

(2021 Batch Onwards)

G 501 DC1.6

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester VI – Degree Examination

May-2024

PHYSICS PAPER VI(a)

ELEMENTS OF CONDENSED MATTER AND NUCLEAR PHYSICS

Time: 2½ hrs.

Max Marks: 60

SECTION – A

Answer any **FOUR** of the following.

(4x2=8)

1. a) What are X-rays? How are they produced?
- b) Define drift velocity. Write an expression for it.
- c) Distinguish between soft and hard magnetic materials
- d) What is internal conversion? Give internal conversion equation of alpha decay.
- e) What is pair production? Write its equation.
- f) What are mirror nuclei? Give one example.

SECTION – B

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

(4x10=40)

UNIT-I

- 2.a) What are the assumptions of quantum free electron theory? Derive the expression for Fermi energy of a metal at OK. (6)
- b) State and explain Bragg's law (4)
- 3.a) With diagram explain any 3 crystal systems (6)
- b) What is Hall Coefficient? Describe an experiment to determine the Hall coefficient. (4)

UNIT-II

- 4.a) Explain B-H curve of ferromagnetic material. (6)
- b) Distinguish between type I and type II super conductors. (4)
- 5.a) Derive Clausius-Mosotti relation between Polarizability and dielectric constant. (6)
- b) Discuss different types of polarisations in a dielectric material. (4)

UNIT-III

- 6.a) Explain spin angular momentum, orbital angular momentum, total angular momentum of a nucleon and from them discuss the nuclear spin of the nucleus. (6)
- b) Explain any four characteristics of nuclear force. (4)
- 7.a) What is nuclear quadrupole moment? Explain the dependence of the shape of the nucleus on quadrupole moment. (6)
- b) Explain the paradoxes in β ray spectra. (4)

Contd...2

UNIT-IV

- 8.a) Describe the construction and working of a cyclotron. Obtain the resonance condition and obtain the expression for the final energy of the output beam. (6)
- b) With neat figure explain the construction of a LINAC. (4)
- 9.a) Describe the working of a GM tube with the necessary diagram. Explain the quenching action that takes place in the GM detector. (6)
- b) Explain the construction and working of an proportional counter. (4)

SECTION –C

Answer any THREE from the following. (3x4=12)

10. In Bragg's spectrometer, the glancing angle for second order spectrum is observed to be 24° . Calculate the wavelength of the X-ray if the crystal lattice space is 2.85×10^{-10} m.
11. A magnetic material has a magnetization of 3300 A/m and a flux density of 0.0044 T. Calculate the magnetizing field and the relative permeability of the material. **ST ALOYSIUS COLLEGE LIBRARY**
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12. Calculate the packing fraction and binding energy for ${}_8\text{O}^{16}$ nucleus. Given that mass of proton $m_p = 1.007825$ amu, mass of neutron $m_n = 1.008665$ amu. Atomic mass of ${}_8\text{O}^{16}$ is equal to 15.994516amu.
13. In a cyclotron, Dees with diameter 2m accelerate alpha particles(${}_2\text{He}^4$) to the energy of 100 MeV. Calculate the magnetic field strength and frequency of the oscillator used. Given $1\text{amu} = 1.67 \times 10^{-27}$ kg.

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St Aloysius College (Autonomous), Mangaluru

B.Sc. Semester VI – Degree Examination

May-2024

PHYSICS PAPER VI(b)

ELECTRONIC INSTRUMENTATION AND SENSORS

Time: 2½ hrs.

Max Marks: 60

SECTION – A

Answer any **FOUR** of the following.

(4×2=8)

1. a) Distinguish between line voltage and phase voltage in a three-phase system.
- b) What is feedback in a electronic system? Also define loop gain.
- c) Define a passive filter and provide an example of its application.
- d) Write any two applications of R-2R DAC?
- e) What is a transducer? How MIC acts as a transducer?
- f) Is potentiometer a transducer? Justify your answer.

SECTION – B

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

(4×10=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 a capacitor filter in minimizing the ripple. (6)
- b) Explain why a DC power supply is essential in electronic devices. Also discuss any one application where in DC power supply is used. (4)
- 3.a) What is a Cathode ray oscilloscope? Explain the advantage of using it in waveform analysis. (6)
- b) How does a single- phase power transmission system differ from a three -phase system? (4)

UNIT-II

- 4.a) Explain the operational principles of a Wien bridge oscillator. Provide a detailed analysis of the oscillator's frequency stability and distortion characteristics. (6)
- b) Explain the design and advantages of crystal oscillators, emphasizing their high frequency applications. (4)
- 5.a) Explain how high pass filter attenuates low-frequency signals while allowing high-frequency signals to pass through it. Also Provide any one example of real-world application of a high pass filter. (6)
- b) Design a first-order active low-pass filter with a cut-off frequency of 1 kHz. Provide the circuit diagram, component values and discuss its frequency response characteristics. (4)

Contd...2

UNIT-III

- 6.a) Describe the Working of a 3-bit binary-weighted digital-to-analog converter (DAC) with circuit diagram. (6)
- b) Differentiate between analog and digital signal. (4)
- 7.a) Describe the basic structure of an LCD display system, and its functioning. (6)
- b) Explain the function of comparators and encoders in flash ADC circuit. (4)

UNIT-IV

- 8.a) Explain the concept of transducers. Describe the types of transducers with suitable examples for each type. (6)
- b) Describe the working principle of a piezoelectric transducer. (4)
- 9.a) With a neat diagram, explain the construction and working principle of a photo transistor. (6)
- b) Discuss the applications of thermistors in temperature sensing. (4)

SECTION -C

Answer any THREE from the following. (3x4=12)

10. Calculate the ripple of a capacitor filter for a peak rectified voltage of 30 volt, capacitor $C=50 \mu\text{F}$ and load current of 50 mA.
11. If in a Wien bridge oscillator circuit, the resistors R_1 and R_2 are both $22 \text{ k}\Omega$, and the capacitors C_1 and C_2 are both $0.22 \mu\text{F}$, determine the frequency of oscillation.
12. Given an R-2R ladder DAC with a reference voltage of 5 volt, calculate the output voltage for a digital input of 1010 and 1100.
13. A potentiometer is used as a variable resistor in a circuit. If the total resistance is 500 ohms and the wiper is at 250 ohms from one end, what is the resistance ratio between the two segments?

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St Aloysius College (Autonomous), Mangaluru
B.Sc. CHEMISTRY -Semester VI - Degree Examination
May-2024

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 in 1 to 2 sentences. (8×1=8)

1. a) What is chelate effect? Give an example.
- b) Mention the role of calcium in biological system.
- c) State Laporte selection rule.
- d) Calculate the number of microstates in 4F .
- e) State Raoult's law.
- f) Write Gibb's phase rule and explain the terms.
- g) Draw the DTA for $CaC_2O_4 \cdot H_2O$ in oxygen atmosphere.
- h) What are radiation chemistry and ionizing radiations?

PART - B

Answer any **EIGHT** of the following questions. (8×3=24)

2. (i) Derive an expression for stepwise formation constants for a complex.
- (ii) Explain Bohr effect.
- (iii) Calculate the spectroscopic ground terms for d^2 and d^8 system.
- (iv) Write Orgel diagram for d^1 system with suitable example.
- (v) Write a note on Racah parameter.
- (vi) Explain the phase diagram of phenol-water system.
- (vii) Discuss Pattinson's process of desilverisation of lead.
- (viii) Explain the significance of DTG curves.
- (ix) Describe the relaxation methods for studying fast reactions.
- (x) Explain decomposition of ethene.

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PART - C

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

3. Describe the factors influencing the stability of complex ion.
4. What is meant by sodium potassium pump? Explain its mechanism and importance.
5. What are charge transfer spectra? Write their characteristics.
6. Explain the principle and experimental procedure for the determination of magnetic susceptibility of the solid complex by Gouy's method.
7. Explain nicotin-water system.
8. Explain the phase diagram of sodium chloride -water system.
9. Discuss the principle and instrumentation of TGA.
10. Explain the applications of radioisotopes in industry and medicine.
11. Discuss the comparative study of thermal and photochemical hydrogen-halogen reactions.

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St Aloysius College (Autonomous), Mangaluru
B.Sc. CHEMISTRY - Semester VI- Degree Examination
MAY- 2024

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 in 1 to 2 sentences. (8×1=8)

1. a) Give an example for Vilsmeier Haack reaction.
 b) Write any two biological importance of Vitamin B₆.
 c) Give the equation for the reaction of ethyl magnesium bromide with acetaldehyde.
 d) Give an example for Ziegler-Natta catalyst.
 e) State Grothus - Draper Law.
 f) What is Improper axis of symmetry?
 g) Give the selection rules for ESR spectroscopy.
 h) Predict the number of peaks in the ESR spectrum of benzene radical anion.

PART – B

Answer any EIGHT of the following questions. (8×3=24)

2. (i) Give the mechanism of Gattermann reaction.
 (ii) What are vitamins? How are they classified? Give examples for each class.
 (iii) What is benzil- benzilic acid rearrangement? Give the mechanism.
 (iv) How does an unsaturated carbonyl compound react with the organolithium reagent? Write the chemical reaction.
 (v) Explain the preparation of nylon - 6,6.
 (vi) Discuss the classification of molecules based on symmetry.
 (vii) A system absorbs 3×10^{16} quanta light per second on irradiation for 10 minutes. 0.002 moles of the reactant reacted. Calculate the quantum efficiency of the process.
 (viii) Explain photosensitization with a suitable example.
 (ix) Explain the photoelectron spectrum of NaN₃ molecule.
 (x) Write any two disadvantages of atomic absorption spectroscopy.

PART - C

Answer any SEVEN of the following questions. (7×4=28)

3. Explain the coupling reactions of diazonium salt with a suitable example.
4. How is vitamin C synthesized?

Contd...2

5. Explain the mechanism of Mannich reaction.
6. Describe the preparation of phenol formaldehyde resin and give its applications.
7. Draw Jablonski diagram and explain the following:
 - (i) interconversion
 - (ii) intersystem crossing
 - (iii) fluorescence
 - (iv) phosphorescence.
8. How do you explain the high quantum yield of hydrogen chloride?
9. Derive the matrix representation of the axis of symmetry, C_n .
10. Explain the instrumentation used in electron spin resonance spectroscopy.
11. Explain the principle of atomic emission spectroscopy. Write its advantages and disadvantages.

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St Aloysius College (Autonomous)
Mangaluru
B.Sc. Semester VI – Degree Examination
May - 2024

MATHEMATICS –VI(a)
Linear Algebra

Max Marks: 60

Time: 2½ hrs.

PART-A

(6×2=12)

Answer any SIX of the following:

1. Prove that intersection of 2 subspaces of a vector space V is a subspace of V .
2. Consider the vectors $u = (1, 2, 3)$ and $v = (2, 3, 1)$. Write $w = (1, 3, 8)$ as linear combination of u and v .
3. Write the matrix of the linear transformation defined by $(1, 0) \rightarrow (4, 0)$ and $(0, 1) \rightarrow (-1, 2)$.
4. If S and T are linear transformations then prove that their sum is also a linear transformation.
5. Let $T: V \rightarrow V$ be a linear transformation on a vector space V over the field F . Then prove that $\lambda \in F$ is an eigenvalue of T iff $T - \lambda I$ is singular.
6. If E_{λ_1} and E_{λ_2} are eigen-spaces corresponding to two distinct eigenvalues λ_1 and λ_2 respectively, then prove that $E_{\lambda_1} \cap E_{\lambda_2} = \{0\}$.
7. Prove that null space of a vector space V is a subspace of V .
8. Let $G: R^2 \rightarrow R^2$ be defined by $G(x, y) = (2x - 4y, 3x - 6y)$ Check whether G is singular or nonsingular.

PART-B

UNIT-I

Answer any TWO of the following :

(2×6=12)

1. Define Internal Direct Sum. Prove that if V is internal direct sum of U_1, U_2, \dots, U_n then V is isomorphic to $U_1 \oplus U_2 \oplus \dots \oplus U_n$.
2. Show that the set $\{(x_1, x_2, x_3), (y_1, y_2, y_3), (z_1, z_2, z_3)\}$ of vectors of vector space R^3 is linearly dependent iff $\begin{vmatrix} x_1 & x_2 & x_3 \\ y_1 & y_2 & y_3 \\ z_1 & z_2 & z_3 \end{vmatrix} = 0$.
3. Suppose U and W are finite dimensional subspaces of vector space V . Then show that $U + W$ has finite dimension and $\dim(U + W) = \dim(U) + \dim(W) - \dim(U \cap W)$.

Contd....2

UNIT- II

Answer any **TWO** of the following:

(2×6=12)

1. 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 vector in W . Then prove that there exists a unique linear transformation $T: V \rightarrow W$ such that $T(\beta_i) = \alpha_i$.
2. Prove that the dimension of the domain V is equal to rank + nullity.
3. If the matrix of the linear transformation T relative to usual basis is $\begin{bmatrix} 2 & 1 \\ -3 & 1 \end{bmatrix}$ then find the matrix of T with respect to the basis $B = \{(1, 1), (1, -1)\}$.

UNIT- III

Answer any **TWO** of the following:

(2×6=12)

1. i. Define eigenvalues and eigenvectors of a linear transformation. (2)
 ii. Let v_1, v_2, \dots, v_n be eigenvectors of the operator $T: V \rightarrow V$ corresponding to the distinct eigenvalues $\lambda_1, \lambda_2, \dots, \lambda_n$ respectively. Then prove that the set $\{v_1, v_2, \dots, v_n\}$ is linearly independent. (4)
2. Let $T: R^3 \rightarrow R^3$ be defined by ,
 $T(x, y, z) = (2x + 2y + z, x + 3y + z, x + 2y + 2z)$.
 i. Find the eigenvalues of T and its corresponding eigenvectors.
 ii. Find the matrix P such that $P^{-1}AP$ is diagonal, where A is the matrix of T .
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3. State and prove Fundamental Theorem of Homomorphism.

UNIT- IV

Answer any **TWO** of the following:

(2×6=12)

1. State and prove first isomorphism theorem of linear transformation.
2. State and prove Schwartz's inequality.
3. Let $F: R^2 \rightarrow R^2$ be defined by $F(x, y) = (2x + y, 3x + 2y)$.
 i) Show that F is nonsingular.
 ii) Find a formula for F^{-1} .

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination
May - 2024

MATHEMATICS –VI(b)

Numerical Analysis

Max Marks: 60

Time: $2\frac{1}{2}$ hrs.

PART-A

Answer any SIX of the following:

(6×2=12)

- Find the absolute error and relative error of approximating the value of e by 2.7183.
- Give the condition for convergence in iteration method.
- Define shift operator E and obtain the relation between the shift operator and forward difference operator.
- By constructing the difference table and taking 2nd order difference as constant, find the 6th term of the sequence $y = 8, 12, 19, 29, 42$.
- Write the formula for $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = x_0$ using Newton's forward difference formula.
- Using Trapezoidal rule, find the approximate value of $\int_1^3 \frac{1}{x} dx$ by dividing [1, 3] into 4 subintervals.
- Give the formula for n^{th} approximation using Picard's method for successive approximations.
- Give the formula for fourth order Runge-Kutta method.

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PART-B

UNIT-I

Answer any TWO of the following:

(2×6=12)

- Find the real root of the equation $f(x) = x^3 - 2x - 5$ using the method of bisection.
- Use Newton Raphson method to find the root of the equation $f(x) = 2x^3 - 3x - 6$ correct to 3 decimal places.
- Solve by Gauss elimination method

$$3x_1 + 2x_2 + 4x_3 = 7$$

$$2x_1 + x_2 + x_3 = 7$$

$$x_1 + 3x_2 + 5x_3 = 2.$$

Contd...2

UNIT- II

(2×6=12)

Answer any **TWO** of the following:

1. The population of a town in decennial census was as given below. Estimate the population for the year 1895.

| | | | | | |
|---------------------------|------|------|------|------|------|
| Year | 1891 | 1901 | 1911 | 1921 | 1931 |
| Population (in thousands) | 46 | 66 | 81 | 93 | 101 |

2. Derive Newton's backward difference interpolation formula.
3. a) Using Lagrange's formula, express the function $\frac{3x^2+x+1}{(x-1)(x-2)(x-3)}$ as a sum of partial fractions. (4)

b) Prepare the divided difference table for the following data:

| | | | | | |
|---|---|----|----|-----|-----|
| x | 1 | 3 | 4 | 6 | 10 |
| y | 0 | 18 | 58 | 190 | 920 |

(2)

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UNIT- III

(2×6=12)

Answer any **TWO** of the following:

1. From the following table of values of x and y, obtain $\frac{dy}{dx}$ for x = 1.0, x = 1.2 and $\frac{d^2y}{dx^2}$ for x = 2.2.

| | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|
| 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 |

2. From the following table find x, correct to 2 decimal places, for which y is maximum. Also find the maximum value of y.

| | | | | | |
|---|--------|--------|--------|--------|--------|
| x | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 |
| y | 0.9320 | 0.9636 | 0.9855 | 0.9975 | 0.9996 |

3. Derive Simpson's $\frac{3}{8}$ rule to evaluate $\int_a^b y dx$.

UNIT- IV

(2×6=12)

Answer any **TWO** of the following:

1. Solve the differential equation $\frac{dy}{dx} = x + y$, given y(1) = 0 by Taylor's series method and hence find the value of y(1.1) and y(1.2).
2. Solve the differential equation $y' = 4y^2$ with the initial condition y(0) = 1 using Euler's method and hence find the value of y(0.1), y(0.2), y(0.3), y(0.4) by taking h = 0.1.
3. Solve the differential equation $y' - 1 = y^2$ with the initial condition y(0) = 0 using Adam -Bashforth method. Also find the value of y(0.8).

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

May -2024

ELECTRONICS - VI (a)

**Transducers, Sensor networks and
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. (6x1=6)

- i. The number of total steps of a 9-bit ADC is _____.
a)255 b) 256 c) 511 d) 512
- ii. Full form of LVDT is _____.
a) Linear Voltage Differential Transmitter
b) Linear Variable Differential Transformer
c) Line Voltage Differential Transformer
d) Line Variable Different Transmitter
- iii. _____ is a major part of a Transducer.
a) Sensor. b) analog input c) digital signal d) signal conditioning device
- iv. Which of the following is the way in which an IoT device is associated with data?
a)Internet b)Cloud c)Automate d)Network
- v. Which of the following is used to capture data from the physical world in IoT devices?
a) Sensors b) Actuators c) Microprocessors d) Microcontrollers
- vi. Which of the following is not an application of IoT?
a) Wearables b)Smart Grid c) Arduino d) Smart City

2. Answer any SIX questions: (6x1=6)

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- i. A DAC has a maximum full-scale output of 15 V. What is the percentage of Resolution?
- ii. Define a Transducer.
- iii. What are the measurements a Helipot can do?
- iv. What do you mean by Piezoelectric effect?
- v. Define "Internet of Things".
- vi. Mention the benefits of IoT.
- vii. With necessary block diagram Briefly explain an Inductive transducer.
- viii. What is the largest value of output voltage from an 8-bit DAC that produces 1.0V for a digital input of 00110010?

Contd...2

3. Answer any SIX questions: (6x2=12)

- i. What is the advantage of R-2R ladder DACs over binary weighted resistors?
- ii. Which physical quantity can be measured using Rheostat?
- iii. A 5-bit DAC has a current output. For a digital input of 10100, an output current of 5mA is produced. What will I_{OUT} be for a digital input of 10101?
- iv. 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.
- v. Draw the block diagram of RFID security system.
- vi. Name any two wireless communication technologies frequently employed in IoT devices.
- vii. Draw the Generic block diagram of an IoT Device.
- viii. When was the actual term "Internet of Things" coined? and by Whom?

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

- i. With necessary diagrams explain a) Resolution and b) Percentage of Resolution
- ii. With necessary diagrams, explain digital to Analog conversion.
- iii. Mention any four differences between sensors and transducers.
- iv. Explain the Characteristics of IoT.
- v. With necessary diagrams explain a Hall effect transducer.
- vi. Explain briefly the Applications of IoT.

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Section - C**Answer any TWO full questions (10x2=20)**

- 5.a) With a circuit diagram, explain the working of R-2R ladder network (5) circuit and hence give the expression for the output voltage.
- b) With a circuit diagram, explain Binary weighted resistor DAC and hence (5) give the expression for the output voltage.
- 6.a) With a circuit diagram, explain (5)
 - a) Strain gauge and b) Potentiometric resistive transducer.
 - b) With necessary diagram Briefly explain Pizo electric Transducer. (5)
- 7.a) With necessary diagram, explain the different Components of IoT. (5)
- b) With necessary block diagram Briefly explain Logical design of IoT. (5)

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**St Aloysius College (Autonomous)
Mangaluru**

**B.Sc. Semester VI- Degree Examination
May-2024**

ELECTRONICS - VI (b)

C Language & Signals and systems

Time: 3 Hours

Max. Marks: 60

Note: This question paper has Three sections. Section – A, Section – B and Section – C. Answer all sections.

Section – A

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

- i) Arrays are _____ type of data in C language.
(a) derived (b) user defined (c) void (d) primary
- ii) The field specifier %d is used for _____ type data.
(a) void (b) integer (c) real (d) string
- iii) _____ is a key word in C language.
(a) integer (b) alphabet (c) main (d) float
- iv) The C statement a+=1; is same as.
(a) a=a+0; (b) a=a+2; (c) a=a+a; (d) a=a+1;
- v) -14%3=_____ in C language.
(a) 2 (b) -2 (c) 4 (d) -4
- vi) If a[10] = {100}; then value of a[1] is _____.
(a) 100 (b) 0 (c) garbage value (d) wrong statement

2. Answer any SIX of the following

(6×1=6)

- i) Write the syntax of if-else statement.
- ii) Mention any two integer data types used in C language.
- iii) Write the C statement for equation $Z = a^2b^2 + a^2/2b + 3a + 3c$.
- iv) Give an example for entry controlled loop in C language.
- v) Write the output of C language statement **printf("%d", A);**
- vi) Write a C language program to print the length of a String.
- vii) Define a periodic signal.
- viii) What is meant by an even signal?

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3. Answer any SIX of the following

(6×2=12)

- i) Define 'signal' and give at least two examples of commonly used signals.
- ii) Distinguish between a energy signal and power signal.
- iii) What is meant by infinite loop in C language?
- iv) Distinguish between local variables and global variables.
- v) Mention the rules to be followed while framing variable names in C language.
- vi) Write a C program to check whether the input integer is odd or even.
- vii) With syntax and example, explain the strcpy() function in C language.
- viii) Explain the function header in C user defined functions.

Contd...2

Section – B

4. Answer any FOUR questions

(4×4=16)

- i) Distinguish between continuous-time and discrete-time signals. Give two examples for each type.
- ii) With syntax and example, explain the **for** statement in C language.
- iii) With an example explain how user defined function can be written to pass two parameters into the function and to get one return value to the main program.
- iv) Write a C program to accept two strings, concatenate them and and print all the three strings.
- v) Write a program to accept 10 integers from the key board and sort them in ascending order using bubble sort method. Print the original array and sorted array.
- vi) Explain any two elementary signals.

Section – C

Answer any TWO full questions

(10×2=20)

5. a) With an example explain a user defined function with return value and parameters. (6)
- b) Write a C language program to accept the coefficients of a quadratic equation and print the real roots. (4)
6. a) With necessary examples explain various data types in C language. (6)
- b) What is meant by a recursive function? Explain with an example. (4)
7. a) Give the block diagram of communication system and explain the signal and system interaction. (6)
- b) With necessary examples explain periodic and non periodic signals. (4)

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester VI – Degree Examination

MAY -2024

COMPUTER SCIENCE- VI(a)

Web Technologies

Time: 2 ½ hrs.

Max Marks: 60

PART -A

1. Answer any **SIX** of the following. (6X2=12)
- How do you create a numbered list in HTML?
 - Define ROWSPAN attribute of <TABLE> tag.
 - Define XML, Give an example for XML Syntax.
 - Write the syntax for CSS Linear Gradient with example
 - How do we initialize Arrays In Java Script?
 - List out the JavaScript Operators.
 - List out four techniques used in Session tracking.
 - List out 2 types of cookies in servlets.

PART -B

Answer any **ONE FULL** question from each unit 12 marks each (4x12=48)

UNIT - I

- Explain ordered and unordered list with example. (4)
 - Explain the following form elements. (4)
 - password
 - checkbox
 - radio button
 - List and explain any four text formatting tags in HTML. (4)
- How do you create internal links in html document? Explain. (4)
 - Explain any two HTML Form Control tags with example. (4)
 - Explain Table tag with suitable example. (4)

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UNIT - II

- Explain in detail about CSS Box Model with structure (4)
 - Write the importance of CSS specificity in determining which styles are applied to HTML elements. Provide an example to demonstrate how specificity affects style precedence (4)
 - Distinguish between XML and HTML. (4)
- Explain the three Ways to insert CSS (4)
 - Explain the different properties of 2D transition. (4)
 - Write a note on XML elements. (4)

Contd.2

UNIT – III

6. a) Write a note Java Script data types. (4)
 b) Explain any three Browser Object Model in JavaScript. (4)
 c) List out Selection Statement in JavaScript and explain each syntax with programming example. (4)
7. a) Explain any two looping statements in Java Script. (4)
 b) Describe exception handling in Java Script. (4)
 c) Define JavaScript variable, and explain four different types of variables and snippet the code. (4)

UNIT – IV

8. a) Explain in details about Life of a servlets with structure (4)
 b) Define Cookies in Servlet and Explain how Cookies works? (4)
 c) Explain the following form elements. (4)
 a) SQL injection
 b) XML injection
9. a) Briefly describe Java Database connectivity with five steps. (4)
 b) List out Types of XSS and explain with details (4)
 c) List out the methods of cookies class in detail. (4)

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St Aloysius College (Autonomous)**Mangaluru****B.Sc. Semester VI – Degree Examination****May -2024****COMPUTER SCIENCE –VI (b)****Statistical Computing & R Programming**

Time: 2½ Hrs.

Max Marks: 60

PART –A1. Answer any SIX of the following. (6X2=12)

- Write an R command to access the element in the second row and third column of a matrix named my matrix.
- How would you create a character vector containing the names "Alice," "Bob," and "Charlie"?
- Describe the purpose of the plot function in R.
- Describe any two operators that can be used to extract subsets of R objects.
- Write a R code to calculate mode of (1, 2, 2,2, 3, 3, 4, 5, 5, 5)
- What is variance? Write the formula to calculate variance.
- What is level of significance in statistical inference and hypothesis testing?
- What is Null hypothesis? Give an example.

ST ALOYSIUS COLLEGE LIBRARY**MANGALURU - 575 003****PART –B**Answer any ONE FULLquestion from each unit 12marks each(4x12=48)**UNIT - I**

- What are special values? Explain with an example. 4
 - Write a R program to extract the specified data from data frame 4
 - Extract 3rd column information
 - Extract 3rd & 4th values of 2nd column
 - Explain different data structures in R. 4
- Explain how the all() and any() functions are used in R ? Provide an example to each . 4
 - What is data frame? Explain how to add new rows and columns to an existing data frame in R. 4
 - Demonstrate how different types of operators are used in R with suitable examples. 4

Contd..2

UNIT – II

4. a) Describe 'for' statement in R. 4
 b) Write a R Program to perform set operations using vectors. 4
 c) What is exception handling in R? Explain with an example. 4
5. a) With an example, explain different types of user-defined functions in R. 6
 b) What is data visualization. Explain with example plot function. 6

UNIT – III

- 6.a) With neat graphs explain the concepts of Skewness and Kurtosis. 6
 b) Write the notes on following: 6
 i. Event
 ii. Independent Events
 iii. Complementary Events
7. a) What is Z-Score? Write the R code to calculate Z Score for c(6, 7, 7, 12, 13, 13, 15, 16, 19, 22). 6
 b) How to get Pearson's sample correlation coefficient? Write a R program to calculate Pearson's sample correlation coefficient of following data 6
 xdata <- c(2,4,4,3,3,2,2,2,2,4)
 ydata <- c(1,4,4,1,3,2,2,2,2,7)

UNIT – IV

8. a) Explain the types of hypotheses. 6
 b) Explain different types of Correlation with suitable scatter diagram. 6
9. a) Explain positive correlation, negative correlation and perfect correlation in R with suitable example. 6
 b) Explain type I and Type II errors. 6

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination

May - 2024

STATISTICS – VI(a)

STATISTICAL INFERENCE II

Time: 2 1/2 Hours.

Max Marks: 60

Note: Answer all parts

PART – A

I. Answer any FIVE of the following: (2x5=10)

- State any two properties of Likelihood Ratio Test.
- Verify whether the Poisson distribution belongs to an exponential family.
- State the large sample approximation of Median test.
- Why Wilcoxon signed rank test is more powerful than sign test?
- Write a note on Yate's Correction for continuity in test for independence of attributes.
- Write the expressions for strength of SPRT.
- Define ASN and OC function.

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PART – B

II. Answer any FIVE of the following. (10x5=50)

- Prove that Normal Distribution follows MLR property. (5)
 - Derive the likelihood ratio test for testing $H_0: \theta = \theta_0$ Vs $H_1: \theta = \theta_1$, where θ is the parameter of $N(\mu, \sigma^2)$ and variance is unknown. (5)
- Derive the likelihood ratio test for testing the equality of variances with unknown means, when the two samples are drawn from two independent Normal Populations. (7)
 - Derive the UMP test for $H_0: \theta = \theta_0$ Vs $H_1: \theta = \theta_1$ when the sample is drawn from a Poisson population. (3)
- State the merits and demerits of Non-parametric tests. (5)
 - Write the test procedure of one sample sign test. (5)
- Explain the Kolmogorov-Smirnov two sample test. (5)
 - Explain the test procedure of Wilcoxon-Mann-Whitney U-test. (5)
- Derive Brandt Snedecor's formula for 2xk contingency table. (6)
 - Derive the SPRT for testing $H_0: \theta = \theta_0$ Vs $H_1: \theta = \theta_1$ when the sample is drawn from a Bernoulli population. (4)
- State any two advantages of sequential sampling. (2)
 - Derive the SPRT for testing $H_0: \sigma = \sigma_0$ Vs $H_1: \sigma = \sigma_1$ when the sample is drawn from $N(\mu, \sigma^2)$. (8)
- Derive the test statistic for testing independence of attributes in a 2X2 contingency table. (6)
 - Briefly explain the Chi-square test of goodness of fit. (4)

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St Aloysius College (Autonomous)
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B.Sc. Semester VI – Degree Examination
May - 2024
STATISTICS – VI(b)
SAMPLING TECHNIQUES AND STATISTICS
FOR NATIONAL DEVELOPMENT

Time: 2 1/2 Hours.

Max Marks: 60

Note: Answer all parts

PART – A**I. Answer any FIVE of the following: (2x5=10)**

1. State the types of errors in sampling.
2. Prove that in SRSWR sample mean is an unbiased estimator of population mean.
3. Write a note on sampling of attributes.
4. Briefly explain the types of allocation under Stratified random sampling.
5. State any two merits of systematic sampling.
6. State any two functions of CSO.
7. State the methods of estimation of National Income.

PART – B**II. Answer any FIVE of the following. (10x5=50)**

8. a) Briefly explain the principles of sample survey. (5)
- b) Derive the sample-size for given margin of error in estimate and the confidence coefficient $(1 - \alpha)$. (5)
9. a) State the advantages of sample survey over census survey. (4)
- b) Prove that under SRSWOR, sample mean square is an unbiased estimator of population mean square. (6)
10. Derive the formula of variance of the estimate of the population variance under SRSWOR and hence compare the efficiency of SRSWOR with that of SRSWR. (10)
11. a) Briefly explain the sampling of attributes and derive the formula variance of the estimate of the population proportion. (4)
- b) Derive the formula of $V(\bar{y}_{st})$ and hence find the variance of the sample mean under optimum allocation. (6)
12. a) With a cost function $c = a + c_i n_i$, prove that the variance of the estimated mean is minimum when $n_i \propto \frac{N_i S_i}{\sqrt{c_i}}$. (5)
- b) Show that systematic sampling is more efficient than SRSWOR if $S_{sys}^2 \geq S^2$. (5)
13. Prove that $V(\bar{y}_{st}) \leq V(\bar{y}_{sys}) \leq V(\bar{y})_{SRS}$, when there is a linear trend of the form $Y_i = \mu + i\theta, i = 1, 2, \dots, N$, is present in the population. (10)
14. a) Write a note on production statistics. (2)
- b) Explain the scope and content of census in India. (8)

(2021 batch onwards)

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St Aloysius College (Autonomous)**Mangaluru****B.Sc. Semester VI – Degree Examination****May - 2024****BOTANY – VI(a)****PLANT PHYSIOLOGY AND BIOCHEMISTRY**

Time: 2½ hrs.

Max Marks: 60

SECTION –A**I. Answer any FIVE of the following.****(5x2=10)**

1. What is plasmolysis? Mention its significance.
2. Enlist two deficiency symptoms of Nitrogen.
3. Define action spectrum.
4. State the law of limiting factors.
5. What are recalcitrant seeds? Give an example.
6. Write any two physiological effects of ethylene.
7. What are fatty acids? Give an example.
8. Write the structure of ribose sugar.

SECTION –B**II. Answer any SIX of the following.****(6x5=30)**

1. What are minor elements? Explain the role of Mn and Zn in plants.
2. Discuss the significance of transpiration.
3. Give an account of cyclic photophosphorylation.
4. Write a note on photorespiration.
5. What are nastic movements, and how do they differ from tropic movements? Provide examples of nastic movements observed in plants.
6. What is vernalisation? Write a note on its practical applications.
7. Discuss the primary, secondary, tertiary, and quaternary levels of protein structure and provide examples of proteins belonging to each category.
8. Write a note on classification of enzymes.

SECTION - C**III. Answer any TWO of the following.****(2x10=20)**

1. Describe cohesion-tension theory. Add a note on its merits and demerits.
2. Explain the following:
 - a) Hatch-Slack pathway
 - b) Glycolysis
3. What is seed dormancy? Explain the causes and methods of breaking seed dormancy.
4. Explain the structure of starch and cellulose. Write a note on its importance.

(2021 batch onwards)

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination
May - 2024

BOTANY – VI(b)
PLANT BIOTECHNOLOGY

Time: 2½ hrs.

Max Marks: 60

SECTION – A**I. Answer any FIVE of the following. (5x2=10)**

1. Define Callus. Mention its types.
2. Write the principle used in LAF.
3. What is Embryo rescue?
4. Differentiate between hybrids and Cybrids.
5. Mention any two ethical issues raised in GMO's.
6. What is shot gun method?
7. What is Herbicide tolerance? Give an example.
8. Mention four applications of Synthetic seeds.

SECTION – B**II. Answer any SIX of the following. (6x5=30)**

1. Give a general account of Organogenesis.
2. Explain the concept of Cell theory and Totipotency. Add a note on Redifferentiation.
3. Explain i) Haploid culture ii) Continuous cultures
4. Explain the steps involved in meristem culture technique. Add a note on its significance.
5. Write a note on i) *psy* gene ii) Polygalactronase
6. Briefly elaborate the process of Protein blotting
7. Discuss in brief the development of transgenic plants for the resistance against virus and bacteria.
8. Write a note on i) Edible vaccines ii) Biofertilizers.

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SECTION - C**III. Answer any TWO of the following. (2x10=20)**

1. Explain
 - i) Agar-Agar ii) Lux meter iii) Explant iv) Biosafety v) Auxin.
2. Discuss the method of isolation and purification of protoplast for protoplast culture.
3. Explain i) Ti plasmid ii) PCR
4. Briefly explain Bioremediation with reference to waste management.

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St Aloysius College (Autonomous), Mangaluru

B.Sc. Semester VI- Degree Examination

May- 2024

ZOOLOGY - Paper VII

EVOLUTIONARY AND DEVELOPMENTAL BIOLOGY

Time: 2 ½ hrs

Max Marks: 60

Note: 1. Answer any **ten** questions from Part-A, any **four** questions from Part- B and any **two** questions from part-C.

2. Draw diagrams wherever necessary.

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

- Define gene flow
- Give any two characters of *Homo erectus*.
- Write two functions of sertoli cells.
- What are accessory sex organs? Give an example.
- What are morphogenic movements? Mention any two of them.
- What is blastopore? Give its significance.
- What are extra embryonic membranes? Name them.
- Define monospermy. Where do you find it?
- What is morula? Where do you find it?
- What are stem cells? Name any two types.
- Mention any two causes of aging.
- Write a note on Tubectomy

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

- Explain the mechanism of isolation.
- Write a note on micro and macroevolution.
- Comment on the Fate map of frog's Blastula with a neat labeled diagram.
- Explain menstrual cycle in humans.
- Discuss twins and multiple births.
- Give an account on metamorphosis in amphibians.

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

- Discuss the conclusions of Lamarckism and Darwinism.
- Draw a neat labeled diagram of hen's egg and explain the structure.
- Describe the structure and functions of placenta.
- Explain the process of oogenesis with suitable diagram.

(2021 batch onwards)

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St Aloysius College (Autonomous), Mangaluru**B.Sc. Semester VI - Degree Examination****May- 2024****ZOOLOGY - Paper VIII****ENVIRONMENTAL BIOLOGY, WILDLIFE MANAGEMENT AND CONSERVATION****Time: 2 ½ hrs****Max Marks: 60****Note:** 1. Answer any **ten** questions from Part-A, any **four** questions from Part- B and any **two** questions from part-C.

2. Draw diagrams wherever necessary.

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

- a) Define cyclomorphosis.
- b) What are natural and man engineered ecosystem?
- c) State the second law of thermodynamics.
- d) Name the two major freshwater habitats.
- e) Define community. Explain Community structure.
- f) With reference to population, define mortality and nataliy
- g) What is habitat degradation?
- h) List out any four needs for wildlife conservation.
- i) Name any two wildlife sanctuaries of Karnataka.
- j) What is conservation breeding?
- k) Name the governmental organization engaged in Wildlife Conservation.
- l) Expand IUCN

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

- a) Write short notes on Commensalism and Parasitism.
- b) Explain the Zonation of sea.
- c) Explain the concept of the Red Data Book and its significance in wildlife conservation.
- d) Give a brief account of ecological niches.
- e) Explain briefly the various international conventions and treaties related to nature and conservation.
- f) Comment on Project Tiger and Project Rhino.

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- a) What are food chains? Explain the various types of food chains with the help of schematic representation.
- b) With reference to population ecology, explain population density, natality, morality, age distribution and population growth curves.
- c) Give an account of national parks in India.
- d) Write an explanatory note on Wildlife protection act 197 and Ex-situ & In-situ conservation of wildlife.

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St Aloysius College (Autonomous)**Mangaluru****B.Sc. Semester VI –Degree Examination****May - 2024****MICROBIOLOGY – VI(a)****Immunology & 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)
- Define Agglutination with two examples
 - Give two examples of live attenuated vaccines
 - Define acquired immunity and classify
 - Give two examples of infections transmitted through droplet infection
 - Name two antibiotics inhibiting protein synthesis
 - Contact Dermatitis
 - Name two antimalarial drugs
 - Name any two enzymes produced by *Staphylococcus aureus*
 - Mention two dermatophytes
 - List two differences between T cells and B cells
 - Mention two differences between exotoxin and endotoxin
 - Name any two congenital viral infections

SECTION – BAnswer any **FOUR** of the following (4x5=20)

- Enzyme linked immunosorbent assay
- Phagocytosis
- Anaphylaxis
- Laboratory diagnosis of intestinal amoebiasis
- Pathogenesis of cholera
- Serological markers in Hepatitis B infection

SECTION - CAnswer any **TWO** of the following (2x10=20)

- Describe the pathogenesis and laboratory diagnosis of malaria
- Give a detailed account of the innate immune mechanisms
- Describe the Radial Immunodiffusion Technique.
- Explain the pathogenesis and laboratory diagnosis of Enteric fever

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(2021 batch onwards)

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St Aloysius College (Autonomous)**Mangaluru****B.Sc. Semester VI –Degree Examination****May -2024****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: (10×2=20)
- Industrial Microbiology
 - Inoculum development
 - Koji
 - Packed bed reactor
 - Sampling methods
 - Inducers
 - Hormones
 - Enzymes
 - Product testing
 - Malting
 - Types of wine
 - Baker's Yeast

SECTION – BAnswer any **FOUR** of the following. (4×5=20)

- Write a short note on the preservation of industrially important microbes
- Write a short note on Batch fermentation
- Write briefly on membrane bioreactors and their applications
- List and mention the steps in extraction and purification of the product
- Write briefly on Fermentation processes of wine
- Write a short note on Production of Vinegar by Orleans's method

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SECTION - CAnswer any **TWO** of the following (2×10=20)

- Explain in detail the submerged fermentation
- List and describe natural and synthetic media
- Explain in detail the Enzyme immobilization techniques in industrial processing
- Write in detail about beer production in industries

(2021 Batch onwards)

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**St Aloysius College (Autonomous)
Mangaluru**

B.Sc. Semester VI – Degree Examination

May - 2024

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. (2×5=10)
- What is oxidative phosphorylation? Give an example.
 - Enlist the differences between Photosystem I & II.
 - How does cell synthesize glucose in absence of carbohydrate diet?
 - Define Cori cycle.
 - Why should fatty acids be activated before β -oxidation?
 - Under what circumstances ketone bodies are formed?
 - Diagrammatically indicate the sources of atoms in purine ring structure.

PART – B

Answer any **FOUR** of the following. (5×4=20)

- Write a note on structure of chloroplast.
- Discuss on ATP synthase complex with functions.
- Schemate Pentose phosphate pathway.
- Explain the reactions of TCA cycle.
- Elaborate on Denovo biosynthesis of IMP.
- Outline cholesterol biosynthesis.

PART - C

Answer any **THREE** of the following: (10×3=30)

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- Discuss on complexes of ETC and indicate the sites of energy production.
- Outline gluconeogenesis. Explain entry of fructose into glycolytic pathway.
- What is β -oxidation? Explain β -oxidation of saturated fatty acid with energetics.
- Describe Urea cycle in detail.
- Write short note on i) Salvage pathway of pyrimidines ii) Glycogenolysis

(2021 Batch onwards)

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**St Aloysius College (Autonomous)
Mangaluru**

B.Sc. Semester VI – Degree Examination

May - 2024

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. (2×5=10)
- Define cistron and recon.
 - Mention the enzymes involved in replication.
 - Define mutation and mention types of mutation.
 - What is Wobble hypothesis?
 - Mention different classes of Antigens.
 - What are NK cells? Give the functions.
 - Mention professional and non-professional APC.

PART – B

Answer any **FOUR** of the following. (5×4=20)

- Explain Hershey and Chase experiment to prove DNA as a genetic material.
- Explain clinical stages of graft rejection.
- Write a detailed note on chemical and physical mutagens.
- Write about Rho dependent and independent termination of transcription.
- Explain the factors that influence immunogenicity of antigen.
- Explain structure of B-Cell receptors.

PART - C

Answer any **THREE** of the following: (10×3=30)

- Explain the types and functions of Immunoglobulin.
- Write the various steps in prokaryotic translational process.
- Explain Lac operon concept.
- Explain B-cell maturation and activation (T dependent only).
- Explain antigen process and presentation through endogenous pathway.

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester VI – Degree Examination
May - 2024

BIOTECHNOLOGY-VI (a)
IMMUNOLOGY

Time: 2 ½ Hours

Max. Marks: 60

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART - A1. Answer any **FIVE** of the following: (5×2=10)

- Define humoral immunity.
- How do natural killer cells differ from T-cytotoxic cells?
- What are cytokine? Give an example.
- Differentiate between immunogenicity and antigenicity
- Define agglutination.
- Define DNA vaccine. Give an example.
- Differentiate between primary and secondary immunodeficiencies.
- What are cancer antigens?

PART - BAnswer any **SIX** of the following: (6×5=30)

- What are three major types of T-cells? Describe their function
- Explain phagocytosis.
- Illustrate the general structure and domains of class I MHC molecule with the help of neat diagram
- Write short note on interferons.
- Comment on active and passive immunization.
- Comment on ELISA.
- Differentiate between systemic and organ-specific autoimmune disorders.
- Write a short note on Hepatitis-B viral infection.

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

- Explain the cells of myeloid lineage system.
- Describe the hybridoma technology for the production of monoclonal antibodies.
- Explain different types of vaccines.
- Elaborate on the nature, causes, and progression of acquired immunodeficiency syndrome

G 511 DC3.6

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St Aloysius College (Autonomous)
Mangaluru
B.Sc. Semester VI – Degree Examination
May -2024

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: (5×2=10)
- What are precursors in fermentation media?
 - Write any two applications of airlift bioreactors.
 - Define reverse osmosis.
 - Comment on Giardiasis.
 - Define Del factor.
 - Write two applications of seaweed.
 - What is SARS?
 - Name any two organisms with biopesticide action.

PART - B

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

- Give an account on the principle and methodology involved in lyophilisation technique
- Write a note on *ex-situ* bioremediation
- Briefly comment on cell immobilization technique.
- Write a short note on the microbial production of Penicillin.
- Comment on batch sterilization of media
- Give an account on vermicomposting
- Comment on strain improvement using auxotrophic mutant selection.
- Write a short note on the microorganisms involved in positive interactions.

PART - C

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

- Describe the various methods of cell lysis.
- Explain the growth kinetics of microorganisms in a batch culture.
- Describe the steps involved in analysis of water.
- Give an account on the production of Rhizobial biofertilizer.

(2021 Batch onwards)

G 110-DC-1.6/G 512DC 1.6

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St Aloysius College (Autonomous)
Mangaluru

B.A./B.Sc. Semester VI- Degree Examination
May -2024

COMPUTER ANIMATION – VI (a)
3D Rigging & Animation

Time: 2½ hrs.

Max Marks: 60

PART - AAnswer any **FIVE** of the following.**(5x2=10)**

1. a) What is the use of Time Configuration?
- b) What is copy posture under biped?
- c) What is the use of detonation in bomb?
- d) What is the use of linking objects?
- e) Name the different body types of biped.
- f) What is the use of ALT+X?

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PART - BAnswer any **FOUR** of the following.**(4x5=20)**

2. Explain the steps to create a flower pot cracker
3. Write down the steps of creating table fan animation.
4. How to create the snooker game animation? Write the steps.
5. How to create flag flying animation? Explain the steps
6. Write a note on footstep animation

PART - CAnswer any **THREE** of the following:**(3x10=30)**

7. Write a note on Rigging process.
8. Explain briefly about curve editor & dope sheet.
9. Write a note on figure mode & structure of Biped.
10. Write a brief note on MassFx.

(2021 Batch onwards)

G 110.DG3:6/G 512 DC3.6

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St Aloysius College (Autonomous)

Mangaluru

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

May - 2024

COMPUTER ANIMATION – VI (b)

3d Dynamics & Effects

Time: 2½ hrs.

Max Marks: 60

PART - A

Answer any **FIVE** of the following.

(5x2=10)

1. a) Explain about Maya Dynamics?
- b) What role do particles play in Maya Dynamics?
- c) What is the use of transform constraint?
- d) Name two types of rigid bodies
- e) What are Soft Bodies in Maya, and when are they used?
- f) Define MEL and explain how is it related to Maya Dynamics.

PART - B

Answer any **FOUR** of the following.

(4x5=20)

2. Write down the steps to create water ripple simulations.
3. Explain the concept of Rigid Body Dynamics in Maya.
4. Explain the difference between Rigid Body Dynamics and Soft Body Dynamics in Maya. Provide an example of when you might use each.
5. Explain how particle systems in Maya are used in visual effects.
6. What is the purpose of the nCloth system in Maya.

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PART - C MANGALURU - 575 003

Answer any **THREE** of the following:

(3x10=30)

7. What tools and features does Maya offer for dynamics and effects.
8. Explain the concept of a 'driver' and 'driven' in set driven key animation
9. Write a note on maya dynamics.
10. Explain the Process of Simulating Cloth Interacting with Wind in Maya.

(2021 Batch Onwards)

G 513 DC1.6

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**St Aloysius College (Autonomous)
Mangaluru**

**B.Sc.- SEMESTER VI – Degree Examination
May - 2024**

ECONOMICS –VI (a)

ACTUARIAL ECONOMICS

Time: 2½ Hours.

Max. Marks: 60

SECTION - A

I. Answer any FIVE of the following:

(5×2=10)

1. What do you mean by insurance?
2. How do you explain risk in life?
3. List out any two functions of insurance.
4. Give the meaning of insurer and insured.
5. Briefly explain insurance density?
6. What is general insurance?
7. State any two features of life insurance.
8. What do you mean by capital budgeting?

SECTION - B

II. Answer any SIX of the following:

(6×5=30)

9. Write a note on principles of insurance.
10. Briefly explain role of insurance in economic development.
11. Briefly explain the case study related to health insurance scam in Mumbai.
12. Explain the various types of insurance frauds in the market.
13. Write a note on accident insurance.
14. Briefly explain rural insurance.
15. Briefly explain IRR and PI criteria in capital budgeting.
16. Find out SPP for the following table

| YEAR | CASH INFLOW |
|------|--------------|
| 2017 | 1000000 |
| 2018 | 150000 |
| 2019 | 100000 |
| 2020 | 400000 |
| 2021 | 200000 |
| CO | Rs 15,00,000 |

17. Find out DPP for the following table

| YEAR | CASH INFLOW |
|------|-------------|
| 2017 | 9000 |
| 2018 | 15000 |
| 2019 | 7000 |
| 2020 | 40000 |
| 2021 | 20000 |
| CO | Rs 17000 |

Contd...2

SECTION – C

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

- 18. Briefly explain the benefits of the life insurance.
- 19. What is the growth promoting factors for insurance sector in India? Explain.
- 20. Briefly explain pet and cattle insurance: The untapped market in India with SWOT analysis.

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21. Find out NPV for the following table.

| YEAR | CASH INFLOW (Rs) |
|------|---------------------|
| 2016 | 1200000 |
| 2017 | 170000 |
| 2018 | 80000 |
| 2019 | 500000 |
| 2020 | 400000 |
| CO | Rs 1600000 |

MDR = 4%

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MANGALURU – 575 003

(2021 Batch Onwards)

G 513 DC2.6

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. SEMESTER VI – Degree Examination

May - 2021

ECONOMICS –VI (b)**INTERNATIONAL ECONOMICS**

Time: 2½ Hours.

Max. Marks: 60

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

1. Define international trade.
2. What is Leontief's paradox?
3. Give the meaning of import license.
4. Distinguish between unilateral and bilateral quota.
5. List out the forms of economic integration.
6. Distinguish between balance of payment and balance of trade.
7. Distinguish between fixed and flexible exchange rates.
8. Write any two objectives of WTO.

SECTION - B**II. Answer any SIX of the following:****(6×5=30)**

9. Briefly explain the significance of international trade.
10. Briefly explain the opportunity cost theory of international trade.
11. Explain the factors determining terms of trade.
12. What is dumping? Explain the various anti-dumping measures.
13. Briefly explain the various types of tariffs.
14. Explain the arguments against protection.
15. Briefly explain the advantages of fixed exchange rate.
16. Write a note on foreign direct investment.
17. Briefly explain the objectives and functions of World bank.

ST ALOYSIUS COLLEGE LIBRARY**MANGALURU - 575 003****SECTION - C****III. Answer any TWO of the following:****(2×10=20)**

18. Explain the difference between internal and international trade.
19. What is free trade policy? Explain the advantages of free trade.
20. Explain the causes of disequilibrium in balance of payment.
21. Explain the purchasing power parity theory.

(2021 Batch Onwards)

G 513 DC3.6

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St Aloysius College (Autonomous)**Mangaluru****B.Sc.- SEMESTER VI – Degree Examination**

May - 2024

ECONOMICS – VI (c)**ENVIRONMENTAL ECONOMICS**

Time: 2½ Hours

Max. Marks: 60

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

1. Define Environment.
2. What are abiotic components environment?
3. What do you mean by energy pricing?
4. What are the 3 R principles?
5. What do you mean by solid waste?
6. Which are the three types of bio diversity?
7. Who is the leader of Chipko movement?
8. Write the names of any two NGOs which strive to protect the environment.

SECTION - B**II. Answer any SIX of the following: (6×5=30)**

9. Write a note on the elements of ecology.
10. Write a note on food, hydrological and carbon cycles.
11. Write a note on Rio-summit.
12. Write a note on the depletion of natural resources.
13. Write a note on recycling measures.
14. Which are the three types of bio diversity?
15. Write a note on different types of solid waste management.
16. Explain the functions of State Pollution Control Boards in India.
17. Write a note on various environmental regulations in India?

ST ALOYSIUS COLLEGE LIBRARY**MANGALURU - 575 003****SECTION - C****III. Answer any TWO of the following: (2×10=20)**

18. Explain the linkages between Environment and the Economy.
19. What do you mean by energy resources? Explain the various kinds of energy resources.
20. Explain the causes and effects of global warming.
21. Explain the role of Chipko movement in environment protection of India.

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester VI – Degree Examination

MAY – 2024

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)

- Define Meat Curing.
- Define myoglobin.
- What is Marbling?
- Define USDA.
- Define nutrition value of meat.
- Explain composition of lean meat.
- Define Collagen.

PART – B

Answer any SIX of the following.

(5×6=30)

- Write a note on meat pigments.
- Write a note on Egg Processing with neat diagram.
- Write a note on types of Muscles in Meat.
- Give a brief account factor effecting decomposition in fish.
- Give a detail note on Meat waste management and their byproducts.
- Write a note on different types of meat grading.
- Give a note on regulations followed by the company for Slaughter of animals.
- Explain the process of sausage making.

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PART – C

Answer any TWO of the following:

(10×2=20)

- Give a brief a note on Rigor Mortis.
- Write a note on Muscle structure of meat with neat diagram.
- Give a brief account on Inspection of meat in Federal act, USDA.

G 514 DC3.6

(2021 Batch onwards)

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St Aloysius College (Autonomous)**Mangaluru****B.Sc. Semester VI – Degree Examination****MAY - 2024****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 – A1. Answer any **FIVE** of the following.**(2×5=10)**

- Define Trickling filter.
- Give a note on Organic and Inorganic Waste.
- Define Fermentation.
- Give a note on Yeast.
- Give a note on flocculation.
- Write about citrus peel.
- Define about Bioreactor.

PART – BAnswer any **SIX** of the following.**(5×6=30)**

- Give a detail account Coconut Processing and there by products.
- Write short notes on Fish Waste and it's by products.
- Give a note on Membrane Technology.
- Explain in detail about types of household waste and their cause.
- Write short notes on Vermicompost with example.
- Give a detail note on Carbohydrates and its classification.
- Give a note on Utilization of banana waste and their byproducts.
- Write a short note on HPLC.

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

- Explain briefly about the Down Stream Processing.
- Give a detail note on BOD & COD.
- Give a note on Wastewater Treatment in Food Industries.
