

(2021 Batch Onwards)

G 501 DC1.6

Reg. No. :

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination
April/May - 2025

PHYSICS – VI (a)

ELEMENTS OF CONDENSED MATTER AND NUCLEAR PHYSICS

Max Marks: 60

Time: 2½ hrs.

SECTION – A

(4x2=8)

Answer any **FOUR** of the following.

1. a) What is Bravais lattice? Which are the major types of Bravais lattice?
- b) What are dielectric materials? Give the types.
- c) Give two applications of superconductivity.
- d) What is K electron capture? Give one example.
- e) What are pair production and annihilation?
- f) If all drift tubes are of same length in a LINAC, can an ion be accelerated in it? Justify your answer.

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SECTION – B

Answer any **ONE FULL QUESTION** from each unit.

(4x10=40)

UNIT-I

- 2.a) Explain how miller indices are obtained for a crystal plane. (6)
- b) What are continuous and characteristic X-rays? (4)
- 3.a) Define Fermi energy and obtain an expression for it at absolute temperature. Hence obtain the expression for the average energy of the electrons. (6)
- b) State and explain Bragg's law. (4)

UNIT-II

- 4.a) Explain B-H curve of a Ferromagnetic material. (6)
- b) Distinguish between type I and type II superconductors. (4)
- 5.a) Derive the expression for the Lorentz field in a dielectric material. (6)
- b) What is Piezo electric effect and how does it occur? (4)

UNIT-III

- 6.a) With a proper binding energy curve, explain the various facts about binding energy of a nuclei. (6)
- b) Explain Yukawa's meson field theory of nuclear force. (4)
- 7.a) What are the observed paradoxes of β -decay? Explain Pauli's neutrino hypothesis to account for these paradoxes. (6)
- b) Discuss Isobars and Mirror nuclei with an example for each. (4)

Contd...2

UNIT-IV

- 8.a) With a neat figure explain the construction and working principle of a linear accelerator. (6)
- b) With a neat figure explain the working of a semiconductor detector. (4)
- 9.a) With a neat figure describe the construction and working of a cyclotron. Also obtain the expression for resonance condition. (6)
- b) Describe the working of a GM tube with necessary diagram. Also give its characteristic curve. (4)

SECTION - C

Answer any **THREE** from the following.

(3×4=12)

10. A crystal plane intersects the three axis at (3a, 2b and 6c). Determine the miller Indices of the plane.
11. A magnetic material has a magnetization of 3300 A/m and a flux density of 0.0044T. Calculate the magnetizing field and the relative permeability of the material.
12. Calculate the time required for 10% of a sample of thorium to disintegrate. Given half life of thorium is 1.4×10^{10} years.
13. In a linear accelerator protons are accelerated. The velocity of the proton in the first drift tube is $4.7 \times 10^6 \text{ ms}^{-1}$ and the length of the drift tube is 1m. What would be the energy of the protons emerging out of the fourth drift tube? Also find the length of the fourth drift tube. Given mass of proton = $1.67 \times 10^{-27} \text{ kg}$.

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination

April/May - 2025

PHYSICS – VI (b)

ELECTRONIC INSTRUMENTATION AND SENSORS

Time: 2½ hrs.

Max Marks: 60

SECTION – A

Answer any FOUR of the following.

(4x2=8)

1. a) Distinguish between line voltage and phase voltage in a three-phase system.
- b) Explain the concept of AC power, highlighting the differences between AC and DC power sources. Provide an example of a common application where AC power is preferred.
- c) Discuss the advantages and limitations of using passive filters in electronic circuits.
- d) What are the key components of a Wien bridge oscillator, and how do they contribute to oscillation?
- e) What is the difference between a digital and an analog signal?
- f) Mention the key advantages of LED displays over LCD displays?

SECTION – B

Answer any ONE FULL QUESTION from each unit.

(4x10=40)

UNIT-I

- 2.a) Explain how the combination of a bridge rectifier and a capacitor filter reduces ripple voltage in the rectified output. Discuss the working of the capacitor in minimizing ripple. (6)
- b) Explore two practical applications where capacitors are commonly used for filtering in AC circuits. Discuss the specific requirements of these applications and how capacitors contribute to achieving desired outcomes. (4)
- 3.a) Compare the output characteristics of a bridge rectifier with a capacitor filter to an unfiltered bridge rectifier. Discuss the impact of the capacitor filter on the purity and stability of the DC output. (6)
- b) Define ripple voltage in a half-wave rectifier. Discuss the factors that contribute to the presence of ripple in the output and how it can be minimized. (4)

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UNIT-II

- 4.a) Describe the principles of feedback in active filter circuits. Explain the role of feedback on the overall performance and stability of the filter. (6)
- b) Discuss the operational principles of a Wien bridge oscillator. Explain how the feedback network and amplifier stage produces the oscillatory output. (4)

Contd...2

- 5.a) Explain how low pass filter attenuates high-frequency signals while allowing low-frequency signals to pass through. Provide examples. (6)
- b) Explain the role of operational amplifiers (op-amps) in active filter circuits. (4)

UNIT-III

- 6.a) Explain the principle of operation of a 4-bit R-2R digital-to-analog converter (DAC). (6)
- b) Explain the construction and working of a Liquid Crystal Display(LCD). (4)
- 7.a) What are the applications for an DAC? (6)
- b) Describe the basic principle behind PWM. (4)

UNIT-IV

- 8.a) Discuss the working principle of a photovoltaic cell. How does it convert sunlight into electricity? (6)
- b) Discuss the applications of thermistors in temperature sensing. (4)
- 9.a) What is an LVDT? Explain its working principle and discuss its advantages and applications. (6)
- b) Discuss the applications of piezoelectric transducers. (4)

SECTION -C

Answer any **THREE** from the following.

(3x4=12)

10. An electronic circuit which consists of transformer and one diode supplies power to a 1100-ohm load. The input supply voltage measured in meter is 230. Considering the resistance offered by diode as zero, calculate V_{dc} , I_{dc} , RMS Ripple voltage.
11. In a phase shift oscillator circuit using three identical RC stages, each with a resistance of $10\text{ k}\Omega$ and a capacitance of $0.1\ \mu\text{F}$, calculate the frequency of oscillation.
12. For an R-2R ladder DAC with a resolution of 12 bits, calculate the percentage increase in the number of output levels when compared to an 8-bit DAC.
13. An LVDT has a maximum core displacement of $\pm 10\text{ mm}$ and provides an output voltage of 2.5 mV/mm/V of excitation voltage. If the excitation voltage is 5 V , calculate the output voltage when the core is displaced by 6 mm .

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination
April/May - 2025

CHEMISTRY- VI (a)
Inorganic and Physical Chemistry - IV

Time: 2½ hrs.

Max Marks: 60

- Instructions: 1. Write the question number and subdivision clearly.
2. Write equations and diagrams wherever necessary.
3. Answer Part – A in first two pages of the answer book.

PART - A

Answer all the following questions.

(1×8=8)

- 1.a) Which metal ion is found in vitamin B₁₂ and mention its role in enzyme function?
- b) $[\text{HgI}_4]^-$ is stable complex than $[\text{HgF}_4]^{-2}$. Give reason.
- c) Find out term symbol of Co in $[\text{Co}(\text{H}_2\text{O})_6]^{+3}$.
- d) How does paramagnetic susceptibility vary with temperature?
- e) Define eutectic point.
- f) Define component.
- g) Give the chain propagation step of thermochemical reaction between hydrogen and bromine.
- h) What is relaxation method in the kinetic study of fast reactions?

PART- B

Answer any EIGHT of the following questions.

(3×8=24)

- 2.(i) What is the principle of the spectrophotometric method in determining the stability constant of metal complexes?
- (ii) Discuss any three factors affecting the oxygen binding in hemoglobin.
- (iii) Explain Racah parameter.
- (iv) Write a note on ferromagnetic substances.
- (v) How does rate of heating effects the TGA curve?
- (vi) Explain phenol water system.
- (vii) Write the mechanism for the photochemical reaction between H₂ & Cl₂.
- (viii) Give any three applications of radioisotopes in the industries.
- (ix) Draw the skeletal structure of hemoglobin.
- (x) Illustrate the S_N2 mechanism for ligand substitution in a square planar complex.

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Contd...2

PART - C**Answer any SEVEN of the following questions.****(4×7=28)**

3. Justify d^n and d^{10-n} systems have the same ground term.
4. An octahedral Cr(III) complex shows spin-allowed bands at 17,000, 24,000 & 37,000 cm^{-1} . Interpret the spectrum and calculate nephelauxetic ratio (β) (Given B for Cr^{+3} free ion is 1030 cm^{-1}).
5. Explain any two factors effecting DTA curves.
6. Explain the phase diagram of water system.
7. Write a note on radiation dosimetry.
8. Derive the rate equation for the pyrolysis of acetaldehyde.
9. Derive the relationship between stepwise stability constants and overall formation constant (β_n).
10. Calculate the number of microstates in d^2 and d^4 system.
11. With a neat diagram explain steam distillation.

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**St Aloysius College (Autonomous)
Mangaluru**

**B.Sc. Semester VI – Degree Examination
April/May - 2025**

CHEMISTRY- VI (b)

Organic Chemistry and Spectroscopy-II

Time: 2½ hrs.

Max Marks: 60

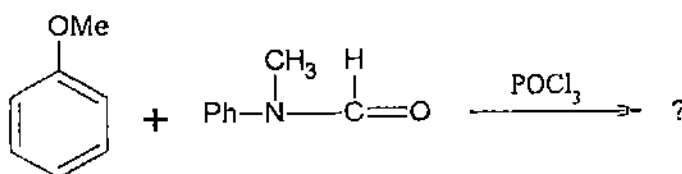
- Instructions:** 1. Write the question number and subdivision clearly.
2. Write equations and diagrams wherever necessary.
3. Answer Part – A in first two pages of the answer book.

PART - A

Answer all the following questions.

(1×8=8)

- 1.a) Classify vitamins based on thermal behavior.
b) Predict the product in the given reaction:



- c) Give the reaction of Grignard reagent with CO₂.
d) Name the monomers used to synthesize nylon 6,6.
e) Name the axis of symmetry present in H₂O molecule.
f) Define quantum yield.
g) Give the selection rules for ESR spectroscopy.
h) What is binding energy?

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PART- B

Answer any EIGHT of the following questions.

(3×8=24)

- 2.(i) Differentiate phyloquinone and menaquinone.
(ii) How are aryl fluorides obtained from arene diazonium fluoroborates?
(iii) Give the synthesis of Terylene.
(iv) How are alkenes obtained from carbonyl compounds and phosphorous ylides?
(v) What is free radical polymerisation? Give an example.
(vi) Explain conversion of α-halo ketones to esters.
(vii) Write any three differences between photochemical and thermal reactions.
(viii) Write the group multiplication table for C_{2v} group.
(ix) What is ionisation interference? Explain.
(x) Provide explanation for the intensity of ESR Lines.

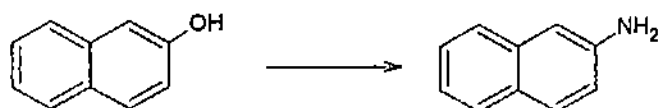
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PART - C

Answer any **SEVEN** of the following questions.

(4×7=28)

- Write a note on biological importance of vitamin B₂.
- Compare the reactions of Grignard reagent and alkyl lithium with α,β -unsaturated carbonyl compounds.
- Explain Hoffmann rearrangement with mechanism.
- Give the mechanism for the conversion of :



- In a photochemical reaction, 0.1 moles of a substance decompose when exposed to 400 nm light for 10 minutes. The light source emits 5×10^{18} photons per second.
 - Calculate the total number of photons absorbed during the reaction.
 - Determine the quantum yield (ϕ) of the reaction.
- Give reasons for
 - high quantum yields
 - low quantum yields in a photochemical reaction.
- Derive the matrix representation for a rotation operation along axis C_n .
- Explain the concept of hyperfine splitting in ESR spectroscopy with an example.
- How does zero-field splitting affect the ESR spectrum of transition metal ions with more than one unpaired electron? Explain with a d^2 system.

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**St Aloysius College (Autonomous)
Mangaluru**

B.Sc SEMESTER VI - DEGREE EXAMINATION

April / May - 2025

Mathematics - VI (a)

Linear Algebra

Max. Marks : 60

Time : 2 ½ Hours

PART - A

Answer any **SIX** of the following.

(6×2=12)

- Let $V = \mathbb{R}^3$ over the field \mathbb{R} . Check whether the subset $W = \{(x, y, z) : x, y, z \in \mathbb{Q}\}$ is a subspace of V .
- In any vector space V over \mathbb{F} , show that $c \cdot 0 = 0, \forall c \in \mathbb{F}$.
- Show that the transformation $f : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ defined by $f(x, y) = (x + 2, y + 3)$ is not a linear transformation.
- Define Image of a linear transformation.
- Check whether the vectors $(1, 1, 0, 0), (0, 1, -1, 0)$ and $(0, 0, 0, 3)$ are linearly independent.
- If λ is eigenvalue of an invertible linear transformation T , then show that λ^{-1} is eigenvalue of T^{-1} .
- If $\{v_1, v_2, \dots, v_n\}$ is an orthonormal set, then prove that v_1, v_2, \dots, v_n are linearly independent.
- If $A \in M_n(\mathbb{F})$ has $q(x)$ as the minimum polynomial and $f(A) = 0$, then prove that $q(x) | f(x)$.

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PART - B

UNIT - I

Answer any **TWO** of the following .

(2×6=12)

- Let S be non-empty subset of a vector space V over F . Show that $L[S]$ is the smallest subspace of V containing S .
- Define Linear Combination of vectors. Express the vector $(1, -2, 5)$ as linear combination of the vectors $(1, 1, 1), (1, 2, 3), (2, -1, 1)$.
- Define Sum of Subspaces. Suppose U and W are the finite dimensional subspaces of vector space V , then show that $U + W$ has finite dimension and $\dim(U + W) = \dim(U) + \dim(W) - \dim(U \cap W)$.

UNIT - II

Answer any **TWO** of the following .

(2×6=12)

- Prove that dimension of the domain V is equal to rank + nullity.
- Let $\beta_1, \beta_2, \dots, \beta_n$ be a basis for a vector space V and $\alpha_1, \alpha_2, \dots, \alpha_n$ are any vectors in W . Then prove that there exists a unique linear transformation $T : V \rightarrow W$ such that $T(\beta_i) = \alpha_i, \forall i$.
- Find the matrix representation of the operator $T(x, y) = (2x - 3y, x + y)$ on \mathbb{R}^2 relative to the basis $B = \{(1, 2), (2, 3)\}$.

UNIT - III

Answer any **TWO** of the following .

(2×6=12)

- Suppose $\phi : U \rightarrow V$ is onto linear transformation then show that $\frac{U}{\text{Ker}\phi} \cong V$.
- Find the eigenvalues and corresponding eigenspaces for $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ defined by $T(x, y) = (3x + y, 6x + 2y)$.
- Suppose v_1, v_2, \dots, v_n are the eigenvectors of the operator $T : V \rightarrow V$ corresponding to the distinct eigenvalues $\lambda_1, \lambda_2, \dots, \lambda_n$ respectively, then show that the set $\{v_1, v_2, \dots, v_n\}$ is linearly independent.

UNIT - IV

Answer any **TWO** of the following .

(2×6=12)

- Prove that a linear transformation T of a vector space V with finite basis $\alpha_1, \alpha_2, \dots, \alpha_n$ is non-singular if and only if $T(\alpha_1), T(\alpha_2), \dots, T(\alpha_n)$ are linearly independent in V .
- State and prove Schwartz inequality theorem.
- Let F be a linear operator on \mathbb{R}^3 defined by $F(x, y, z) = (x + y - 2z, x + 2y + z, 2x + 2y - 3z)$. Show that F is non-singular and also find F^{-1} .

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St Aloysius College (Autonomous)
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B.Sc SEMESTER VI - DEGREE EXAMINATION
 April / May - 2025
Mathematics - VI (b)
Numerical Analysis

Max. Marks : 60

Time : 2 ½ Hours

PART - A

(6×2=12)

Answer any **SIX** of the following .

1. Explain Iterative method to find a real root of the equation $f(x) = 0$, in the interval (a, b) .
2. Find the number of significant figures
(a)95400
(b)1.5040.
3. Define shift operator and obtain the relation between backward difference operator and shift operator.
4. Construct the difference table for the following data:

x	0	10	20	30
y	0	0.174	0.347	0.518

5. Write the formula for $\frac{dy}{dx}$ at $x = x_n$.
6. Define Divided Difference of order one.
7. Give the formula for Runge kutta method of second and fourth order.
8. Write the formula for n^{th} approximation in Picard's method.

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PART - B
UNIT - I

(2x6=12)

Answer any **TWO** of the following :

1. Use Newton-Raphson method to find the root of the equation $x \sin x + \cos x = 0$ nearest to $x = \pi$.
2. Find a real root of the equation $x^3 - x - 1 = 0$, using Bisection method.
3. Solve the system of equations
 $10x + 2y + z = 9$
 $2x + 20y - 2z = -44$
 $-2x + 3y + 10z = 22$
 by Jacobi's method.

UNIT - II

(2x6=12)

Answer any **TWO** of the following .

1. The population of a town in the decennial census is given below. Estimate population for the year 1925.

Year (x)	1891	1901	1911	1921	1931
Population in thousand (y)	46	66	81	93	101

2. Find the value of y corresponding to $x = 10$ from the following table.

x	5	6	9	11
y	12	13	14	16

3. Derive Newton's forward difference interpolation formula.

Contd...2

UNIT - IIIAnswer any **TWO** of the following .

(2x6=12)

1. Find the value of $\int_3^7 x^2 \log_{10} x \, dx$ by taking 4 strips.
2. From the following table, find the area bounded by the curve and x -axis from $x_0 = 7.47$ to $x_n = 7.52$.

x	7.47	7.48	7.49	7.50	7.51	7.52
y	1.93	1.95	1.98	2.01	2.03	2.06

3. From the following table of values of x and y , obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for $x = 1.0$ and $x = 1.2$.

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

UNIT - IVAnswer any **TWO** of the following .

(2x6=12)

1. Solve by Picard's method: $y' + y = e^x$; $y(0) = 0$. Hence find approximate values of $y(0.1)$ and $y(0.2)$.
2. If $y' = 1 + y^2$, with $y(0) = 0$, find $y(0.1)$, $y(0.2)$, $y(0.3)$ and $y(0.4)$ using Euler's method.
3. Consider the initial value problem $y' = 3x + \frac{y}{2}$, with $y(0) = 1$. Find $y(0.2)$ using Euler's modified method and Runge-Kutta method of 4th order with step size $h = 0.2$. Compare the results.

(2021 Batch onwards)

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St Aloysius College (Autonomous)

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B.Sc. Semester VI – Degree Examination

April/May - 2025

ELECTRONICS - VI(a)

**TRANSDUCERS, SENSOR NETWORKS, PRINCIPLES OF IOT AND 5G
COMMUNICATIONS**

Time: 2½ hrs.

Max Marks: 60

Note: This question paper has TWO sections- SECTION A AND SECTION B.

Answer both the sections.

SECTION – A

1. Choose the correct answer from the choices given at the end of each question and Write the correct answer. (1x6=6)

- i) What is the Internet of Things (IoT)?
 - a) A system that connects all types of devices to the internet
 - b) A technology that allows for remote control of home appliances
 - c) A tool for managing computer networks
 - d) A platform for online shopping
- ii) Which of the following is an example of an IoT application in healthcare?
 - a) Online shopping for medical supplies
 - b) Remote patient monitoring
 - c) Electronic medical record management
 - d) Telemedicine consultations
- iii) Which of the following is the way in which an IoT device is associated with data?
 - a) Internet
 - b) Cloud
 - c) Automate
 - d) Network
- iv) _____ is the largest value of output voltage from an 8-bit DAC that produces 1.0V for a digital input of 00110010
 - a) 10mV
 - b) 20mV
 - c) 5.10V
 - d) 10.20V
- v) The number of total steps of a 10-bit ADC is _____.
 - a) 1024
 - b) 1023
 - c) 1026
 - d) 1025
- vi) MQTT stands for _____.
 - a) Message Query Telemetry Transport
 - b) MetaQuery Telemetry Transport
 - c) Multiple Query Telemetry Transport
 - d) Multi-Queue Query Telemetry Transport

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2. Answer any **SIX** questions.

(1x6=6)

- i) Define Transducer.
- ii) Define Resolution of a DAC.
- iii) Write full form of PaaS.
- iv) Which layer is used for wireless connection in IoT devices?
- v) What do you mean by Accuracy of a D to A converter?
- vi) Define Hall effect.
- vii) How many Comparators are used in a 3-bit Flash ADC?
- viii) What is edge computing in IoT?

Contd...2

3. Answer any SIX questions.

- i) List any 4 applications of IOT in different fields.
- ii) In a binary weighted resistor circuit, $V_{REF} = 8\text{ V}$ and $R_f = R = 10\text{ k}\Omega$, Determine the resolution and fullscale output for this DAC.
- iii) Draw the Generic block diagram of an IoT Device.
- iv) Give the definition of IoT.
- v) What is the advantage of R-2R ladder DACs over binary weighted resistors?
- vi) Differentiate between RFID and Barcode.
- vii) Why do IOT systems have to be self-adapting and self-configuring?
- viii) What is the primary goal of autonomic computing?

SECTION – B**4. Answer any FOUR questions.****(4x4=16)**

- i) Explain the areas of Autonomic Computing.
- ii) With necessary diagrams explain a Capacitive transducer.
- iii) With a block diagram explain the Interfacing with the analog world using Analog-to-Digital Converter (ADC) and Digital-to-Analog Converter (DAC).
- iv) With a circuit diagram, explain LVDT Inductive Transducer.
- v) With an example explain Active and passive transducers.
- vi) Explain the areas of Autonomic Computing.

SECTION – C**5. Answer any FOUR questions.****(5x4=20)**

- i) With a circuit diagram, explain a parallel comparator (Flash) A to D converter and hence give the expression for the output voltage. **(5)**
- ii) With necessary diagram Briefly explain Piezoelectric Transducer. **(5)**
- iii) With a neat circuit diagram explain a Proximity sensor using IC 741 **(5)**
- iv) With neat diagram explain architecture of IoT. **(5)**
- v) Explain types of RFID. **(5)**
- vi) With necessary block diagram Briefly explain IoT Protocols **(5)**

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St Aloysius College (Autonomous)

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B.Sc. Semester VI – Degree Examination

April/May - 2025

ELECTRONICS - VI(b)

C LANGUAGE & SIGNALS AND SYSTEMS

Time: 2½ hrs.

Max Marks: 60

Note: This question paper has TWO sections- SECTION A AND SECTION B.
Answer both the sections.

SECTION – A

1. Choose the correct answer from the choices given at the end of each question and Write the correct answer. (1x6=6)

- i) -----statement is used in C language to skip a set of instruction within the loop and go ahead with next value of loop control variable.
 - (a) break; (b) goto; (c) exit; (d) continue.
- ii) The field specifier %d is used for----type data.
 - (a) void (b) integer (c) real (d) string
- iii) Arrays are -----data types.
 - (a) Primary (b) derived (c) user defined (d) void
- iv) The break statement within the **switch** statement in C language makes the program counter to _____.
 - a) Outside the switch statement
 - b) go to the label default
 - c) Beginning of the switch statement
 - d) immediate next case value
- v) _____ is not a string constant.
 - a) "ABC" (b) "123" (c) 123 (d) "hi"
- vi) If $a[10] = \{100\}$; then value of $a[1]$ is _____.
 - (a) 100 (b) 0 (c) garbage value (d) wrong statement

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2. Answer any **SIX** questions. (1x6=6)

- i) What is meant by infinite loop?
- ii) Define an array in C language.
- iii) Give one example for a valid variable name in C language.
- iv) Write short hand format of the assignment statement $a=a+1$;
- v) What is the value of $14\% - 2$ in C language?
- vi) How is a single character defined in C language?
- vii) What is meant by an odd signal?
- viii) Define an analog signal.

3. Answer any **SIX** questions. (2x6=12)

- i) Write the syntax and one example for the shorthand assignment operator in C language.
- ii) Write a C program to produce following print out.
1 4 16 32 64 128.

iii) What is meant by infinite loop in C language?

iv) What is the output of the following program?

```
Void main()
{
    int x=10, y=20;
    printf("%d\t%d", x++,--y);
}
```

v) How many times the body the loop is executed in the following program?

```
int m=10;
int n=7;
while(m%n>=0)
{
    -----
    m=m+1;
    n=n+2;
    -----
}
```

vi) Distinguish between energy signal and power signal.

vii) With syntax and example explain the strcmp() function in C language.

viii) Explain the function header in C user defined functions.

SECTION – B

4. Answer any **FOUR** questions.

(4x4=16)

- i) Write a C language program to accept three numbers from keyboard and print the smallest of them.
- ii) With syntax and example, explain the while statement in C language.
- iii) With syntax and example explain the declaration and initialization of one dimensional array in C language.
- iv) Write a C program to accept two strings, concatenate them and print all the three strings.
- v) Distinguish between continuous-time and discrete-time signals. Give examples for each type.
- vi) With necessary examples explain periodic and non-periodic signals.

SECTION – C

5. Answer any **FOUR** questions.

(5x4=20)

- i) With necessary examples explain various data types in C language. (5)
- ii) Write a C program to calculate the sine value of an angle read from the key board in degrees using user defined function. (5)
- iii) With an example explain a user defined function with return value and parameters. (5)
- iv) What is meant by a recursive function? Explain with an example. (5)
- v) Give the block diagram of communication system and explain the signal and system interaction. (5)
- vi) Explain any two elementary signals. (5)

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. - Semester VI – Degree Examination

April/May - 2025

COMPUTER SCIENCE – VI (a)

WEB TECHNOLOGIES

Time: 2 ½ Hours.

Max Marks: 60

PART – A

(6x2=12)

1. Answer any **SIX** of the following.

- Name any two commonly used web browsers.
- What is the use of the tag in HTML?
- What is an XML namespace, and why is it used?
- What is the difference between a class selector and an ID selector in CSS?
- What is event handling in JavaScript?
- List the different data types available in JavaScript.
- How does SQL Injection work, and how can it be prevented?
- What is the purpose of the getParameter() method in a servlet?

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PART – B

Answer any **ONE FULL** question from each unit.

(4x12=48)

UNIT - I

- Explain ordered and unordered list with example. (4)
 - Explain Table tag with suitable example. (4)
 - Explain the structure of an HTML table with an example. (4)
- Explain how to embed audio and video clips in a webpage using HTML. Provide examples. (4)
 - Explain the structure of the HTML webpage with an example. (4)
 - Explain following tags with examples. (4)
 - Text formatting tags
 - <input>

UNIT – II

- Explain about Cascading Style Sheets with an example. (4)
 - Distinguish between XML and HTML. (4)
 - Differentiate between inline, internal, and external CSS. (4)
- How do you change the font size and font style using CSS? (4)
 - What are the types of CSS gradients? (4)
 - What is the difference between display: none; and visibility: hidden;? (4)

UNIT – III

- How does the switch statement work in JavaScript? Provide a code example. (4)
 - Compare while and do-while loops with examples. (4)
 - Explain the difference between function declaration and function expression with examples. (4)

- 7. a) What are the different types of loops in JavaScript? Explain each with an example. (4)
- b) What is JavaScript? Explain its features and uses in web development. (4)
- c) Explain the working of different if-else statement with a program. (4)

UNIT - IV

- 8. a) What is Common Gateway Interface (CGI)? How does it work? (4)
 - b) Explain the lifecycle of a Servlet with a neat diagram. (4)
 - c) Write a JDBC program to perform the following operations on the Book table of the Library database (Book_Id, Book_Title, Book_Author, Book_Price): Remove a specific book from the database. (4)
-
- 9. a) How do you retrieve request parameters in a servlet? Explain with an example. (4)
 - b) Explain how servlets generate and send an HTTP response with an example. (4)
 - c) Explain the role of HttpServletRequest and HttpServletResponse interfaces in handling HTTP requests. (4)

(2021 Batch Onwards)

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. - Semester VI – Degree Examination

April/May - 2025

COMPUTER SCIENCE – VI (b)

STATISTICAL COMPUTING AND R PROGRAMMING

Time: 2 ½ Hours.

Max Marks: 60

PART – A

1. **Answer any SIX of the following.** (6x2=12)

- Differentiate between cat and print function in R.
- Compare and contrast lists and data frames in R.
- Define a) Experiment b)Event
- Write the formula to calculate the mean of n numeric measurements. Using the formula calculate the mean of (3 , 11 , 4 , 6 , 8 , 9 , 6).
- A researcher asks participants to rate their satisfaction on a scale from 1 (Very Dissatisfied) to 5 (Very Satisfied). What scale of measurement is being used?
- What is role of read.table() in R.
- What is the purpose of using as.character(n) in R?
- What is the purpose of the Sys.time() function in R?

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PART – B

Answer any ONE FULL question from each unit. (4x12=48)

UNIT - I

- Explain types of function supports in R to accept input from user. (4)
 - How to declare a matrix in R? How to fill the elements row wise in a matrix? (4)
 - What is the difference between NA and NaN in R? Provide an example. (4)

3. a) What is data frame? Explain how to add new rows and columns to an existing data frame in R. (4)

b) Determine the product of following matrices

$$A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 6 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \quad (4)$$

c) Explain the role of the factor data type in R. Give an example. (4)

UNIT – II

- Write an R program to print the multiplication table for a given input. (4)
 - What is data visualization? Explain the plot function with an example. (4)
 - What is the purpose of the try() function in R? Provide an example of its usage. (4)
- Explain how to read and write files in R with examples. (4)
 - Explain different scales of measurement. (4)
 - Write and explain a simple function using R. (4)

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St Aloysius College (Autonomous)
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B.Sc. - Semester VI – Degree Examination
April/May - 2025

STATISTICS - VI(a)

Statistical Inference-II

Time: 2 1/2 Hours.

Max Marks: 60

SECTION - A

I. Answer any FIVE of the following: (5×2=10)

1. State any two properties of LRT.
2. Define Most powerful test.
3. Write the expression of test statistic of Kolmogorov-Smirnov test for one sample and explain the terms.
4. State any two uses of Non-parametric tests.
5. State any two properties of SPRT.
6. Write the expression of the test statistic of chi square test for goodness of fit and explain the terms.
7. State the probability density function of chi square distribution.

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SECTION - B

II. Answer any FIVE of the following. (5×10=50)

8. Derive the UMP test for testing $H_0:p=p_0$ Vs testing $H_1:p \neq p_0$, when the sample is drawn from a Binomial population with n known.
9. a) Derive the UMP test for testing $H_0:\theta=\theta_0$ Vs testing $H_1:\theta \neq \theta_0$, when the sample is drawn from a Poisson population.
b) Derive the UMP test for testing $H_0:\theta=\theta_0$ Vs testing $H_1:\theta \neq \theta_0$, when the sample is drawn from a Normal population.
10. a) State the merits and demerits of Non-parametric tests.
b) Explain Sign test for one sample.
11. a) Explain Friedman's test for several sample.
b) Explain Kruskal-Walli's test for several sample.
12. Derive the SPRT for testing $H_0:p=p_0$ Vs testing $H_1:p \neq p_0$, when the sample is drawn from a Binomial population with n known.
13. a) Explain the SPRT procedure.
b) Derive the SPRT for testing $H_0:\theta=\theta_0$ Vs testing $H_1:\theta \neq \theta_0$, when the sample is drawn from an Exponential population.
14. a) Explain the procedure of Chi square test for variance.
b) Explain the procedure of Chi square test for goodness of fit.

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St Aloysius College (Autonomous)
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B.Sc. - Semester VI – Degree Examination

April/May - 2025

STATISTICS - VI(b)

Sampling Techniques and Statistics for National Development

Time: 2 1/2 Hours.

Max Marks: 60

SECTION - A

I. Answer any FIVE of the following: (5x2=10)

1. Define sampling.
2. Define sampling errors with an example.
3. What is the purpose of random number tables in SRS?
4. Define an unbiased estimator with an example.
5. What is the formula for variance of estimate of population mean in Systematic sampling?
6. What are the advantages of Systematic sampling?
7. What is the significance of national income statistics?

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SECTION - B

II. Answer any FIVE of the following. (5x10=50)

8. Explain the principal steps in a sample survey.
9. a) Explain the limitations of sampling.
b) Explain (i) Random number method (ii) Lottery method of drawing random samples.
10. a) Explain with examples i) Parameter ii) Statistic iii) Sampling distribution.
b) Prove that $E(s^2) = \sigma^2$ under SRSWR.
11. Prove that under SRSWOR sample mean square is an unbiased estimator of population mean square.
12. a) Derive an expression for variance of the estimated mean under Stratified Random sampling and modify the expression using optimum allocation.
b) Show that with the cost function $C = a + \sum c_i n_i$, the variance of estimated mean $V(\bar{y})_{st}$ is minimum if $n_i \propto \frac{N_i S_i}{\sqrt{C_i}}$.
13. a) Derive the formula for variance of the systematic sample mean.
b) State the disadvantages of systematic sampling.
14. Explain the scope and content of population census of India.

(2021 batch onwards)

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**St Aloysius College (Autonomous)
Mangaluru**

B.Sc. Semester VI – Degree Examination

April/May - 2025

BOTANY – VI(a)

Plant Physiology and Biochemistry

Time: 2½ hrs.

Max Marks: 60

Note: i) Answer all the sections.

ii) Draw diagrams wherever necessary.

SECTION –A

I. Answer any FIVE of the following.

(5x2=10)

1. What is passive absorption of water.
2. What is cohesion tension theory? Who proposed it?
3. What is stroma? Mention its role in photosynthesis.
4. What is photophosphorylation?
5. Write any two practical applications of vernalization.
6. What is the difference between determinate and indeterminate growth?
7. What are amino acids?
8. What is lock and key model?

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SECTION –B

II. Answer any SIX of the following.

(6x5=30)

1. Explain plasmolysis. Write a note on its significance.
2. Describe the external factors affecting the rate of transpiration.
3. Describe the process of glycolysis.
4. Explain CAM cycle.
5. Explain the kinds of autonomic movements in plants.
6. Write a short note on artificial methods of breaking seed dormancy.
7. Describe the types of lipids.
8. Give an account on tertiary structure of proteins.

SECTION –C

III. Answer any TWO of the following.

(2x10=20)

1. Classify the carbohydrates explaining the structure and examples for each category.
2. Answer the following:
a) hydroponics b) osmotic pressure c) plant antitranspirants d) root pressure
e) symptoms due to deficiency of zinc.
3. Describe the Calvin cycle.
4. What are plant hormones? Add a brief note on discovery, chemical nature and physiological effects of auxins.

(2021 batch onwards)

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**St Aloysius College (Autonomous)
Mangaluru**

B.Sc. Semester VI – Degree Examination

April/May - 2025

BOTANY – VI(b)

Plant Biotechnology

Time: 2½ hrs.

Max Marks: 60

Note: i) Answer all the sections.

ii) Draw diagrams wherever necessary.

SECTION –A

I. Answer any FIVE of the following.

(5×2=10)

1. Mention the role of molybdenum and boron in plant tissue culture.
2. What is an antibrowning agent?
3. Name the types of batch cultures.
4. Define micropropagation and list its main stages.
5. What is SDS PAGE?
6. What is Gemini virus? Give example.
7. What is a transgenic plant?
8. What are plantibodies? Give any two examples.

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SECTION –B

II. Answer any SIX of the following.

(6×5=30)

1. Give an account on gelling agents used in plant tissue culture.
2. Assess the role of laminar air flow in minimizing contamination during tissue culture experiments.
3. Discuss the steps involved in cryopreservation.
4. Briefly explain embryo culture.
5. What are the objectives of PCR?
6. Explain Agrobacterium mediated gene transfer.
7. Evaluate the advantages and disadvantages of using gene cloning.
8. Evaluate the economic benefits of growing Bt Cotton for farmers.

SECTION –C

III. Answer any TWO of the following.

(2×10=20)

1. Explain the biotechnological approaches to manage plant disease. Add a note on its significance.
2. Describe the different sterilization techniques used in plant tissue culture.
3. Differentiate between
(i) Direct and indirect organogenesis (ii) Caulogenesis and rhizogenesis.
4. State the difference between (i) reporter and selectable marker gene
(ii) transient and stable gene expression.

St Aloysius College (Autonomous), Mangaluru**B.Sc. Semester VI - Degree Examination****April/May- 2025****ZOOLOGY- VI(a)****EVOLUTIONARY AND DEVELOPMENTAL BIOLOGY**

Time: 2 ½ hrs

Max Marks: 60

Instructions: Answer all the three sections-A, B and C

Draw Diagrams wherever necessary.

SECTION-A**I Answer any TEN of the following. (10X2=20)**

1. What do you mean by inheritance of acquired characters?
2. What is the significance of Spallanzani's experiment in disproving abiogenesis?
3. Define extinction. Give an example.
4. Mention two differences between male and female reproductive systems.
5. What are intrauterine devices (IUDs)?
6. What are the two main types of fertilization?
7. Define Cleavage. Mention its types.
8. Draw a neat labeled diagram of 18hrs chick embryo.
9. What is implantation? Where does implantation typically takesplace in the female Reproductive system?
10. Define an allantoic placenta and mention its function.
11. What is compensatory regeneration? Give an Example.
12. Differentiate between embryonic and adult stem cells.

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MANGALURU - 575 003****SECTION- B****II Answer any FOUR of the following. (4X5=20)**

1. Illustrate the role of natural selection in origin of new species.
2. Explain the process of artificial parthenogenesis and its applications.
3. Describe the Structure of hen's egg.
4. Discuss the Development of Kidney.
5. Describe menstrual cycle.
6. Compare and contrast abiogenesis and biochemical evolution.

SECTION- C**III Answer any TWO of the following. (2X10=20)**

1. Discuss comparative anatomy, embryology, and atavism as strong pieces of evidence for organic evolution with relevant examples.
2. Explain the process of oogenesis.
3. Describe the Development, Structure and function of any two extra embryonic membranes with neat labeled diagrams.
4. Define Metamorphosis. Discuss the hormonal reactivation of development in amphibians and insects.

St Aloysius College (Autonomous), Mangaluru**B.Sc. Semester VI - Degree Examination****April/May- 2025****ZOOLOGY-VI(b)****ENVIRONMENTAL BIOLOGY, WILDLIFE MANAGEMENT AND CONSERVATION**

Time: 2 ½ hrs

Max Marks: 60

Instructions: Answer all the three sections-A, B and C**Draw Diagrams wherever necessary.****SECTION-A****I Answer any TEN of the following.****(10X2=20)**

1. Define mutualism with an example.
2. What is Liebig's Law of Minimum?
3. Define homeothermy and poikilothermy.
4. What is Oligotrophic lake?
5. Differentiate between natality and mortality with examples.
6. Mention the abiotic factors responsible for formation of biomes.
7. Name any two threats to biodiversity in India
8. What is the main objective of Project Tiger?
9. List any two national parks in India.
10. Name two famous wildlife sanctuaries in India and their significance.
11. What is Red data book? Mention its importance.
12. Mention two threats that led to the decline of vulture populations.

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SECTION- B**II Answer any FOUR of the following.****(4X5=20)**

1. Elucidate on features of Biosphere reserves.
2. What essential components are needed to set up a functional aquarium ecosystem?
3. Define plankton, nekton, and benthos, giving suitable examples for each.
4. Discuss the ecological determinants (abiotic and biotic factors) that influence community structure and species distribution.
5. Explain the effect of light on plants and Animals.
6. What are the major threats to wildlife? Explain with examples.

SECTION- C**III Answer any TWO of the following.****(2X10=20)**

1. Describe the different types of ecological pyramids and their significance in ecosystem studies.
2. What are Ecotones. Elaborate on its characteristics with suitable example.
3. Compare and contrast endangered, threatened, and vulnerable species with suitable examples.
4. Explain the role of NGOs in wildlife conservation.

(2021 Batch Onwards)

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester VI – Degree Examination

April/May - 2025

MICROBIOLOGY – VI(a)

IMMUNOLOGY AND MEDICAL MICROBIOLOGY

Time: 2½ hrs.

Max Marks: 60

Instructions: Draw Diagrams wherever necessary.

Answer all three sections- A, B, and C.

SECTION – A

1. **Define/Answer any TEN of the following:** (10x2=20)
- Enumerate any four antigen-antibody reactions.
 - Define Humoral Immunity.
 - Mention two tests for the identification of *Bacillus anthracis*.
 - List two toxin-mediated infections caused by *Staphylococcus aureus*.
 - Give two examples of zoonotic infections.
 - Name the parasite and the vector causing malaria.
 - Mention any two properties of cytokines.
 - Enumerate two Rabies vaccines.
 - List two uses of monoclonal antibodies.
 - Mention two properties of Immunoglobulin G.
 - Name two antibiotics acting on cell wall synthesis.
 - Give two examples for lymphoid tissues.

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SECTION – B

Answer any FOUR of the following. (4x5=20)

- Primary (central) lymphoid organs.
- Diarrhoeagenic *Escherichia coli*.
- Infections caused by *Streptococcus pyogenes*.
- Candidiasis.
- Structure of antibody.
- Dermatophytes.

SECTION - C

Answer any TWO of the following. (2x10=20)

- Define Immunity and classify with examples.
- Explain the pathogenesis, clinical features, and laboratory diagnosis of Hepatitis B infection. Add a note on the prophylaxis.
- Describe in detail about Type I Hypersensitivity.
- Define pathogenicity and virulence. Describe the various types of infections.

(2021 Batch Onwards)

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St Aloysius College (Autonomous)

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B.Sc. Semester VI – Degree Examination

April/May - 2025

MICROBIOLOGY – VI(b)

INDUSTRIAL MICROBIOLOGY

Time: 2½ hrs.

Max Marks: 60

Instructions: Draw Diagrams wherever necessary.

Answer all three sections- A, B, and C.

SECTION – A

1. Define/Answer any **TEN** of the following:

(10x2=20)

- Glycerol stock.
- List any two objectives of culture preservation.
- Interfering components of fermentation media.
- Deep-jet fermenter.
- List two important enzymes produced by fermentation.
- Enzyme immobilisation technique.
- Baker's yeast.
- Ale.
- Strain improvement.
- Dead End filtrations.
- List any two factors that influence yield during the scale-up.
- Must.

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SECTION – B

Answer any **FOUR** of the following.

(4x5=20)

- Discuss mechanical cell disruption by high pressure homogenisation.
- Evaluate Rotary vacuum drum filter as DSP tool.
- Discuss Generator method of vinegar fermentation.
- Describe the secondary fermentation process in wine fermentation.
- Explain baffle design and function in a fermenter.
- Explain the process of developing inoculum to feed the fermenter.

SECTION - C

Answer any **TWO** of the following.

(2x10=20)

- Explain the design components of fermenter.
- Evaluate chemical methods of cell disruption.
- Describe industrial wine fermentation in detail.
- Explain culture preservation techniques.

G 510 DC1.6

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination
April - 2025

BIOCHEMISTRY – VI(a)
BIOENERGETICS AND METABOLISM

Time: 2½ Hours

Max. Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART – A

1. Answer any **FIVE** of the following.

(5×2=10)

- State the First and second laws of thermodynamics.
- What is Anaplerosis? Give example.
- Anabolic reactions consume energy. Justify your statement.
- Name the enzyme complexes of ETC.
- What are ketone bodies? Give an example.
- Write the reactions catalyzed by HMG CoA reductase.
- What are glucogenic & ketogenic amino acids? Give examples.

PART – B

Answer any **FOUR** of the following.

(4×5=20)

- Discuss on transamination and decarboxylation reactions.
- Elaborate on the structure of ATP synthase.
- Outline cholesterol biosynthesis.
- Explain briefly glycolysis (Aerobic).
- Write a note on the structure of chloroplast.
- Discuss on RNase & Phosphodiesterase.

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PART - C

Answer any **THREE** of the following:

(3×10=30)

- Explain the ultra-structure of mitochondria and add a note on uncouplers of oxidative phosphorylation.
- Explain TCA cycle.
- Explain β -oxidation of even number of saturated fatty acid.
- Explain Urea cycle.
- Discuss on De-novo biosynthetic pathway of purines.

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester VI – Degree Examination

April - 2025

BIOCHEMISTRY – VI(b)

MOLECULAR BIOLOGY AND IMMUNOLOGY

Time: 2½ Hours

Max. Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART – A

1. **Answer any FIVE of the following.**

(5×2=10)

- Write the difference between hetero and euchromatin?
- What is spontaneous and induced mutation?
- Define inducible and repressible systems.
- Write the reaction for activation of amino acids during translation
- Define epitope and haptens.
- What is complement protein? Give example.
- Write the difference between adaptive and Innate Immunity.

PART – B

Answer any FOUR of the following.

(4×5=20)

- Explain Messelson and Stahl experiment to prove semi conservative mode of replication.
- Write a note on alkylating agent and Intercalating agent.
- What are the characteristics of genetic code?
- Explain the structure of Class-I MHC molecule.
- Write a note on T-Cell maturation.
- Write a note on B-cell activation using stromal cells.

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PART - C

Answer any THREE of the following:

(3×10=30)

- Explain in detail the replication process. Add a detailed note on enzymes involved in it.
- Explain the experiments that proves DNA as a genetic material.
- Explain tryptophan operon concept.
- Explain antigen process and presentation through exogenous pathway.
- Write a note on immune cells.

(2021 Batch onwards)

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**St Aloysius College (Autonomous)
Mangaluru**

B.Sc. Semester VI – Degree Examination

April/May - 2025

BIOTECHNOLOGY – VI(a)

Immunology

Time: 2½ Hours

Max. Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART - A

1. **Answer any FIVE of the following:** (5x2=10)
- a) Define Immunology. Who is considered as the father of Immunology?
 - b) Name the different types of Mucosal Associated Lymphoid tissues.
 - c) Define superantigens. Give an example.
 - d) What are haptens?
 - e) What are killed (inactivated) vaccines? Give an example.
 - f) Name one radioactive isotope used in RIA.
 - g) Define immune suppression. Give one example.
 - h) What is typhoid? Mention the serotypes of the disease.

PART - B

Answer any SIX of the following: (6x5=30)

- 2. Write short notes on haematopoiesis.
- 3. Explain the first line of defense.
- 4. Describe Type I hypersensitivity reaction with suitable example.
- 5. Explain the mechanism by which HAT medium selects for hybridoma cells.
- 6. What is passive agglutination? Explain with an example.
- 7. Describe the ABO blood group system.
- 8. What are cancer antigens? Explain their role in cancer.
- 9. Describe systemic autoimmune disorder with an example.

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PART - C

Answer any TWO of the following: (2x10=20)

- 10. Explain Mode of infection, symptoms, epidemiology and control measures of Hepatitis B.
- 11. With a neat labelled diagram explain the cells of immune system.
- 12. Describe in detail the mechanisms of antigen processing and presentation in the cytosolic and endocytic pathways.
- 13. Explain the principle, procedure, and interpretation of radial immunodiffusion (RID). Discuss its applications.

(2021 Batch onwards)

G 511 DC3.6

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**St Aloysius College (Autonomous)
Mangaluru**

**B.Sc. Semester VI – Degree Examination
April/May - 2025**

BIOTECHNOLOGY – VI(b)

Bioprocess and Environmental Biotechnology

Time: 2½ Hours

Max. Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART - A

1. Answer any **FIVE** of the following: (5x2=10)
- Differentiate between complex media and defined media used in fermentation.
 - Name two materials commonly used in bioreactor construction.
 - Define Reverse Osmosis and mention one of its applications.
 - Define fedbatch culture.
 - Name the causative agent of cholera.
 - What is the full form of SARS?
 - What are the environmental benefits of biogas production?
 - Differentiate between in-situ and ex-situ bioremediation.

PART – B

Answer any **SIX** of the following: (6x5=30)

- Explain the concept of metabolic engineering in microbial strain improvement.
- Describe the role of filter sterilization in fermentation.
- Explain the design of a bioreactor.
- Explain the chemical and enzymatic methods of cell lysis with examples.
- Describe confirmed coliform test.
- Differentiate between Amoebiasis and Giardiasis.
- How does mycorrhiza improve plant growth?
- Discuss the role of fungal biopesticides, particularly *Beauveria bassiana*, in pest control.

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PART – C

Answer any **TWO** of the following: (2x10=20)

- Explain the growth kinetics of batch culture using relevant equations and graphical representation.
- Give an account on mode of action of *Bacillus sphaericus*.
- Describe in detail the principle, methodology and applications of gel permeation chromatography (GPC).
- Explain the role of parasitism and predation in controlling microbial populations in soil.

(2021 Batch onwards)

G 110 DC1.6/G 512 DC1.6

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**St Aloysius College (Autonomous)
Mangaluru**

B.A./B.Sc. Semester VI – Degree Examination

April/May - 2025

COMPUTER ANIMATION – VI (a)

3D RIGGING AND ANIMATION

Time : 2 ½ Hours

Max. Marks : 60

SECTION - A

Answer any **FIVE** of the following.

(5×2=10)

1. What is the use of freezing objects?
2. How to blur the particles?
3. Where do you find cycle and loop effects?
4. What is the bomb detonation?
5. What is the use of loop & Ping Pong option?
6. What is the use of ALT+X?
7. What is the use of kinematic rigid body?

SECTION - B

Answer any **FOUR** of the following.

(4×5=20)

8. How to create facial talking expression?
9. Explain Mouse running animation techniques.
10. How to create footstep animation?
11. Explain the steps to create a table fan animation.
12. How to create flag animation?
13. How to use Auto Key mode?

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SECTION - C

Answer any **TWO** of the following .

(2×15=30)

14. Write a brief note on figure mode.
15. Explain the structure of biped.
16. Write a note on static, dynamic & kinematic rigid body.

(2021 Batch onwards)

G 110 DC3.6 / G 512 DC3.6

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St Aloysius College (Autonomous)
Mangaluru
B.A./B.Sc. Semester VI – Degree Examination
April/May - 2025
COMPUTER ANIMATION – VI (b)
3D DYNAMICS AND EFFECTS

Time : 2 ½ Hours

Max. Marks : 60

SECTION - A

Answer any **FIVE** of the following.

(5×2=10)

1. List two key features of Arnold in Maya.
2. State one advantage of using MASH.
3. Mention the shortcuts to Scale and Rotate in Maya.
4. What are Bullet physics?
5. Expand MASH.
6. What is a signal node?
7. State the benefits of using nCloth in Maya.

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SECTION – B

Answer any **FOUR** of the following.

(4×5=20)

8. Analyze how MASH nodes help in signal node animation.
9. Describe the purpose and workflow of Mixamo in animation.
10. Describe the applications of MASH nodes, explain the types and key functions.
11. Explain the key features of nCloth.
12. How to create a rain simulation in Maya?
13. What are rigid bodies?

SECTION – C

Answer any **TWO** of the following .

(2×15=30)

14. What is Maya? Elaborate on its features and draw a diagram of the workspace stating the use of each sections.
15. Define the structure of nParticles and its key features with an example.
16. Explain the steps to create a dynamic simulation using mash network.

(2021 Batch Onwards)

G 513 DC1.6

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. - SEMESTER VI – Degree Examination

April/May - 2025

ECONOMICS – VI(a)

INTERNATIONAL ECONOMICS

Time: 2½ Hours.

Max. Marks: 60

SECTION - A

I. Answer any FIVE of the following:

(5×2=10)

1. Give the meaning of Leontief paradox.
2. What is tariff quota?
3. Give the meaning of terms of trade.
4. Give the meaning of economic integration.
5. What is foreign direct investment?
6. Distinguish between BOP and BOT.
7. What is managed floating exchange rate?
8. Distinguish between IMF and World Bank.

SECTION - B

II. Answer any SIX of the following:

(6×5=30)

9. Briefly explain the Heckscher- Ohlin theory.
10. Explain the arguments for free trade.
11. Briefly explain the devices of protection policy.
12. Briefly explain the types of tariffs.
13. Explain the objectives and types of dumping.
14. Explain forms and advantages of economic integration.
15. Briefly explain the non-monetary measures to correct disequilibrium in BOP.
16. Explain the advantages of FDI.
17. Briefly explain the objectives and functions of IMF.

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SECTION - C

III. Answer any TWO of the following:

(2×10=20)

18. Differentiate between internal and international trade.
19. Explain the comparative cost advantage theory.
20. Explain the various causes of disequilibrium in balance of payment.
21. Explain the advantages and disadvantages of flexible exchange rate.

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. - SEMESTER VI – Degree Examination

April/May - 2025

ECONOMICS – VI(b)

ACTUARIAL ECONOMICS

Time: 2½ Hours.

Max. Marks: 60

SECTION - A

(5×2=10)

I. Answer any FIVE of the following:

1. Define Life insurance.
2. What do you mean by capital budgeting?
3. State an example on domestic travel insurance.
4. How do you explain risk in life?
5. List out any two functions of insurance.
6. What do you mean by insurance penetration?
7. How do you explain duty insurance?
8. How do you explain duty insurance?

SECTION - B

(6×5=30)

II. Answer any SIX of the following:

9. Write a note on marine insurance.
10. Briefly explain role of insurance in economic development.
11. Write a note on motor insurance.
12. Briefly explain the case study related to livestock insurance policy.
13. Why social insurance is important? Explain with case studies.
14. Find out SPP for the following:
Cash inflows: Rs. 102500, 145000, 105000, 37000, 240000
Cash Outflow: Rs. 1027000
15. Write a note on accident insurance.
16. Why social insurance is important? Explain with case studies.
17. Briefly explain rural insurance.

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SECTION - C

(2×10=20)

III. Answer any TWO of the following:

18. Find out NPV & IRR for the following table.

YEAR	CASH INFLOW (Rs)
2019	1250000
2020	175000
2021	85000
2022	525000
2023	425000
CO	Rs 1600000

MDR = 4.5%

19. What are the growth promoting factors for insurance sector in India? Explain.
20. Explain the various types of Miscellaneous Insurance.
21. Briefly explain pet and cattle insurance: The untapped market in India with SWOT analysis.

(2021 Batch Onwards)

G 513 DC3.6

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. - SEMESTER VI – Degree Examination

April/May - 2025

ECONOMICS – VI(c)

ENVIRONMENTAL ECONOMICS

Time: 2½ Hours.

Max. Marks: 60

SECTION - A

I. Answer any FIVE of the following:

(5×2=10)

1. What do the 3Rs stand for?
2. What is the basic idea of the Limits to Growth Model?
3. Name two abiotic components of ecology.
4. Define renewable resources.
5. What is primary function of Pollution Control Board (PCB)?
6. What does the term 'Green Accounting' mean?
7. What do you mean by global warming?
8. Mention any two of the Green House Gases.

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SECTION - B

II. Answer any SIX of the following:

(6×5=30)

9. Discuss the effects of population explosion on natural resources.
10. What was the Chipko movement? Explain its significance.
11. Explain how poverty is linked with environmental degradation.
12. Discuss the role of recycling in resource conservation.
13. Explain the health hazards associated with improper waste disposal.
14. What is the importance of the Limits to Growth model?
15. Write a brief note on the Environmental Protection Act, 1986.
16. Explain how resource scarcity affects economic development.
17. Discuss the significance of hydrological cycle.

SECTION - C

III. Answer any TWO of the following:

(2×10=20)

18. Discuss the economic implications of the depletion of non-renewable resources.
19. Analyze the causes and effects of air pollution and suggest mitigation measures.
20. Evaluate the global initiatives taken to combat global warming and climate change.
21. Explain the concept of sustainable development and discuss the role of SDGs in achieving it.

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester VI – Degree Examination

April/May – 2025

FOOD SCIENCE- VI(a)

INTRODUCTION TO MEAT, FISH AND POULTRY PROCESSING

Time: 2½ Hours

Max. Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART – A

1. Answer any **FIVE** of the following. (2×5=10)
- What is the role of myoglobin in meat?
 - Define rigor mortis.
 - Name the major structural components of an egg.
 - What is Isinglass? Give its application.
 - Define meat curing.
 - What is the role of antibiotics in fish preservation?
 - Why desugaring is done in egg powder production process?

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PART – B

Answer any **SIX** of the following. (5×6=30)

- Explain the utilization of fish meal and fish oil as by-products.
- Discuss different methods of fish preservation.
- Differentiate between AA, A, and B grade eggs.
- Write a note on meat and poultry sectors in India.
- Write a note on conversion of muscle to meat.
- Describe the process of making frozen egg products.
- Explain the steps involved in the meat canning process.
- Write a note on WHC.

PART – C

Answer any **TWO** of the following: (10×2=20)

- Explain the physico-chemical properties of meat.
- Explain the mechanism of rigor mortis with the role of ATP and calcium ions.
- Elaborate on the different methods of egg preservation.

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St Aloysius College (Autonomous)**Mangaluru****B.Sc. Semester VI – Degree Examination****April/May – 2025****FOOD SCIENCE- VI(b)****WASTE MANAGEMENT IN FOOD INDUSTRY**

Time: 2½ Hours

Max. Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART – A

1. Answer any **FIVE** of the following. (2×5=10)
- What is the impact of generation of food waste on the environment?
 - Name one commonly used oxidizing agent in wastewater treatment.
 - Name two by-products obtained from cheese production.
 - Write a note on fish oil.
 - What is Landfilling?
 - Name two food waste materials commonly used for biofuel production.
 - How does flocculation help in removing impurities from wastewater?

ST ALOYSIUS COLLEGE LIBRARY
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- Explain the utilization of wastes generated from cereals and grain milling Industries.
- Explain the principle and working of reverse osmosis.
- Elaborate on the effect of higher BOD levels in wastewater.
- Discuss on wastes generated from Sugar Industry and its utilization.
- Write a note on COD and the steps involved in the measurement of COD.
- Discuss on Ion exchange treatment of water.
- Explain the different primary treatments involved in waste water treatment.
- Give an account of different solid waste disposal methods.

PART – CAnswer any **TWO** of the following: (10×2=20)

- Give an account of utilization of wastes generated from Meat and Poultry Industry.
- Write a note on the status of Waste Management in India.
- Elaborate on the working of Bioreactor using a neat labelled diagram.

(2022 Batch)

G 701 DC 1.6

Reg No

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St. Aloysius college (Autonomous), Mangaluru

B.Sc (Visual Communication) - Semester VI-Degree Examination-

April 2025

Advertising

Time:2 ½hrs

Max Marks:60

SECTION -A

Answer any **FIVE** of the following

(5x2=10)

1. Who is the visible face of an advertisement and why?
2. What is an advertising agency
3. Compare the role of text and images in an advertisement. Which elements do you think is more persuasive?
4. Design a basic segmentation strategy for a new organic skin care brand entering the market
5. How do surprise and shock draw attention to an advertisement? Give an example
6. Suggest a major selling idea for a new smart phone brand targeting young professional.
7. Differentiate between digital and traditional campaigning

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SECTION-B

Answer any **FOUR** of the following

(4x5=20)

8. Choose a product and suggest the most suitable type of Advertising and media for its proportion. Justify your choice
9. Evaluate the effectiveness of storytelling in advertising copy. Provide an example where story telling has been successfully used.
10. Analyse the relationship between art direction and visual elements in creating a persuasive advertisement. How do these elements work together?
11. Discuss how creative media can enhance the effectiveness of outdoor advertising campaign. Provide examples of how creative elements can influence the audience
12. Suppose you are launching a new product how would you utilize an advertising agency to promote it effectively?
13. Define audience analysis in advertising and list its key components

SECTION-C

Answer any **TWO** of the following.

(2x15=30)

14. Design a brief audience research plan for a new fitness app targeting young professionals.
15. Evaluate the effectiveness of social media advertising compared to traditional media
16. Create a PR campaign strategy for your university with concrete plans.

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St Aloysius College (Autonomous), Mangaluru

B.Sc. (Visual Communication) Semester VI – Degree Examination

April - 2025

Fundamentals of Film Editing

Time: 2½ hrs.

Max Marks: 60

SECTION - A

Answer any FIVE of the following.

(5x2=10)

1. J Cut
2. Editing
3. Dissolve
4. Match cut
5. MP4
6. Scaling and Positioning
7. Garūda Gamana Vrishabha Vahana

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SECTION - B

Answer any FOUR of the following.

(4x5=20)

8. Define what a rough cut and a fine cut are in the context of the editing process
9. Describe the role of selection and review in ensuring a smooth editing workflow.
10. Explain the significance of editing in film and video production.
11. In a horror film, how could you use an L-cut to build suspense before a scare moment?
12. Explain how diegetic sound enhances realism in a film.
13. Explain the different types of sounds gathered during production.

SECTION - C

Answer any TWO of the following.

(2x15=30)

14. Define Film Editing and discuss its significance in the filmmaking process. How does editing shape narrative structure and audience engagement? Provide examples
15. Explain how the editing techniques in 'Ford v Ferrari' contribute to the emotional intensity of the racing sequence.
16. How does a montage sequence help in condensing time in visual storytelling?

(2022-Batch)

G 701 DC3.6

Reg. No.

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St Aloysius College (Autonomous), Mangaluru

B.Sc. (Visual Communication) Semester VI – Degree Examination

April - 2025

Media Management

Time: 2½ hrs.

Max Marks: 60

SECTION - A

Answer any FIVE of the following.

(5x2=10)

1. Leadership in management context.
2. Technology influence in media
3. Role of trusts in media ownership
4. Media partnership
5. Role of advertisers in media
6. Media diversity
7. Gender equality in media

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SECTION - B

Answer any FOUR of the following.

(4x5=20)

8. What are the main legal considerations that affect media businesses?
9. How does leadership play a role in effective media management?
10. Explain the role of ethics and legal compliance in media management.
11. Explain the relationship between media ownership and editorial independence.
12. What is cross-media ownership & private ownership
13. How do new media platform contribute to the spread of misinformation

SECTION - C

Answer any TWO of the following.

(2x15=30)

14. Analyze the security challenges faced by media organizations in the digital age.
15. Analyze the impact of digitalization on the economics of electronic media
16. Discuss the role of mergers & acquisition in reshaping the global media industry
