICS

Paper–VII

(Microprocessor and its Applications)

(Friday, 2-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Illustrate your answers with suitably labelled diagram, wherever necessary.

1. Explain the different types of addressing modes with suitable example used in 8085 microprocessor. 15

Or

(*a*) Draw block diagram of microprocessor based system and explain each block. 8

(*b*) Explain demultiplexing of AD_0–AD_7 bus using latch IC 74LS373 7

P.T.O.

2. State control word pattern of IC8255 and explain application of IC 8255 for interfacing of LED. 15

Or

(*a*) Write on ALP to find the smaller between the two eight bit numbers. 8

(*b*) Write an ALP to find the addition of two 8-bit numbers. 7

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

(*a*) Features of 8085 microprocessor

(*b*) Logical instructions (any *five*)

(*c*) ALP for 2's compliment of 8-bit number

(*d*) Draw functional pin diagram of IC8255.

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

SA—204—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(New/CBCS Pattern)

FISHERY SCIENCE

Paper VI

(Fish Diseases Management)

(Tuesday, 6-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

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

(*ii*) Draw suitable diagram wherever necessary.

1. Write in detail water associated extrinsic factors affecting fish health. 15

Or

Write notes on :

(*a*) Effect of stress in Fish health. 8

(*b*) Fungal gill rot disease. 7

2. Write in detail protozoan white spot disease. 15

P.T.O.

Or

Write notes on :

(*a*) Oxygen deficiency 8

(*b*) Gas bubble disease. 7

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

(*a*) Common symptoms of stress

(*b*) Bacterial fin rot

(*c*) Gyrodactylus

(*d*) Control measures of fish disease.

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

SA—267—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

FISHERY SCIENCE

Paper VII

(Fish Developmental Biology)

(Thursday, 8-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Marks of each question are written on right hand side of the respective question.

(*iii*) Illustrate answers with suitable and well labelled diagram wherever necessary.

1. Describe gametogenesis in fishes. 15

Or

Write notes on :

(*a*) Blastula 8

(*b*) Hatching and post embryonic development in fishes. 7

P.T.O.

2. Explain in detail the methods of age and growth determination in fishes. 15

Or

Write notes on :

(*a*) Sexual dimorphis in fishes with suitable example. 8

(*b*) Maturity stages in male fish. 7

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

(*a*) Types of fishes based on reproduction

(*b*) Fate map of Blastula

(*c*) Volumetric method of fecundity assessment

(*d*) Factors affecting growth in fishes.

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

SA—74—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(CBCS/New Pattern)

MATHEMATICS

Paper VII

(Group Theory)

(Wednesday, 23-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

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

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

1. If A be a non-empty set and let R be an equivalence relation in A. Let a and b be arbitrary elements in A, then prove that : 15

(*i*) $a \in [a]$

(*ii*) If $b \in [a]$, then $[b] = [a]$

(*iii*) $[a] = [b]$ iff $(a, b) \in R$

(*iv*) Either $[a] = [b]$ *or* $[a] \wedge [b] = \phi$.

P.T.O.

Or

(*a*) State and prove Lagrange's theorem. 8

(*b*) Prove that every group of prime order is cyclic. 7

2. Prove that the set of residue classes modulo m is an abelian group of order m with respect to addition of residue classes. 15

Or

(*a*) Suppose G is a group and N is a normal subgroup of G. Let f be a mapping from G to G|N defined by :

$$f(x) = \mathrm{N}.x \ \forall \ x \in \mathrm{G}$$

then prove that f is a homomorphism of G onto G|N and kernel of f is N. 8

(*b*) Prove that intersection of any collection of normal subgroup is itself a normal subgroup. 7

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

(*a*) If H is any subgroup of G and $h \in \mathrm{H}$, then prove that $\mathrm{H}h = \mathrm{H} = h\mathrm{H}$.

(*b*) Let a be a fixed element of a group G, then prove that the mapping $f_a : \mathrm{G} \to \mathrm{G}$ defined by :

$$f_a(x) = a^{-1}xa \ \forall \ x \in \mathrm{G}$$

is an automorphism of G.

(*c*) If I be the set of all integers and R be a relation in I defined as xR_y holds iff $x - y$ is divisible by 5, $x, y \in$ I, then prove that R is an equivalence relation.

(*d*) Prepare the composition table for the group :

$$G = \{0, 1, 2, 3, 4\}$$

with respect to addition modulo 5 and write down the inverse of each element of G.

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

SA—89—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(CBCS/New Pattern)

MATHEMATICS

(Ordinary Differential Equations-VIII)

(Friday, 25-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

(*iii*) Attempt (A) or (B : *a*, *b*) in question Nos. **1** and **2**.

1. (A) Define linear differential equation with example and explain method to solve the linear equation of the first order is $\frac{dy}{dx} + Py = Q$, where P and Q are functions of x or constant and $\cos^2 x \frac{dy}{dx} + y = \tan x$. 15

Or

(B) (*a*) Define Clairaut's equation and solve it. 8

(*b*) Solve :

$(x^2 - 4xy - 2y^2)\, dx + (y^2 - 4xy - 2x^2)\, dy = 0$. 7

P.T.O.

2. (A) Explain the method for finding particular integral corresponding to a term of the form sin ax or cos ax in the second member. 15

Solve :

$$\frac{d^3y}{dx^3} + \frac{d^2y}{dx^2} - \frac{dy}{dx} - y = \cos 2x.$$

Or

(B) (*a*) Explain the method for solving : 8

$$\frac{d^ny}{dx^n} + P_1\frac{d^{n-1}y}{dx^{n-1}} + \ldots\ldots\ldots\ldots + P_ny = 0$$

where the coefficients $P_1, P_2, \ldots\ldots\ldots, P_n$ are constants and auxiliary equation having equal roots.

(*b*) Solve : 7

$$\frac{d^2y}{dx^2} - y = 2 + 5x.$$

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

(*a*) Explain the method of solving :

$$\frac{dy}{dx} = \frac{f_1(x, y)}{f_2(x, y)}$$

where f_1, f_2 are expressions homogeneous and of the same degree in x and y.

(*b*) Solve :

$$y = (1 + p)x + p^2.$$

(*c*) Solve :

$$\frac{d^3y}{dx^3} - \frac{3d^2y}{dx^2} + 4y = 0.$$

(*d*) Solve :

$$\frac{d^2y}{dx^2} + y = xe^{2x}.$$

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

SA—94—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

MATHEMATICS

Paper XI

(Partial Differential Equations)

(Saturday, 26-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) *All* questions are compulsory.

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

1. Explain the rules for finding the complementary function of the equation : 15

$$a_0 \frac{\partial^2 z}{\partial x^2} + a_1 \frac{\partial^2 z}{\partial x\, \partial y} + a_2 \frac{\partial^2 z}{\partial y^2} = 0 .$$

Explain the rule for finding the particular integral of the partial differential equation :

$$f(\mathrm{D}, \mathrm{D}') = \mathrm{F}(x, y)$$

when :

$$\mathrm{F}(x, y) = x^m y^n.$$

P.T.O.

Or

(*a*) Explain the working rule of Lagrange's linear equation is an equation of type : 8

$$P_p + Q_q = R$$

(*b*) Solve : 7

$$p(1+q) = qz$$

2. Explain the Chartpit's method to solve partial differential equation :15

$$f(x, y, z, p, q) = 0$$

Or

(*a*) Obtain the solution of the wave equation : 8

$$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$$

by D' Alembert's method.

(*b*) Solve the wave equation :

$$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$$

such that $y = P_0 \cos pt$, (P_0 is constant) when $x = l$ and $y = 0$ when $x = 0$. 7

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

(*a*) Form a partial differential equation from :

$$x^2 + y^2 + (z - c)^2 = a^2$$

(*b*) Solve :

$$(D - D' - 2)\ (D - D' - 3)z = e^{3x - 2y}$$

(*c*) Solve :

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

which satisfies the conditions :

$$u(0, y) = u\ (l, y) = u\ (x, 0) = 0$$

and

$$u(x, a) = \sin \frac{n\pi x}{l}.$$

(*d*) Find the general solution of :

$$\frac{\partial^2 z}{\partial x^2} + \frac{3\partial^2 z}{\partial x \partial y} + \frac{2\partial^2 z}{\partial y^2} = x + y.$$

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

SA—111—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

MICROBIOLOGY

(Applied Microbiology-VI)

(Tuesday, 29-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

(*ii*) Draw well labelled diagrams wherever necessary.

1. Describe composition of air and different methods used for enumeration of microorganisms in air. 15

Or

Write notes on :

(*a*) Sources of microorganisms in water. 8

(*b*) Index of water pollution. 7

2. What is sewage ? Give its composition. Add a note on Imhoff tank. 15

Or

Write notes on :

(*a*) Definition and composition of milk. 8

(*b*) Application of microorganisms in dairy industry. 7

P.T.O.

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

(*a*) Control of microorganisms in air by UV-radiations.

(*b*) Most probable number

(*c*) Strength of sewage

(*d*) SPC of milk.

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

SA—155—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

APRIL/MAY, 2025

(New/CBCS Pattern)

MICROBIOLOGY

Paper–VII

(Immunology)

(Friday, 2-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Illustrate your answer with suitably labelled diagram, wherever necessary.

1. What are immunoglobulins ? Explain structure, types and properties of IgM. 15

Or

(*a*) Differentiate between Endotoxin and Exotoxin. 8

(*b*) Write on different types of infection. 7

P.T.O.

2. Define Antigen-antibody reaction. Explain in detail complement fixation test. Add a note on its application. 15

Or

(*a*) Explain what causes erythoblastosis fetalis. 8

(*b*) Write on contact dermatitis. 7

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

(*a*) Arthus reaction

(*b*) Immunofluorescence test

(*c*) Humoral immune response

(*d*) Normal flora of oral cavity.

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

SA—29—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(CBCS/New Pattern)

PHYSICS

Paper–VI

(Waves and Oscillations)

(Tuesday, 15-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— *All* questions are compulsory and carry equal marks.

1. What is Reverberation ? Derive an expression for Sabine's reverberation time formula. 15

Or

(*a*) Derive an expression for charge on condenser in damped SHM in an electrical circuit.

(*b*) Distinguish between free and forced vibrations.

P.T.O.

2. Derive an analytical treatment of stationary waves for close end pipe at the other end. 15

Or

(*a*) (*i*) A simple harmonic wave of amplitude 20 cm, wave velocity of 24000 m/s, wavelength 200 cm. Find the displacement of a particle (in cm) at any instant of time.

(*ii*) Source of sound has a frequency of 512 Hz and an amplitude of 0.25 cm. What is total energy per unit volume, if the velocity of sound in air is 340 m/s and the density of air is 0.0013 g/cm^3.

(*b*) Show that the energy of a plane progressive wave is given by $E = 2\pi^2 \rho n^2 a^2$

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

(*i*) Particle and wave velocity for a simple harmonic wave

(*ii*) Energy is not transferred in a stationary wave

(*iii*) Resonance and sharpness of resonance

(*iv*) Application of ultrasonic wave.

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

SA—47—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

PHYSICS

Paper–VII

(Statistical Physics, Electromagnetic and Theory of Relativity)

(Thursday, 17-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. Derive an expression for Bose-Einstein distribution law. 15

Or

(*a*) Explain entropy and thermodynamic probability and relation connecting them. 8

(*b*) A dice is thrown, what is the probability that the number obtained is a prime number. 7

P.T.O.

2. Derive an expression for electromagnetic energy and Poynting vector. 15

Or

(*a*) Obtain an expression for Einstein's energy mass relation 8

(*b*) Explain the basic postulates of Einstein's special theory of relativity. 7

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

(*a*) Probability and frequency

(*b*) Compression among B.E, F.D and M.B. [Bose-Einstein, Fermi-Dirac and Maxwell-Boltzman]

(*c*) Ampere's law

(*d*) Length contraction.

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

SA—60—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(New/CBCS Pattern)

ZOOLOGY

Paper VI

(Physiology)

(Monday, 21-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

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

1. Describe in detail structure and working of human heart. 15

Or

(*a*) Describe physiology digestion of proteins. 8

(*b*) Describe types of respiration in animals. 7

2. Explain structure and functions of pituitary gland. 15

Or

(*a*) Describe structure of synapse. 8

(*b*) Describe types of muscle. 7

P.T.O.

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

(*a*) Water soluble vitamins

(*b*) Counter current mechanism

(*c*) Acetylcholine

(*d*) T.S. Ovary.

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

SA—75—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(New/CBCS Pattern)

ZOOLOGY

Paper VII

(Biochemistry)

(Wednesday, 23-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

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

1. Explain in detail classification of carbohydrates. 15

Or

(*a*) Describe in detail classification of enzymes. 8

(*b*) Explain in detail lock and key model and induced fit hypothesis. 7

P.T.O.

2. Explain in detail glycolysis. 15

Or

(*a*) Describe in detail β-oxidation pathway. 8

(*b*) Deamination and decarboxylation. 7

3. Attempt any *two* of the four (each of **5** marks) : 10

(*a*) Properties of lipids

(*b*) Glycogenesis

(*c*) Ketolysis

(*d*) Effect of temperature and pH on enzyme activity.

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

AC—12—2025

FACULTY OF ARTS/SCIENCE/COMMERCE

B.A./B.Sc./B.Com. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

HINDI (S.L.)

(कथेत्तर गद्य-III)

(Wednesday, 2-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—50

N.B. :— (1) **सभी** प्रश्न अनिवार्य हैं।

(2) **सभी** प्रश्नों के आगे अंक दिए गए हैं।

1. 'नाखून क्यों बढ़ते हैं ?' इस निबंध में व्यक्त विचारों को स्पष्ट कीजिए। 10

अथवा

हरिवंशराय बच्चनजी की कौनसी चारित्रिक विशेषताएँ 'प्रवास की डायरी' में व्यक्त हुई हैं ? स्पष्ट कीजिए।

2. स्वामी विवेकानंदजी ने 'युवाओं से' इस संबोधन में युवाओं को कौनसा संदेश दिया है ? 10

अथवा

'रसायन और हमारा पर्यावरण' में व्यक्त संदेश को बताइए।

3. 'औरंगजेब के जीवन की अंतिम रात उनके पश्चाताप की रात है।' एकांकी के द्वारा विशद कीजिए। 10

अथवा

रामरती की प्रामाणिकता, समर्पण भाव, संघर्ष को 'एक थी रामरती' के आधार पर स्पष्ट कीजिए।

P.T.O.

4. 'वीरांगना कनकलता बरुआ' का चरित्र-चित्रण कीजिए। 10

अथवा

पुलिस विभाग की भ्रष्ट प्रशासकीय व्यवस्था को पठित व्यंग्य रचना 'इंस्पेक्टर मातादीन चाँद पर' के आधार पर समझाइए।

5. टिप्पणी लिखिए :

(अ) 'काशी के नाम' रचना का संदेश। 5

अथवा

जीनत का चरित्र-चित्रण।

(ब) विज्ञापन में स्त्री। 5

अथवा

स्वामी विवेकानंद का परिचय।

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

AC—13—2025

FACULTY OF ARTS/COMMERCE/SCIENCE

B.A./B.Com./B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

MARATHI (S.L.)

Paper III

(अक्षरविद्या)

(Wednesday, 2-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—50

N.B. :— (1) **सर्व** प्रश्नांना समान गुण आहेत.

(2) **सर्व** प्रश्न सोडविणे अनिवार्य आहे.

1. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) संत गाडगेबाबा यांनी सर्वसामान्य माणसाला प्रज्ञावंत होण्याच्या दृष्टीने 'शिक्षणविषयक कीर्तन' या पाठातून कोणता उपदेश केला आहे ? ते साधार स्पष्ट करा.

(*ii*) राजा ढाले यांनी 'थेरबन' या पाठातून बौद्ध धम्माच्या कोणत्या पाऊलखुणा आधोरेखित केल्या आहेत ? ते लिहा.

2. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) भ्रष्ट प्रशासकीय व्यवस्थेविरुद्ध उद्योगपतीने दिलेल्या लढ्याचे चित्र विदूर महाजन यांनी आपल्या लेखातून कसे मांडले आहे ?

(*ii*) डॉ. करुणा जमदाडे यांच्या 'यशोधराचा निर्धार' या पाठाचा कथाशय तुमच्या शब्दांत लिहा.

P.T.O.

3. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) विलास वैद्य यांच्या 'कुठे दबा धरून बसले आहे तुफान' या कवितेचा आशय स्पष्ट करा.

(*ii*) भाऊ-बहिणीच्या नातेसंबंधाचा भावस्पर्शी वेध हनुमंत चांदगुडे यांच्या 'किनकीन घुंगराची' या कवितेतून कसा उमटला आहे ? ते लिहा.

4. पुढीलपैकी कोणताही **एक** प्रश्न सोडवा : 10

(*i*) 'विज्ञान वंदना' या कवितेत विज्ञानाची महती व मानवी बदलाचा वेध आ.य. पवार यांनी कसा घेतला आहे ? ते स्पष्ट करा.

(*ii*) भारतीय समाजव्यवस्थेत लोकशाहीमूल्ये अनूनही रुजली नसल्याची खंत शेषराव धांडे यांनी 'संविधानिक मूल्ये' या कवितेतून कशी मांडली आहे ? ते विशद करा.

5. पुढीलपैकी 'अ' व 'ब' गटातील प्रत्येकी **एक** टीप लिहा : 10

(अ) (*i*) अर्थदर्शक चिन्हे

(*ii*) स्वल्पविराम

(ब) (*i*) यमक अलंकार

(*ii*) श्लेष अलंकार

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

AC—60—2025

FACULTY OF ARTS/COMMERCE/SCIENCE

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

APRIL/MAY, 2025

ENGLISH COMPULSORY

Paper-IV

(AECC English Communication)

(Saturday, 5-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—50

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

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

1. Comment on the arguments of the sinner for his entry into the heaven. 10

Or

Discuss the futility of war and its consequences with reference to the short story '*The Sniper*'.

2. Write a critical appreciation of the poem '*Love*' ? 10

Or

Write a thematic analysis of the poem '*Courage*' ?

P.T.O.

3. Illustrate the message given by Bhagat Singh to the Indian youth in his essay '*Youth*'. 10

Or

What according to Dalai Lama is needed for real happiness ?

4. How does Leo Tolstoy bring forth the image of God as merciful and loving ? 10

Or

What according to Dalai Lama are three factors that contribute to human happiness ?

5. (A) Change the voice (any *five*) : 5

(*i*) She will give him a book.

(*ii*) Ganesh and Varsha plays Chess.

(*iii*) Megha is writing an essay.

(*iv*) The girl has clicked a selfie.

(*v*) Covid-19 pandemic affected the world.

(*vi*) We shall sing a song.

(*vii*) Have you eaten a mango ?

(B) What are the fundamentals of writing for electronic media ? 5

Or

What are the types of documentaries ?

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

SA—52—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BOTANY

(Plant Metabolism and Biotechnology-IX)

(Saturday, 19-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

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

(*iii*) Illustrate your answer with suitable diagrams.

1. Define respiration. Describe the steps involved in Kreb's cycle. 15

Or

(*a*) Give in detail classification of enzymes. 8

(*b*) Describe symbiotic nitrogen fixation (N_2) in plants. 7

2. What is genetic engineering ? Describe Agrobacterium mediated gene transfer technique in genetic engineering. 15

Or

(*a*) Micropropagation 8

(*b*) Explain the process of somatic hybridization. 7

P.T.O.

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

(*a*) Alcoholic fermentation

(*b*) Physical nitrogen (N_2) fixation

(*c*) Callus culture

(*d*) Transgenic plants.

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

SA—37—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(CBCS/New Pattern)

BOTANY

Paper–VIII

(Plant Embryology)

(Wednesday, 16-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

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

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

Or

Write in brief :

(*a*) T.S. of Anther 8

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

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

P.T.O.

Or

Write on :

(*a*) L.S. of orthotropous ovule 8

(*b*) Endospermic and Non-endospermic seeds. 7

3. Attempt any *two* out of four : 10

(*a*) Pollen storage

(*b*) Dichogamy

(*c*) Helobial endosperm

(*d*) Parthenocarpy.

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

SA—23—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

MARCH/APRIL, 2025

(CBCE/New Pattern)

CHEMISTRY

Paper–IX

(Physical and Inorganic Chemistry)

(Saturday, 12-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

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

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

(*a*) Define Pseudo-halogen. Give its preparation and properties.

(*b*) What are inter-halogen compounds ? Explain structure of $X_{1/3}$ type compound.

(*c*) Give preparation, properties and structure of ICl^{-}_{2}

(*d*) What is basic unit of silicate ? Explain its any *two* classifications.

(*e*) Define carbide and discuss its classifications.

P.T.O.

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

(*i*) What is rate of reaction ? Discuss factors affecting rate of reaction.

(*ii*) Derive rate expression for rate constant of second order reaction ($a = b$)

(*iii*) Discuss relaxation effect and electrophoretic effect

(*iv*) Explain the conductometric titration of strong acid *versus* strong base.

(*v*) A certain system absorbs 3×10^{16} quanta of light per second. On irradiation for 20 minutes, 0.002 mole of reactant was found to have reacted. Calculate quantum efficiency of the process.

($N = 6.023 \times 10^{23}$)

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

(*a*) What is order of reaction ? Derive first order rate equation.

(*b*) The resistance of N/2 solution of an electrolyte placed between two electrodes which are 1.72 cm apart and have an area 4.5 cm^2 was 25 ohms. Calculate equivalent conductance of the solution.

(*c*) State Kohlrausch law. Explain its any *two* applications

(*d*) Discuss fluorescence and phosphorescence with the help of Jablonski diagram.

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

SA—12—2025

FACULTY OF SCIENCE

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

MARCH/APRIL, 2025

CHEMISTRY

(Organic and Inorganic Chemistry-VIII)

(Wednesday, 9-4-2025) **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 : 15

   (*a*) Explain the separation of Lanthanide series elements by ion exchange method.

   (*b*) Give comparison between Lanthanides and Actinides.

   (*c*) Give the general characteristics of '*d*'–block elements.

   (*d*) Compare the atomic of ionic radii properties of second and third transition series elements with first transition series elements.

   (*e*) Give the outermost electronic configuration of actinide series elements.

P.T.O.

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

(*a*) What is stereoisomerism ? Give the 'R' and 'S' configuration of the following compounds :

(*i*) Bromochloroiodomethane

(*ii*) 1-Phenylethanol.

(*b*) What are carbohydrates ? How are they classified ?

(*c*) What are aromatic nitro compounds ? How will you prepare nitrobenzene from benzene ? Give any *three* physical properties of nitrobenzene.

(*d*) Discuss the conformational analysis of *n*-butane.

(*e*) How will you prepare Selenium dioxide from Metallic selenium ? What is action of SeO_2 on the following :

(*i*) CH_3CHO

(*ii*) CH_3COCH_3

(*iii*) $C_6H_5CH_2OH$

(*iv*) CH_3COOH

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

(*a*) How will you convert glucose to fructose ?

(*b*) What is structural isomerism ? Give cis and trans forms.

(*i*) 2–Butene

(*ii*) 1, 2-dibromoethene

(*c*) How will you prepare Aniline from

(*i*) Chlorobenzene

(*ii*) Phenol

(*iii*) Nitrobenzene

Explain the following chemical reactions of Aniline :

(*i*) Action of Benzoylchloride

(*ii*) Formation of P-Nitroacetanilide.

(*d*) Explain open chain structure of Glucose.

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

SA—326—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

COMPUTER SCIENCE

(Programming in Java-IX)

(Friday, 9-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. What is Java ? Explain in detail Java program structure with example. 15

Or

(*a*) Explain data types used in Java. 8

(*b*) Write a java program to calculate the square of a number. 7

2. What is Interface ? Explain in detail implementing interface. 15

Or

(*a*) Explain in detail method overloading. 8

(*b*) Explain in detail accessing class members. 7

P.T.O.

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

(*a*) Java support system

(*b*) Command Line Argument

(*c*) Class and object

(*d*) Arrays.

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

SA—323—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

COMPUTER SCIENCE

Paper-VIII

(Computer Network)

(Wednesday, 7-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. What is computer network ? Discuss OSI reference model in detail. 15

Or

(*a*) Explain magnetic media and twisted pairs. 8

(*b*) Explain radio and wireless transmission. 7

2. Explain any *three* network devices. 15

Or

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

(*b*) Explain the concept of cryptography. 7

P.T.O.

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

(*a*) Applications of computer network

(*b*) Network topologies

(*c*) Fibre optics

(*d*) WiFi and 4-G technology.

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

SA—184—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

ELECTRONICS

Paper–IX

(Introduction to Microcontroller Intel 8051)

(Monday, 5-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

1. Describe function of the following blocks of intel 8051 microcontroller :

Register A, Register B, Stack pointer, Data pointer and program counter. 15

Or

(*a*) Write an ALP to determine sum of series of numbers. Explain its execution. 8

(*b*) Write on ALP to logically XOR two 8-bit numbers. Write output for a set of input data. 7

2. Explain indexed register, direct and long addressing moles of 8051 with a suitable instruction each. 15

P.T.O.

Or

(*a*) Explain timer T_0 in mode 3 operation. 8

(*b*) Interrupt priority in 8051. 7

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

(*a*) Features of 8051

(*b*) Absolute addressing mode

(*c*) ALP to divide two bytes

(*d*) SFRs in 8051.

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

SA—120—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(New Pattern)

ELECTRONICS

Paper VIII

(Oscillators and Multivibrators)

(Wednesday, 30-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

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

1. Explain requirement of an oscillator and explain the working of Colpitt's oscillator with neat diagram and derive expression for condition of oscillation and frequency. 15

Or

(*a*) What is positive and negative feedback ? Write advantages of negative feedback. 8

(*b*) Explain the following : 7

(*i*) Gain stability

(*ii*) Increased bandwidth.

P.T.O.

2. What is multivibrator ? Explain the working of transistorised bistable multivibrator. 15

Or

(*a*) Explain sweep circuit using UJT. 8

(*b*) Explain Bootstrap sweep circuit. 7

3. Attempt any *two* the following : 10

(*a*) Decreased noise

(*b*) Barkhausen criterion

(*c*) Block diagram of IC 555

(*d*) Sweep voltage generator.

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

SA—281—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

FISHERY SCIENCE

Paper IX

(Fishing Craft and Gean Technology)

(Friday, 9-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Marks of each question are written on right hand side of the respective question.

(*iii*) Illustrate answers with suitable and well labelled diagrams, wherever necessary.

1. Describe in detail different Inland Fishing crafts used in India. 15

Or

Write notes on :

(*a*) Classification of fishing gear. 8

(*b*) Care and maintenance of fishing gears. 7

P.T.O.

2. Explain in detail electro-fishing. 15

Or

Write notes on :

(*a*) Purse seine net. 8

(*b*) Gill net. 7

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

(*a*) Net braiding

(*b*) Catamaran

(*c*) RADAR

(*d*) Fishing by hunting.

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

SA—251—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/NEW)

FISHERY SCIENCE

Paper VIII

(Fish Preservation and Fish by Production Technology)

(Wednesday, 7-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Marks of each question are written on right hand side of the respective question.

(*iii*) Illustrate answers with suitable and well labelled diagrams, wherever necessary.

1. Describe causes of fish spoilage in detail. 15

Or

Write short notes on :

(*a*) Principles of preservation 8

(*b*) Canning. 7

P.T.O.

2. Describe in detail different types of fish by-products. 15

Or

Write short notes on :

(*a*) Food poisoning from consumption of poisonous fish 8

(*b*) Denaturation due to freezing. 7

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

(*a*) Organoleptic test for freshness of fish

(*b*) Sun drying

(*c*) Fish meal

(*d*) Allergies from fish food.

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

SA—283—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(New/CBCS Pattern)

INDUSTRIAL CHEMISTRY

Paper IX

(Pollution Monitoring and Control)

(Saturday, 3-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— Solve *all* questions.

1. Describe chemical and biological process of removal of phosphorus and nitrogen from waste water. 15

Or

(*a*) Explain industrial emission liquid and gases of chemical industries. 8

(*b*) Write a note on Air Act. 7

2. Explain characteristics and types of industrial wastes. 15

Or

(*a*) Explain method of gas SO_2 analysis. 8

(*b*) Describe the method of particle size analysis. 7

P.T.O.

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

(*a*) Potability of water characteristics.

(*b*) Air pollution effect on human life

(*c*) Sewage disposal

(*d*) Analysis of CO.

SA-253-2025

FACULTY OF SCIENCE

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

SUMMER-2025

(CBCS)

Subject: INDUSTRIAL CHEMISTRY

Unit Operation-IV-VIII (CBCS) (New)

(Monday, 07-04-2025) **Time: 02.00 p.m. to 04.00 pm**

Time – Two Hours **Maximum Marks-40**

N.B.:- i) All question carry equal marks.

ii) Use of Scientific calculator and log table is allowed.

Q.1 Explain Drying Operation and give the Construction and working of Tray Dryer and Single Drum Dryer with neat labelled diagrams. 15

Or

Solve problems on:

a)

A 50 kg batch of granular solids containing 25 % moisture is to be dried in a tray dryer to 12 % moisture by passing a stream of air at 360 K (87 oC) tangentially across its surface at a velocity of 2 m/s. The constant rate of drying under these conditions is 0.0008 kg moisture/(m2·s) and the critical moisture content is 10 %. Estimate the drying time. The surface area available for drying is 1.0 m2.

All moisture contents are on the wet basis. 8

b) A 100 kg bath of granular solids containing 30 % moisture is to be dried in a tray dryer to 16 % moisture by passing a current of air at 350 K tangentially across its surface at a velocity of 1.8 m/s. If the constant rate of drying under these conditions is 0.7 × 10–3 kg/(m2·s) and the critical moisture content is 15 %, calculate the time required for drying the solids.

Drying surface = 0.03 m2/kg dry weight. 7

Q2. Explain Evaporation and give Construction and working of Forced Circulation Evaporators and Standard vertical tube evaporator – type evaporator with neat labelled digram. 15

Or

Solve Problems on:

a) An evaporator is operating at atmospheric pressure. It is desired to concentrate a feed from 5 % solute to 20 % solute (by weight) at a rate of 5000 kg/h. Dry saturated steam at a pressure corresponding to the saturation temperature of 399 K (126o C) is used. The feed is at 298 K (25o C) and the boiling point rise (elevation), i.e., B.P.E. (B.P.R.) is 5 K. The overall heat transfer coefficient is 2350 W/(m2·K). Calculate the economy of the evaporator and the area of heat transfer to be provided

b) A single effect evaporator is fed with 5000 kg/h of solution containing 1 % solute by weight. Feed temperature is 303 K (30o C) and is to be concentrated to a solution of 2 % solute by weight. The evaporation is at atmospheric pressure (101.325 kPa) and area of evaporator is 69 m2. Saturated steam is supplied at 143.3 kPa as a heating medium. Calculate the steam economy and the overall heat transfer coefficient.

Data : Enthalpy of feed at 303 K = 125.79 kJ/kg
Enthalpy of vapour at 101.325 kPa = 2676.1 kJ/kg
Enthalpy of saturated steam at 143.3 kPa = 2691.5 kJ/kg
Saturation temperature of steam = 383 K (·110o C)
Boiling point of saturation = 373 K
Enthalpy of product = 419.04 kJ/kg
Enthalpy of saturated water at 383 K = 461.30 kJ/kg

Q.3) Write short notes on (any two)
i) Kick's Law of size reduction.
ii) Gyratory Crusher
iii) Rittinger's Law of size reduction.
iv) The Blake Jaw Crusher

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

SA—68—2025

FACULTY OF SCIENCE AND ARTS

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

APRIL/MAY, 2025

MATHEMATICS

Paper-IX

(Real Analysis-II)

(Tuesday, 22-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

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

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

1. (*i*) If a bounded function f is integrable on $[a, b]$, then prove that it is also integrable on $[a, c]$ and $[c, b]$, where c is a point of $[a, b]$. 15

(*ii*) If f is bounded and integrable on $[a, c]$, $[c, b]$, then prove that it is also integrable on $[a, b]$.

(*iii*) Prove that : 15

$$\int_a^b f dx = \int_a^c f dx + \int_c^b f dx, \ a \le c \le b.$$

P.T.O.

Or

(*a*) If a function f is monotonic on $[a, b]$, then prove that it is integrable on $[a, b]$. 8

(*b*) If f is a non-negative continuous function on $[a, b]$ and $\int_a^b f\,dx = 0$, then prove that : 7

$$f(x) = 0, \text{ for all } x \in [a, b].$$

2. Prove that the improper integral $\int_a^b \frac{dx}{(x-a)^n}$ converges if and only if $n < 1$.

Also, test the convergence of $\int_0^{\pi/2} \frac{\sin x}{x^p} dx$. 15

Or

(*a*) Show that the integral $\int_0^\infty x^{m-1}e^{-x}\,dx$ is convergent if and only if $m > 0$. 8

(*b*) If ϕ is bounded and monotonic in $[a, \infty)$ and tends to 0 as $x \to \infty$, and $\int_a^x f dx$ is bounded for $X \geq a$, then prove that $\int_a^\infty f\phi\,dx$ is convergent at ∞. 7

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

(*a*) Show that a constant function k is integrable and $\int_a^b k\,dx = k(b-a)$.

(*b*) If f and g are integrable on $[a, b]$ and g keeps the same sign over $[a, b]$, then prove that there exists a number μ lying between the bounds of f such that :

$$\int_a^b fg\,dx = \mu \int_a^b g\,dx .$$

(*c*) If f and g be two functions such that $f(x) \leq g(x)$, for all x in $[a, X]$, then prove that :

(*i*) $\int_a^\infty f\,dx$ converges, if $\int_a^\infty g\,dx$ converges,

(*ii*) $\int_a^\infty g\,dx$ converges, if $\int_a^\infty f\,dx$ converges.

(*d*) Examine the convergence of $\int_0^2 \frac{dx}{(2x - x^2)}$.

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

SA—81—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(New/CBCS Pattern)

MATHEMATICS

Paper X

(Ring Theory)

(Thursday, 24-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

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

(*i*) $a0 = 0a = 0$

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

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

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

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

Or

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

P.T.O.

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

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

Or

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

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

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

(*a*) Prove that the set of integer R, where R = {0, 1, 2, 3, 4} forms a ring under multiplication modulo 5.

(*b*) Prove that the intersection of two ideals of R is an ideal of R.

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

(*d*) If *f* is a homomorphism of a ring R into a ring R' with kernel S, then prove that S is an ideal of R.

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

SA—94—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

MATHEMATICS

Paper XI

(Partial Differential Equations)

(Saturday, 26-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) *All* questions are compulsory.

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

1. Explain the rules for finding the complementary function of the equation : 15

$$a_0 \frac{\partial^2 z}{\partial x^2} + a_1 \frac{\partial^2 z}{\partial x\, \partial y} + a_2 \frac{\partial^2 z}{\partial y^2} = 0 .$$

Explain the rule for finding the particular integral of the partial differential equation :

$$f(\mathrm{D}, \mathrm{D}') = \mathrm{F}(x, y)$$

when :

$$\mathrm{F}(x, y) = x^m y^n.$$

P.T.O.

Or

(*a*) Explain the working rule of Lagrange's linear equation is an equation of type : 8

$$P_p + Q_q = R$$

(*b*) Solve : 7

$$p(1+q) = qz$$

2. Explain the Chartpit's method to solve partial differential equation :15

$$f(x, y, z, p, q) = 0$$

Or

(*a*) Obtain the solution of the wave equation : 8

$$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$$

by D' Alembert's method.

(*b*) Solve the wave equation :

$$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$$

such that $y = P_0 \cos pt$, (P_0 is constant) when $x = l$ and $y = 0$ when $x = 0$. 7

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

(*a*) Form a partial differential equation from :

$$x^2 + y^2 + (z - c)^2 = a^2$$

(*b*) Solve :

$$(D - D' - 2)\ (D - D' - 3)z = e^{3x - 2y}$$

(*c*) Solve :

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

which satisfies the conditions :

$$u(0, y) = u\ (l, y) = u\ (x, 0) = 0$$

and

$$u(x, a) = \sin \frac{n\pi x}{l}.$$

(*d*) Find the general solution of :

$$\frac{\partial^2 z}{\partial x^2} + \frac{3\partial^2 z}{\partial x \partial y} + \frac{2\partial^2 z}{\partial y^2} = x + y.$$

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

SA—183—2025

FACULTY OF SCIENCE & TECHNOLOGY

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

APRIL/MAY, 2025

(New Pattern)

MICROBIOLOGY

Paper–IX

(Medical Microbiology)

(Monday, 5-5-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Illustrate your answer with suitably labelled diagram, wherever necessary.

1. Explain pathogenesis, symptoms and treatment of staphylococcal infections. 15

Or

(*a*) Pathogenesis and lab diagnosis of Diphtheria. 8

(*b*) Write on disease caused by Spirochaete. 7

2. Write on pathogenesis, lab. diagnosis of prevention of AIDS. 15

Or

(*a*) Treatment and prophylaxis of Malaria. 8

(*b*) Pathogenesis and treatment of Candidiosis. 7

P.T.O.

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

(*a*) ELISA

(*b*) Vaginal thrush

(*c*) Rehydration therapy

(*d*) Treatment of typhoid.

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

SA—119—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(New Pattern)

MICROBIOLOGY

Paper VIII

(Food, Soil Microbiology and Microbial Ecology)

(Wednesday, 30-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

(*ii*) Draw a well labelled diagram if necessary.

1. What is food poisoning ? Explain in detail staphylococcal intoxication. 15

Or

(*a*) Soil as a culture medium. 8

(*b*) Carbon cycle with respect to cellulose degradation. 7

2. Draw well-labelled diagram and explain in detail phosphorus cycle. 15

Or

Write notes on :

(*a*) Types and applications of biofertilizer. 8

(*b*) Mycorrhiza. 7

P.T.O.

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

(*a*) Food preservation

(*b*) Definition and types of soil

(*c*) Denitrification

(*d*) Rumen : Animal-microbe intercation.

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

SA—53—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(CBCS/New Pattern)

PHYSICS

Paper IX

(Basic Electronics)

(Saturday, 19-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :—All questions are compulsory and carry equal marks.

1. Draw neat labelled circuit diagram of CE transistor and explain its input and output characteristics. 15

Or

(*a*) Explain zener diode and light emitting diode. 8

(*b*) Explain P-N junction diode with V-I characteristics. 7

2. Explain the principle and working of phase shift oscillator with a neat labelled diagram. 15

P.T.O.

Or

(*a*) Explain slew rate and CMRR. 8

(*b*) Explain non-inverting amplifier. Obtain an expression for its voltage gain. 7

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

(*a*) Photo-diode

(*b*) Determination of h-parameter.

(*c*) Input offset current and input bias current

(*d*) Barkhausen criterion.

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

SA—38—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

PHYSICS

Paper–VIII

(Optics and Lasers)

(Wednesday, 16-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Log table is allowed.

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

Or

(*a*) Describe Fraunhofer's diffraction due to double slit 8

(*b*) Explain resolving power of grating. 7

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

Or

(*a*) Explain He-Ne laser with a neat labelled diagram. 8

(*b*) Explain population inversion in laser. 7

P.T.O.

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

(*a*) Huygen's eyepiece

(*b*) Newton's rings

(*c*) Malu's Law

(*d*) Properties of Lasers.

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

SA—82—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

ZOOLOGY

Paper IX

(Evolutionary Biology and Genetics Engineering)

(Thursday, 24-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

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

1. Describe in detail evolutionary theory of Lamarckism. 15

Or

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

(*b*) Describe Hardy Weinberg equilibrium principle. 7

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

Or

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

(*b*) Explain DNA fingerprinting. 7

P.T.O.

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

(*a*) Homology and Analogy

(*b*) Mass extinction causes

(*c*) Genetic code

(*d*) Construction of *r*-DNA.

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

SA—82—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

ZOOLOGY

Paper IX

(Evolutionary Biology and Genetics Engineering)

(Thursday, 24-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Note :— (*i*) Attempt *all* questions.

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

1. Describe in detail evolutionary theory of Lamarckism. 15

Or

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

(*b*) Describe Hardy Weinberg equilibrium principle. 7

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

Or

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

(*b*) Explain DNA fingerprinting. 7

P.T.O.

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

(*a*) Homology and Analogy

(*b*) Mass extinction causes

(*c*) Genetic code

(*d*) Construction of *r*-DNA.

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

SA—69—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(CBCS/New Pattern)

ZOOLOGY

Paper VIII

(Cell Biology and Genetics)

(Tuesday, 22-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

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

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

1. Describe the structure and functions of plasma membrane. 15

Or

(*a*) Explain the Mendel's Law of Dominance. 8

(*b*) Give an account on Supplementary factor. 7

2. What is Multiple Allele ? Explain inheritance of ABO Blood Groups in Man. 15

P.T.O.

Or

(*a*) Give an account on Bridge ratio theory of Genic Balance. 8

(*b*) Give an account on Human Pedigree analysis with symbols. 7

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

(*a*) Lysosomes

(*b*) Lethal gene

(*c*) Erythroblastosis foetalis

(*d*) Phenylketonuria (PKU).