

(2021 Batch Onwards)

G 501 DC1.5

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester V – Degree Examination

November - 2024

PHYSICS – Paper V(a)

CLASSICAL MECHANICS AND QUANTUM MECHANICS

Time: 2½ hrs.

Max Marks: 60

SECTION – A

Answer any FOUR of the following.

(4x2=8)

1. a) What is the center of mass of an object, and why is it important in mechanics?
- b) Define the term "displacement" and explain how it differs from distance.
- c) What is D'Alemberts principle, and how it is used to analyze the equilibrium of a mechanical system?
- d) What is a wave function? How it is represented?
- e) Explain the concept of wave packets and their significance.
- f) List the experiments that confirmed the wave nature of electrons.

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SECTION – B

Answer any ONE FULL QUESTION from each unit.

(4x10=40)

UNIT-I

- 2.a) Discuss the conservation of angular momentum in the context of a spinning object with variable moment of inertia. Derive the general equation for angular momentum conservation in a system. (6)
- b) Explain the working of a simple pendulum and how it can be used to determine the gravitational acceleration 'g'? Derive the equation for its period. (4)
- 3.a) Derive the equation for the conservation of angular momentum in a rigid body. Explain the role of moment of inertia in it. (6)
- b) Write the equations for conservation of linear momentum in both one-dimensional and three-dimensional systems, and explain how these equations are applied to solve practical problems. (4)

UNIT-II

- 4.a) Using Hamilton's Principle, derive Lagrange's Equation and demonstrate the derivation of the action principle equation employing the Euler Theorem. (6)
- b) Explain how minimizing the action integral leads to the equations of motion for a mechanical system with an example. (4)
- 5.a) Describe Hamilton's equations of motion. Explain how Hamilton's equations differ from Lagrange's equations. (6)
- b) What are canonical conjugate variables in the Hamiltonian formalism, and how are they used to derive the Hamiltonian equation of motion. (4)

Contd...2

UNIT-III

- 6.a) What are the properties of matter waves? (6)
- b) Explain the following terms: (i) wave packets (ii) group velocity (iii) phase velocity. (4)
- 7.a) With the help of G. P. Thompson's experiment, prove the wave nature of particles. (6)
- b) Prove that the electron does not exist inside the nucleus of a Hydrogen atom. (4)

UNIT-IV

- 8.a) Derive the continuity equation in quantum mechanics. (6)
- b) What are the admissibility conditions on a wave function? (4)
- 9.a) Provide the derivation of the time-dependent Schrödinger wave equation. (6)
- b) Give the postulates of Quantum mechanics. (4)

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SECTION -C

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

10. A 50 kg box is pushed across a horizontal surface with a force of 100 N. If the box moves a distance of 5 meters and experiences a frictional force of 30 N in the opposite direction, calculate the net work done on the box.
11. Use Hamilton's principle to derive the equations of motion for a simple pendulum, considering the constraint.
12. An electron has kinetic energy of $E=100$ eV. Calculate its de Broglie wavelength. Given $m_e=9.1 \times 10^{-31}$ kg, $e=1.602 \times 10^{-19}$ C.
13. A particle of mass $m=1$ kg is moving in a one-dimensional harmonic oscillator potential with angular frequency $\omega=2$ rad/s. Calculate the energy of the particle in the first excited state.

(2021 Batch Onwards)

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester V – Degree Examination

November - 2024

PHYSICS Paper – V (b)

ELEMENTS OF ATOMIC, MOLECULAR AND LASER PHYSICS

Time: 2½ hrs.

Max Marks: 60

SECTION – A

Answer any **FOUR** of the following.

(4x2=8)

1. a) Mention any two success of Bohr atom model.
- b) Name two distinct features of vector atom model.
- c) How does the trace of silver atoms differ in the presence of a magnetic field during the Stern-Gerlach experiment?
- d) Can $^2P_{3/2}$ state exist? Give reason.
- e) Mention the types of spectra of a molecule.
- f) What is the full form of LASER? Mention any two types of Laser.

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SECTION – B

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

(4x10=40)

UNIT-I

- 2.a) Derive the expression to discuss the effect of nuclear motion on the atomic spectra. (6)
- b) With neat figure explain the Franck-Hertz experiment. (4)
- 3.a) Discuss Bohr's theory of hydrogen atom and derive expressions for
i) radius of permitted orbits and ii) Velocity of electrons. (6)
- b) State and explain Bohr's correspondence principle. (4)

UNIT-II

- 4.a) What are coupling schemes? Explain L-S coupling and J-J coupling in multielectron system. (6)
- b) Explain the essential features of vector atom model. (4)
- 5.a) Obtain the expression for magnetic dipole moment of an electron due to orbital motion and spin. (6)
- b) Describe the experimental arrangement for observing normal Zeeman effect and mention the observations made. (4)

UNIT-III

- 6.a) With the neat diagram explain the experimental set up used for observing the Raman effect. (6)
- b) Why is the intensity of Stokes lines usually greater than that of anti-Stokes lines in the Raman effect? (4)

Contd...2

- 7.a) Obtain an expression for the rotational energy levels of a diatomic molecule and the frequency of rotational spectra. State the selection rules. (6)
- b) Briefly explain the electronic spectra of diatomic molecules. (4)

UNIT-IV

- 8.a) What are the essential components of a laser system? Explain the role of each components in the functioning of the laser. (6)
- b) Explain four different industrial applications of laser. (4)
- 9.a) With the help of neat energy level diagram, explain the construction and working of Helium-Neon laser. (6)
- b) Discuss the differences between ordinary light and laser light. (4)

SECTION -C

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

10. The Rydberg constant for hydrogen is $1.097 \times 10^7 \text{m}^{-1}$. Calculate the short and long wavelength limits of Lyman series.
11. In a Stern Gerlach experiment silver atoms cover a distance of 0.12m through a nonhomogenous magnetic field of gradient 50Tm^{-1} . The separation between the two traces on the photographic plate is found to be 0.15mm. Calculate the velocity of silver atoms.
Given mass of silver atom $m=1.79 \times 10^{-25} \text{kg}$.
Bohr magneton $\mu_B=9.27 \times 10^{-24} \text{JT}^{-1}$.
12. The moment of inertia of the CO molecule is $1.46 \times 10^{-46} \text{kgm}^2$. Calculate the energy (in eV) in the lowest rotational energy level of the CO molecule.
13. The ratio of population of two energy levels is 1.059×10^{-30} . Find the wavelength of light emitted at 330 K.

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**St Aloysius College (Autonomous)
Mangaluru**

**B.Sc. Semester V – Degree Examination
November - 2024**

**CHEMISTRY- V (a)
Inorganic and Physical Chemistry - III**

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)

- Write the general electronic configuration of d-block elements.
- Give an example for a molecule with multicenter bonds.
- Give any one limitation of crystal field theory.
- How does the charge of a metal ion influence the stability of a coordination complex?
- Define osmosis.
- Give an example for oxidation-reduction electrode.
- Write the expression for term symbol of an atom.
- What is Laplacian operator?

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PART- B

Answer any EIGHT of the following questions.

(3×8=24)

- Calculate the magnetic moment of the following ions using spin only formula:
(i) Ti^{4+} (ii) Fe^{2+} (iii) Cu^{2+} .
- Provide reasons for the catalytic properties of transition metals.
- Give reactions to represent the autoionization reactions of CH_3COOH and H_2SO_4 .
- Calculate the CFSE for a d^3 system in an octahedral field.
- Give the differences between ideal and non-ideal solutions.
- Give the relationship between E°_{cell} , standard free energy change and equilibrium constant. Explain the terms involved.
- Name the factors affecting nuclear stability? Explain any one.
- What is radioactivity? Write a note on any one type of radioactive emission.
- Explain the mechanism of liquid junction potential.
- How do you compare the oxidation states and magnetic behaviour of 3d elements with 4d and 5d elements?

Contd...2

PART - C

Answer any SEVEN of the following questions.

(4×7=28)

3. Using VBT, explain the structure and magnetic property of $[\text{Fe}(\text{CN})_6]^{3-}$ complex.
4. Derive the thermodynamic relation between elevation in boiling point and molecular mass of the solute.
5. Discuss the application of Schrodinger wave equation for a particle in three-dimensional box.
6. Derive an expression for the decay constant of a radioactive disintegration.
7. State the postulates of VSEPR theory. Determine the geometry of IF_7 using this theory.
8. How are ligands classified? Explain with examples.
9. Explain how do you determine the molecular mass of solute by Walker-Lumsden method?
10. Discuss the construction and working of calomel electrode.
11. Outline a comparison of principal and azimuthal quantum numbers. Give the values of n and l for (i) $3s$ and (ii) $4d$ electrons.

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(2021 batch onwards)

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester V – Degree Examination
November - 2024

CHEMISTRY – V (b)
ORGANIC CHEMISTRY AND SPECTROSCOPY - I

Time: 2½ hrs.

Max Marks: 60

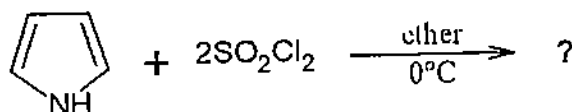
- Instructions: 1. Write the question number and subdivision clearly.
2. Write equations and diagrams wherever necessary.
3. Answer Part – A in first two pages of the answer book.

PART - A

Answer all the following questions.

(1×8=8)

- 1.a) Give an example for condensed heterocyclic compound.
b) Predict the product of the following equation,



- c) Give the equation for the reaction of glycine with acetyl chloride.
d) How are esters formed from α -D-glucose?
e) Give an expression for reduced mass of a diatomic molecule.
f) Give any two applications of rotational spectroscopy.
g) Give the peak area ratio of triplet and quartet.
h) Define chemical shift.

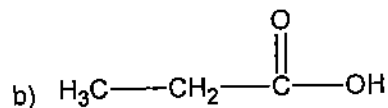
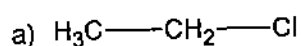
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PART B

Answer any EIGHT of the following questions.

(3×8=24)

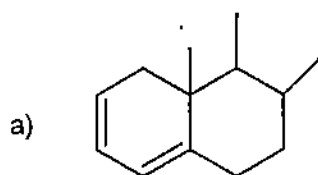
- 2.(i) Explain nitration reaction of thiophene.
(ii) Write any two electrophilic substitution reactions of thiazole.
(iii) How are amino acids classified based on their nature?
(iv) How do you convert arabinose to glucose?
(v) Explain different modes of vibrations in CO₂ molecule.
(vi) Predict the multiplicity of each hydrogen atom in the following compounds:



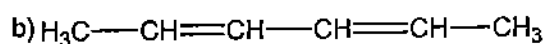
- (vii) Describe nuclear deshielding in ¹HNMR spectroscopy.

Contd...2

(viii) Calculate the absorption maximum for the following compounds using Woodward Fieser rules,



(Basic value = 253 nm)



(Basic value = 217 nm)

- (ix) Explain the Strecker synthesis of amino acid.
 (x) Derive an expression for wave number of rotational lines of a diatomic molecule.

PART - C

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

(4×7=28)

- Describe Feist Benary synthesis of furan.
- Give any one method of synthesis of pyrazole.
- Explain the coupling reaction of protected amino acid.
- Give the mechanism of osazone formation.
- The pure rotational spectrum of the gaseous HCl has a series of equally spaced lines separated by 21.0 cm^{-1} . Calculate the internuclear distance of the molecule. The molar masses of H and Cl are 1.008amu and 35.5amu respectively.
- Explain Rayleigh scattering, stokes and antistokes lines in Raman spectroscopy.
- Draw and explain the ^1H NMR spectrum of ethylbromide and acetaldehyde.
- Explain the different types of electronic transitions in organic compound.
- With the help of energy level diagram explain energy levels of simple harmonic oscillator.

St Aloysius College (Autonomous)
Mangaluru
B.Sc. - Semester V Degree Examination
November - 2024
Mathematics - V (a)
Real Analysis II and Complex Analysis

Time : 2 ½ Hours

Max. Marks : 60

PART - A

(6×2=12)

Answer any **SIX** of the following .

1. Define partition of a closed interval $[a, b]$.
2. Let $f(x) = x, 0 \leq x \leq 1$ and $P = \{0, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, 1\}$ be a partition of $[0, 1]$. Compute $[0, 1]$.
3. Define gamma function.
4. Define an improper Integral.
5. Find the poles of $f(z) = \frac{z^2+i}{z^2-3z+2}$.
6. Find the real part of the function $f(z) = z^3$.
7. Evaluate $\int_0^{\pi/4} e^{it} dt$.
8. Apply the Cauchy-Goursat theorem to show that $\int_C f(z) dz = 0$ when the contour C is the unit circle $|z| = 1$ in either direction and when $f(z) = \frac{z^2}{z-3}$.

PART - B
UNIT - I

(2x6=12)

Answer any **TWO** of the following .

1. State and prove the condition for Integrability.
2. Define Riemann sum. Using Riemann sum, show that $\int_1^2 f dx = \frac{11}{2}$ where $f(x) = 3x + 1$.
3. Show that the function $f(x) = x$ on $[0, 1]$ is Integrable by dividing $[0, 1]$ into n equal parts.

UNIT - II

(2x6=12)

Answer any **TWO** of the following .

1. State direct comparison test. Also, check the convergence of $\int_1^{\infty} \frac{\sin^2 x}{x^2} dx$.
2. i). Prove that $\beta(m, n) = \beta(n, m)$ (2)
ii). Prove that $\Gamma(\frac{1}{2}) = \sqrt{\pi}$. (4)
3. i). Prove that $n\Gamma(n) = \Gamma(n+1) = \int_0^{\infty} e^{-t} t^n dt$ (2)
ii). Write the relation between beta and gamma function. Also show that $\int_0^{\infty} e^{-2y^5} y^3 dy = \frac{1}{5\sqrt[5]{16}} \Gamma(\frac{4}{5})$. (4)

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UNIT - III

(2x6=12)

Answer any **TWO** of the following .

1. Let the function $f(z) = u(x, y) + iv(x, y)$ be defined throughout some neighborhood of a point $z_0 = x_0 + iy_0$. Suppose that the first-order partial derivatives of the functions u and v with respect to x and y exist everywhere in that neighborhood and that they are continuous at (x_0, y_0) . If the partial derivatives satisfy the C-R equations $u_x = v_y$ and $u_y = -v_x$ at (x_0, y_0) , then prove that $f'(z_0)$ exists.
2. Show that the function $u(x, y) = y^3 - 3x^2y$ is harmonic and find its harmonic conjugate.
3. Let $f(z) = u(x, y) + iv(x, y), z_0 = x_0 + iy_0, w_0 = u_0 + iv_0$. Then show that $\lim_{z \rightarrow z_0} f(z) = w_0$ if and only if $\lim_{(x,y) \rightarrow (x_0,y_0)} u(x, y) = u_0$ and $\lim_{(x,y) \rightarrow (x_0,y_0)} v(x, y) = v_0$.

UNIT - IV

(2x6=12)

Answer any **TWO** of the following .

1. Evaluate $I = \int_C f(z) dz$ where $f(z) = \frac{1}{z(z-1)}$ and C is the circle $|z| = 3$.
2. State and prove Cauchy-Goursat theorem.
3. Evaluate the integral $I = \int_C f(z) dz$ where $f(z) = \begin{cases} 1, & \text{when } y < 0 \\ \frac{1}{4y}, & \text{when } y > 0 \end{cases}$ and C is the arc from $z = -2 - 2i$ to $z = 2 + 2i$ along the curve $y = x^3$.

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St Aloysius College (Autonomous), Mangaluru

B.Sc SEMESTER V - DEGREE EXAMINATION

November - 2024

Mathematics - V (b)

Vector Calculus and Graph Theory

Time : 2 ½ Hours

Max. Marks : 60

PART - A

Answer any **SIX** of the following .

(6×2=12)

1. Show that $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{b} = -2\hat{i} + 3\hat{j} - 4\hat{k}$, $\vec{c} = \hat{i} - 3\hat{j} + 5\hat{k}$ are coplanar.
2. Prove that $\text{div}(r \times a) = 0$ taking $r = (x, y, z)$ and $a = (a_1, a_2, a_3)$.
3. Evaluate $\int_C \vec{F} \cdot d\vec{r}$ where, $\vec{F} = x^2y\vec{i} + y^2\vec{j}$ and $\vec{r} = t^2\vec{i} + t^3\vec{j}$ varying from $t = 0$ to 2.
4. State Gauss Divergence theorem.
5. Prove that every connected graph has atleast one spanning tree.
6. Define Walk. Give an example.
7. Write any two properties of K_5 and $K_{3,3}$.
8. Define vertex connectivity. Give an example.

PART - B

UNIT - I

Answer any **TWO** of the following .

(2×6=12)

1. Find $T(t)$, $N(t)$ and $B(t)$ for the plane curves $r(t) = 3 \sin t\vec{i} + 3 \cos t\vec{j} + 4t\vec{k}$. Hence evaluate at $t = \frac{\pi}{4}$.
2. Derive the formula to find the vector triple product.
3. i) Find the tangent plane and normal line to the surface $x^2 - 4y^2 + 3z^2 + 4 = 0$ at $P_0 = (3, 2, 1)$.
ii) Find the curl of $\vec{F} = (x^2 - y^2 + 2xz)\vec{i} + (xz - xy + yz)\vec{j} + (z^2 + x^2)\vec{k}$.

UNIT - II

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Answer any **TWO** of the following .

(2×6=12)

1. Verify the Stoke's Theorem for $\vec{F} = y^2\hat{i} + x^2\hat{j} - (x+z)\hat{k}$ taken over the triangle with $(0, 0, 0)$, $(1, 0, 0)$, $(1, 1, 0)$.
2. State Green's theorem and hence verify the theorem for $\int_C (xy + y^2)dx + x^2dy$ where C is the curve of the region bounded by $y = x$, $y = x^2$.
3. Evaluate $\int \int_S \vec{F} \cdot \hat{n} dS$ for $\vec{F} = 4x\vec{i} - 2y\vec{j} + z\vec{k}$ where, S is the surface in the plane $x + 2y + z = 10$ in the first octant.

UNIT - III

Answer any **TWO** of the following .

(2×6=12)

1. Prove that a simple graph (i.e.a graph without parallel edges or self-loops) with n vertices and k components can have at most $\frac{(n-k)(n-k+1)}{2}$ edges.
2. Prove that every tree has either one or two centres.
3. Prove that a graph G is a tree iff there is one and only path between every pair of vertices.

UNIT - IV

Answer any **TWO** of the following .

(2×6=12)

1. With respect to a given spanning tree T , prove that a chord C_i , that determines a fundamental circuit γ , is contained in every fundamental cutset associated with the branch of γ and in no others.
2. Prove that a graph can be embedded in the surface of a sphere if and only if it can be embedded in a plane.
3. Prove that a graph with at least one edge is 2-chromatic if and only if it has no circuits of odd length.

(2021 Batch onwards)

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester V – Degree Examination

NOVEMBER - 2024

ELECTRONICS - V(a)

ELECTRONIC COMMUNICATION SYSTEMS

Time: 2½ hrs.

Max Marks: 60

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) IMEI Stands for _____.
a) internal mobile equipment identity
b) international mobile equipment identity
c) Indian mobile equipment identity
d) Intra mobile enable identity.
- ii) PWM signal generated by _____ circuit.
a) Comparator b) Astable c) bistable d) free running
- iii) An LED is made up of _____
a) Phosphorescent material b) GaAs c) Silicon d) Germanium
- iv) In a Phototransistor, the base current is _____
a) Set by a bias voltage
b) directly proportional to intensity of light
c) inversely proportional to intensity of light
d) directly proportional to square of the intensity of light
- v) If 70% of electrons recombine with holes radiatively in a LED, then the quantum efficiency is _____
a) 20% b) 80% c) 70% d) 30%
- vi) In an APD the primary photocurrent is $0.25\mu\text{A}$ and the photomultiplied (Avalanche) current is $10\mu\text{A}$. Its multiplication factor M is _____
a) 10 b) 20 c) 30 d) 40

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

- i) Give the full form of GSM.
- ii) What do you mean by SPLICER?
- iii) Expand LASCR.
- iv) State Nyquist's sampling theorem.
- v) What is meant by response time of an optical detector?
- vi) Mention the demerits of optic fibers.
- vii) What is the magnitude of duplex distance in GSM900?
- viii) What does "IP" stand for in internet terminology?

Contd...2

3. Answer any SIX questions

- i) In a certain time, interval 6×10^6 photons incident on a photodetector. Calculate the quantum efficiency, if 5.4×10^6 electron-hole pairs are generated.
- ii) Briefly explain FDMA, TDMA and CDMA
- iii) Mention the three windows of wavelengths used in the construction of optic fibres.
- iv) Mention the frequency ranges of uplink and downlink in GSM 900 mobile communication system.
- v) Draw the circuit diagram of Optocoupler.
- vi) Explain the principle of a photoconductive cell.
- vii) What is internet banking? Explain
- viii) With a block diagram explain the demodulation of PAM signals.

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

- i) With a circuit diagram explain detection of PCM.
- ii) With block diagram explain the outgoing call in GSM.
- iii) Mention any four different combinations of materials used in the construction of core and cladding of glass Optical fibres.
- iv) A fibre cable has an acceptance angle of 30° and core index of 1.4. Calculate the refractive index of the cladding and hence Numerical aperture.
- v) Explain Internet domains with examples.
- vi) Explain the construction and action a solar cell.

SECTION – CST ALOYSIUS COLLEGE LIBRARY
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- i) Obtain an expression for the numerical aperture and acceptance angle of an optical fibre. (5)
- ii) Explain different losses in optic fibre. Also explain attenuation versus wavelength graph. (5)
- iii) With a circuit diagram explain the generation of PWM. (5)
- iv) With a circuit diagram explain the working of PN Photodiode. (5)
- v) With block diagram explain GSM architecture. (5)
- vi) With necessary diagrams, explain i) cell splitting ii) Call Handoff in GSM (5)

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester V – Degree Examination

November - 2024

ELECTRONICS - V(b)

EMBEDDED SYSTEMS

Note: This question paper has three sections. Section A, Section B and Section c. Answer all the sections.

Time: 2 ½ hrs.

Max Marks: 60

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) -----Port of 8051 MC does not have alternate function.
a) Port0 b) Port1 c) Port2 d) Port3
- ii) 8051 microcontroller has ----math flags.
a)6 b) 8 c) 4 d) 6
- iii) PC register of 8051 MC is -----bit.
a) 8 b)12 c) 16 d) 32
- iv) The addressing mode of MOV R₀,A, is _____.
a) direct b) indirect c) immediate d) register
- v) 8051 MC has _____ports.
a) 1 b) 8 c) 3 d) 4
- vi) _____ register of 8051 MC does not have the internal address.
a) SP b) DPL c) PC d) PSW

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

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- i) Mention the flags of PIC18.
- ii) Write a program to interchange the nibbles of a data stored at external memory location X.
- iii) Give one example for three byte instruction in 8051MC.
- iv) Mention the difference between timers and counters.
- v) How many locations are present in the internal RAM of 8051 MC?
- vi) Write the instructions used to set and reset the carry flag in 8051 MC.
- vii) Calculate the time taken to complete one machine cycle if the clock frequency is 12MHz.
- viii) List the elements of serial data communication in 8051MC.

3. Answer any SIX Questions. (6x2=12)

- i) Draw the bit pattern of TMOD and mention the function of each bit.
- ii) Write an 8051 MC program to check whether a one byte data stored at external memory is odd or even. If it is odd store 0D in location X+1 else store 0E in X+1.
- iii) Write the priority list of interrupts of 8051MC.
- iv) List the alternate functions of port0 of 8051MC.

- v) What is the content of accumulator after the execution of the following set of instructions in 8051 MC?

CLRC

MOV R0, #0F

MOV A, #33H

SUBB A, R0

LCALL 0003H

- vi) Write any two differences between a microcontroller and microprocessor.
 vii) With an example explain any one logical instruction of 8051MC.
 viii) Mention any two features of PIC18.

SECTION – B

4. Answer any FOUR Questions.

(4x4=16)

- i) Draw the labeled pin diagram of 8051 MC.
 ii) With a block diagram explain the working of timer1 in Mode1. Also calculate the delay generated in Mode1.
 iii) With syntax and example explain i) CJNE and ii) DJNZ instructions of 8051 MC.
 iv) With an example explain how required delay can be generated using 8051MC.
 v) With example explain any two rotate instructions of 8051MC.
 vi) With bit pattern explain the Status register of PIC18.

SECTION – C

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5. Answer any FOUR questions.

(5x4=20)

- i) With syntax and example, explain any three data transfer instructions of 8051MC. (5)
 ii) With necessary diagram describe the organization of internal RAM of 8051MC. (5)
 iii) What is stack? With example explain how data is stored and retrieved in stack of 8051 MC. (5)
 iv) Write an 8051MC program to multiply two bytes of data stored at external memory locations X and X+1. Store the answers in locations X+2 and X+3. (5)
 v) With necessary Diagram explain the interfacing of a key board to 8051 MC. (5)
 vi) Write instructions to add the values 16H and 43H in PIC18. Find the values of flags after the add operation. (5)

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B.Sc. Semester V – Degree Examination

November - 2024

**COMPUTER SCIENCE – (a)
PROGRAMMING IN PYTHON**

Time: 2 ½ Hours.

Max Marks: 60

PART –A

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

(6x2=12)

- Which of the function is used to read data from the keyboard?
- List any four standard datatypes supported by Python.
- How can you unpack the elements of a tuple into individual variables?
- Find output of following code:

```
str1 = "Hello"  
str2 = " World"  
print(str1*3)  
print(str1+str2)  
print(str1[4])  
print(str1[2:4])
```

- What is inheritance in Python, and how does it promote code reuse?
- What is numpy? How to create a numpy array?
- Write SQL statements to do the following
 - Add a column Marks to Result table
- What is the use of the fetchone() method in Python's database interaction?

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PART –B

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

(4x12=48)

UNIT - I

- Briefly explain the conditional statements available in Python. **(4)**
 - Write a note on random functions in Python. **(4)**
 - Differentiate between user-defined function and built-in functions. **(4)**

- Explain for Loop Statement with Syntax and Example **(4)**
 - Write a program to read the marks of three subjects and find the average of them. **(4)**
 - Explain the different flavors of Python. **(4)**

UNIT – II

- Explain any Four String method with syntax and example. **(4)**
 - Distinguish between the following:
 - pop () and remove () method **(4)**
 - append () and insert () method **(4)**
 - Write a note on Frozenset. **(4)**

Contd...2

5. a) Explain different methods of creating dictionaries in Python. (4)
b) Write short notes on the following methods in dictionary.
a. keys () b. values () c. get(key) d. clear() (4)
c) What Is Tuple Packing and Unpacking in Python? (4)

UNIT – III

6. a) What are series? explain how Pandas data series are created in python? (4)
b) What is linespace () function in NumPy, and how is it used? Explain. (4)
c) What is constructor? Explain How constructor is created in Python. (4)
7. a) Explain following functions in Numpy array.
a) zeros() b) full() c) Random() d) reshape() (4)
b) Explain multilevel inheritance with suitable example. (4)
c) Explain following methods in Pandas series.
A) contains () b) split () c) replace () d) count () (4)

UNIT – IV

8. a) Write the steps of connectivity between SQL and Python. (4)
b) Explain pie chart with an example program using matplotlib. (4)
c) Define Data Visualization. What are the advantages of data visualization in comparison to old methods? (4)
9. a) Write a note on execute () method. (4)
b) Write a note on fetch () method. (4)
c) Explain Anatomy and Customization of Matplotlib plot. (4)

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B.Sc. Semester V – Degree Examination

November - 2024

COMPUTER SCIENCE – (b)

COMPUTER NETWORKS

Time: 2 ½ Hours.

Max Marks: 60

PART –A

1. Answer any SIX of the following.

(6x2=12)

- Differentiate Between internet and intranet.
- Define point-to-point network.
- Define protocol.
- Differentiate fiber optics and copper wire.
- What are the advantages of using Link State Routing over other algorithms?
- What is the function of a switch in networking?
- Write the expansion of the following: FTP, HTTP, SMTP, DHCP.
- Explain how connection release is handled in the Transport Layer.

PART –B

Answer any ONE FULL question from each unit.

(4x12=48)

UNIT - I

- Explain the uses of Metropolitan Area Networks (MANs), and Wide Area Networks (WANs). **(6)**
 - Explain in brief different layers of TCP/IP reference model. **(6)**

- Explain network topology. Explain mesh topology in detail. **(6)**
 - Write a note on OSI reference model. **(6)**

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UNIT – II

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- Write a note on radio transmission. **(4)**
 - Write a note on the following: i) Coaxial cable ii) Fiber optics. **(4)**
 - Explain the Simplex Stop-and-Wait Protocol. How does it ensure data is reliably transmitted over an error-free channel? **(4)**

- A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is x^3+1 . Show the actual bit string transmitted. Suppose that the third bit from the left is inverted during transmission, Show that this error is detected at the receiver end. **(4)**
 - Explain different types of elementary data link protocol with diagrams. **(4)**
 - Explain the methods used to correct errors in data transmission with the help of an example. **(4)**

Contd...2

UNIT – III

- 6. a) List and explain any two networking devices in detail. (4)
- b) Explain the concept of Flooding. (4)
- c) Explain the implementation of connection-oriented service. (4)

- 7. a) What are IP address classes and how they determine the range of IP addresses within a network. (4)
- b) Differentiate between Broadcast Routing and Multicast Routing. (4)
- c) Describe the services provided by the Network Layer to the Transport Layer, with examples of how they facilitate data transmission. (4)

UNIT – IV

- 8. a) Write a note on HTTPs and FTP. (4)
- b) With a neat diagram explain User Datagram Protocol. (4)
- c) Explain the concept of Addressing. (4)

- 9. a) Is UDP a connection-oriented protocol? Explain about UDP protocol. (4)
- b) Write a note on DHCP and HTTP. (4)
- c) Explain the process of TCP connection establishment. (4)

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B.Sc. - Semester V – Degree Examination

November - 2024

STATISTICS - V(a)

MATRIX ALGEBRA AND REGRESSION THEORY

Time: 2 1/2 Hours.

Max Marks: 60

SECTION - A

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

1. Define minors and cofactors of a matrix.
2. Define trace of a matrix and give one example.
3. Verify whether the matrix transformation of $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ is orthogonal.
4. Define rank of a matrix with an example.
5. What do you mean by Orthogonal transformation of a matrix?
6. Define hat matrix.
7. Define the expression for variance in multiple linear regression model.

SECTION - B

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

8. a) Explain any five types of matrices with example.
b) Prove that sum of lower and upper triangular matrix is a square matrix.
9. a) If A and B are invertible matrices of the same order then prove that
 $(AB)^{-1} = B^{-1} A^{-1}$
b) Prove that the determinant of an orthogonal matrix is ± 1 .
10. a) State the properties of Eigen values of a matrix.
b) State the properties of Characteristics root of a matrix.
11. a) Write a note on Homoscedasticity.
b) Explain hypothesis testing on parameters in simple linear regression model.
12. a) Explain Box-Cox method of transformation.
b) Explain normal probability plot.
13. a) State any five properties of least squares fit.
b) Write a note on Violation of Normality in simple linear regression model.
14. a) Explain the method of simultaneous confidence intervals of regression coefficient.
b) Explain backward elimination method of variable selection.

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B.Sc. - Semester V – Degree Examination

November - 2024

STATISTICS - V(b)

Analysis of Variance and Designs of Experiments

Time: 2 1/2 Hours.

Max Marks: 60

SECTION - A

I. Answer any FIVE of the following:

(5x2=10)

1. Write the mathematical model for three way ANOVA.
2. State the Cochran's theorem.
3. Write the mathematical model for LSD.
4. Write the mathematical model for RBD.
5. What is a factorial experiment?
6. State any two advantages of factorial experiment.
7. Define confounding.

SECTION - B

II. Answer any FIVE of the following.

(5x10=50)

8. a) Briefly explain the fixed and random effect model.
b) Prove that $E(MSST) = \sigma^2$ in one-way ANOVA.
9. a) Explain the layout of one-way ANOVA.
b) Prove that $E(MSSB) = \sigma^2$ in two-way ANOVA.
10. Explain the principles of Design of Experiment.
11. a. Stating the model split the total variation under two way classified data and obtain its components.
b. Prove that $E(MSST) = \sigma^2$ in three-way ANOVA.
12. a. Define orthogonal contrast and mutually orthogonal contrast, Verify whether the second order interaction effect is orthogonal contrasts.
b. Explain the statistical analysis of the 2^2 factorial experiments.
13. Describe the statistical analysis under 2^3 factorial experiments with ANOVA table. Also write the expression for main effects and interaction effects.
14. a. What is partial confounding? Explain how the statistical analysis can be carried out in case of partial confounding.
b. Derive expression for estimating two missing observation in case of RBD.

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B.Sc. Semester V – Degree Examination

November - 2024

BOTANY – V(a)

PLANT TAXONOMY & RESOURCE BOTANY

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 the contribution of Engler and Prantl?
2. Who proposed Artificial system of classification? Mention its significance.
3. What is a corymb?
4. What is an aggregate of follicle?
5. What are glumes?
6. Write 2 important characters of Acanthaceae.
7. Mention any four uses of *Chrysanthemum*.
8. Give the scientific and family name of tobacco.

SECTION –B

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

1. Describe the procedure involved in maintenance of herbaria.
2. What is Taxonomic Hierarchy? Describe with examples.
3. Sunflower is an inflorescence. Give reasons. **ST ALOYSIUS COLLEGE LIBRARY**
4. Write any five salient features of Cucurbitaceae. **MANGALURU – 575 003**
5. Write any five salient features of Convolvulaceae.
6. *Areca catechu* is a member of Arecaceae. Give reasons.
7. What are the uses of *Arachis hypogaea* and *Sesamum indicum*?
8. Write the scientific name and family name of grape and mangosteen with uses.

SECTION –C

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

1. Explain the following with two examples each
a) Cereals b) Millets c) Pulses d) Pseudo cereals.
2. Answer the following
a) Kolkata botanical garden b) Principles and rules of ICN.
3. List out the salient features of Family Rubiaceae and give two scientific names of any two plants with economic importance
4. Answer the following
a) Floral whorls in Amaranthaceae b) Female flower in Euphorbiaceae c) Fruit in Poaceae d) Stamens in Acanthaceae e) Gynoecium in Solanaceae

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B.Sc. Semester V – Degree Examination

November - 2024

BOTANY – V(b)

GENETICS AND PLANT BREEDING

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. Write the phenotypic and genotypic ratio of Monohybrid cross.
2. What is blended inheritance? Give example.
3. What are alkylating agents? Give an example.
4. Mention the function of segment IV and V in Y chromosome of *Melandrium album*.
5. What do you mean by cross pollination?
6. What is the difference between sexual and asexual mode of reproduction in plant breeding?
7. What is irradiation breeding?
8. What is polygenic inheritance?

SECTION –B

II. Answer any SIX of the following.

(6x5=30)

1. Differentiate complementary gene interaction with dominant epistasis.
2. Explain test cross with a suitable example.
3. Write a note on trisomy in *Datura*.
4. Write a note on production of *Triticale*.
5. Explain any one conventional method of crop improvement.
6. Give an account on high yielding varieties of plant crops.
7. How biotechnology has contributed in improvement of crops?
8. State the differences between heterosis and inbreeding depression.

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SECTION –C

III. Answer any TWO of the following.

(2x10=20)

1. What is hybridization? Explain the procedure. Add a note on its advantages and limitations.
2. How would you explain complementary gene inheritance in sweet pea cross?
3. Explain deletions with the help of diagrams? Write a note on their applications
4. Explain the following:
a) Role of mutations b) Quantitative inheritance with a suitable example.

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B.Sc. Semester V - Degree Examination
November - 2024
Zoology -Paper V(a)
Non-Chordates and Economic Zoology

Time : 2 ½ Hours

Max. Marks : 60

Instructions: Draw Diagrams wherever necessary.
Answer all three sections- A, B, and C.

SECTION - A

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

(10×2=20)

- a) What is the significance of pseudopodia in protozoans?
- b) Name the cell layers in sponges.
- c) Mention any two harmful Platyhelminthes and the damage they cause.
- d) How do coral reefs contribute to biodiversity?
- e) Mention any two distinctive features of the subphylum Hemichordata.
- f) List two annelid-like features found in *Peripatus*
- g) What is the importance of tanks in Aquaculture?
- h) List the diseases seen in Apiculture.
- i) What are cnidocytes and what is their function?
- j) How does water enter and exit the body of a sponge?
- k) What is the function of the setae in annelids?
- l) Identify two unique features of Nematelminths.

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SECTION - B

Answer any **FOUR** of the following.

(4x5=20)

2. Describe the unique characteristics of the class Merostomata and explain how it differs from the class Arachnida.
3. Write the distinguishing characteristics of the class Crinoidea.
4. With a neat labelled diagram describe the morphology of earthworm.
5. What is reeling and stifling in sericulture. Mentions its importance.
6. Explain the adaptations of parasitic annelids for survival in their hosts.
7. Enumerate the general characteristics of Ctenophora.

SECTION - C

Answer any **TWO** of the following .

(2x10=20)

8. Explain the general characteristics of phylum Platyhelminthes.
9. Discuss the classification of the phylum Mollusca up to its major classes, highlighting the distinguishing features of each class and providing suitable examples.
10. Give a detailed account on the types of feed used in dairy farming.
11. Describe the types of housing management in poultry.

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B.Sc. Semester V -Degree Examination
November - 2024
Zoology-V(b)
Chordates and Comparative Anatomy

Time : 2 ½ Hours

Max. Marks : 60

Instructions: Draw Diagrams wherever necessary.

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

SECTION - A

1. Answer any **TEN** of the following: (10×2=20)
- What are tunicates? Name the phylum to which it belongs.
 - What are the primary characteristics that define the subphylum Vertebrata?
 - List two distinctive characteristics of Cephalochordata that classify them as chordates.
 - How do Chondrichthyes differ from Osteichthyes in terms of skeletal structure?
 - Define the term "Amphibia" and provide two examples of organisms belonging to this class.
 - Explain any two flight adaptations in birds.
 - How does an MRI aid in the study of internal animal structures?
 - List two differences between the digestive systems of herbivores and carnivores.
 - List any two types of jaw suspensions found in vertebrates with suitable example.
 - What are the two main types of photoreceptor cells found in the vertebrate eye?
 - Mention the chambers of a primitive vertebrate heart.
 - What are the two divisions of the autonomic nervous system, and how do they differ?

SECTION - B

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

- Define the key features of the phylum Chordata, and list the main characteristics that distinguish chordates from other animal phyla.
- Analyse the external features of *Herdmania*.
- Mention the distinguishing characteristics of order Chelonia with an example.
- Compare the distinctive features of Prototheria and Eutheria, providing specific examples for each.
- Define comparative anatomy and discuss its significance in the study of biological evolution.
- Explain the differences between the mesonephric and metanephric kidneys in vertebrates.

SECTION - C

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

- Write an account on the external morphology of lamprey and hagfish.
- Describe the general characters of class Aves with examples.
- Discuss the evolutionary modifications in the integumentary system of cyclostomes, pisces and amphibians.
- Compare the respiratory structures of fish and amphibians, focusing on their adaptations to aquatic and terrestrial environments.

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B.Sc. Semester V –Degree Examination

November - 2024

MICROBIOLOGY – V(a)

MOLECULAR BIOLOGY

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)

- What is the central dogma of molecular biology?
- Mention the different types of DNA replication.
- Mention the phases of transcription.
- State two key differences between DNA and RNA.
- Differentiate prokaryotic and eukaryotic initiator tRNA.
- Protein acetylation.
- List any two modes of horizontal gene exchange in bacteria.
- Abortive transductants.
- Define cross linking in DNA.
- Prophage.
- What are exons and introns in RNA molecules?
- Nonsense codons.

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SECTION – B

Answer any FOUR of the following.

(4x5=20)

- Evaluate ribosomes as the site of translation.
- Explain the elongation step in translation in prokaryotes.
- Outline the Operon system.
- Outline bacterial transformation process.
- Write a note on Rho-independent termination.
- Write a note on DNA polymerase III.

SECTION - C

Answer any TWO of the following.

(2x10=20)

- Explain the process of prokaryotic transcription.
- Explain bacterial conjugation process in detail.
- Define DNA repair. Explain BER and NER mechanisms.
- Explain prokaryotic translation process in detail.

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B.Sc. Semester V – Degree Examination

November - 2024

MICROBIOLOGY – V(b)

FOOD 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)
- Primary food packaging.
 - Phycotoxins.
 - Canning.
 - Define Class II Preservative. Give one example.
 - What are prebiotics?
 - What is microfiltration?
 - Name any two important elements of GHP.
 - What is the objective of FSSAI?
 - Enumerate any two food borne infections.
 - What happens to microbes at high relative humidity in food environment?
 - What is MPN index and how is it expressed?
 - Normal range of acidity in milk.

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SECTION - B

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

- Elaborate on the properties of an ideal starter culture.
- Assess biopreservation as a food preservation technique.
- How does Codex Alimentarius contribute to food safety?
- Discuss the methods to control biological hazards.
- Discuss the principle and interpretation of MBRT.
- Discuss pH and food composition as intrinsic factors affecting microbes in food.

SECTION - C

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

- Explain Staphylococcal food poisoning.
- Discuss different types of canned food spoilage.
- Discuss the pathogenic microorganisms present in the milk.
- Discuss water analysis by MPN method.

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B.Sc. Semester V – Degree Examination

November - 2024

BIOCHEMISTRY - V(a)

BIOCHEMISTRY OF MACROMOLECULES

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 structure of Lactose and galactose.
 - Define mutarotation.
 - What is the difference between Cysteine and cystine?
 - Define saponification value and give its significance.
 - Write the difference between tertiary and quaternary structure of protein.
 - What is T_m value?
 - Write the structure of Guanine and Cytosine.

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PART – B

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

- Why sucrose act as a nonreducing sugar? Explain with structure.
- Write biological importance of isomaltose and trehalose.
- Write a note on Rancidity and acid value of oil/fat.
- Give the structure and importance of glutathione.
- Explain chemical reactions of RNA.
- In detail explain Clover leaf model of tRNA.

PART – C

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

- a) Illustrate on the elucidation of open chain structure of glucose.
b) Give the reaction of aldoses with HNO_2 and HCN .
- Explain the classification of Lipids.
- Explain the classification of amino acids with example.
- Discuss on the forces that stabilizes the structure of protein.
- Explain Watson and Crick model of DNA.

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B.Sc. Semester V – Degree Examination

November - 2024

BIOCHEMISTRY – V(b)

HUMAN PHYSIOLOGY AND ENZYMOLOGY

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)**
- Why axon terminals are sometimes called biological transducers?
 - What is the normal blood pressure? How do you find it?
 - Enlist the excretory function of liver.
 - Name the hormones secreted by posterior pituitary.
 - Increased progesterone levels stop the ovulation. Give reason.
 - Give the significance of K_m and V_{max} .
 - Write L-B plot equation for rate of enzyme catalyzed reactions.

PART – B

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

- Explain the role of lungs in maintain acid base balance.
- How are proteins digested and absorbed? **ST ALOYSIUS COLLEGE LIBRARY**
- Give an account on hormones produced by hypothalamus. **MANGALURU - 575 003**
- What are secondary messengers? Explain cAMP as a secondary messenger.
- Explain the theories of enzyme catalysis in detail.
- Write the significance of Michaelis-Menten mantel and L-B plot

PART - C

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

- Explain the generation of action potential and its mechanism of transmission of nerve impulse across synapse.
- Discuss the process of urine formation.
- Explain ECG in detail.
- Elaborate on IUB classification of enzymes.
- Explain the competitive and uncompetitive inhibition and represent it on LB plot.

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B.Sc. Semester V – Degree Examination
November - 2024

BIOTECHNOLOGY – V(a)

Genetic Engineering

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 is the primary function of BAC?
 - What are binary vectors? Give an example.
 - Name one challenge in mRNA isolation.
 - What is the function of cohesive ends in DNA cloning?
 - What is gene therapy?
 - What is the role of a DNA probe in FISH?
 - Mention two ethical considerations in genetic engineering.
 - Define bioinformatics.

PART – B

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

- Explain the role of RNase A and RNase H in nucleic acid modification.
- Explain the process of recombinant DNA (rDNA) technology.
- Discuss colony hybridization using radioactive probes.
- Give an account on Pyrosequencing.
- Discuss the role of antibodies in Western blotting.
- Discuss the applications of DNA fingerprinting in forensic science.
- Apply genetic engineering techniques to describe the process of creating a microorganism for bioremediation.
- Analyze the ethical implications of patenting genetically engineered organisms.

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PART – C

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

- Compare and contrast the functions of Type I, II, and III restriction enzymes.
- Describe any two physical and chemical methods of gene transfer.
- Explain the principle and steps of PCR reaction. Add a note on its applications.
- Write short notes on:
 - BLAST
 - FASTA

(2021 Batch onwards)

G 511 DC3.5

Reg. No.

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**St Aloysius College (Autonomous)
Mangaluru**

**B.Sc. Semester V – Degree Examination
November - 2024**

**BIOTECHNOLOGY – V(b)
Plant and Animal 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)**
- Mention two key historical milestones in the development of plant tissue culture.
 - How does the choice of explant influence the success of plant tissue culture?
 - What are transgenic plants? Give an example.
 - How is Golden Rice different from regular rice in terms of nutritional content?
 - List two methods used for the identification of stem cells.
 - Name two essential equipments used in an animal cell culture laboratory.
 - What is α -anti trypsin (AAT) and its function?
 - Which organs of silkworms are typically used for producing heterologous proteins?

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PART – B

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

- Outline the preparation of MS media and its significance in plant tissue culture.
- Explain how cell suspension cultures are used in secondary metabolite production.
- Describe the strategies used to develop virus-resistant transgenic plants.
- Discuss the role of patents in protecting innovations related to genetically modified organisms. What are the key criteria for patentability?
- Explain the concepts of differentiation, transdifferentiation and reprogramming.
- Describe the basic steps involved in the mammalian cell culture technique.
- Analyze the use of gene therapy in treating severe combined immunodeficiency (SCID).
- How does xenotransplantation work, and what are its potential benefits?

PART – C

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

- Explain the process of micropropagation using bud culture and meristem culture.
- Explain Bt-gene in the development of insect resistant transgenic plant.
- Critically assess the methods used to measure cell viability and cytotoxicity in cultured cells.
- Explain the production and applications of transgenic cattle, sheep and fish with examples.

(2021 Batch onwards)

G 110 DC1.5/ G 512 DC1.5

Reg No

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St Aloysius College (Autonomous)
Mangaluru
B.A./B.Sc. Semester V - Degree Examination
November - 2024
COMPUTER ANIMATION - V(a)
3D TEXTURING, CAMERA AND LIGHTING

Time : 2 ½ Hours

Max. Marks : 60

SECTION - A

Answer any **FIVE** of the following.

(5×2=10)

1. What is the use of Projector map?
2. Which modifier to use for face texturing?
3. Where you will find default 3D maps?
4. What is the use of ink & paint material?
5. How to fix camera to path?
6. Name any 4 lens effects.
7. Name the Photometric lights.

SECTION - B

Answer any **FOUR** of the following.

(4×5=20)

8. Explain about UVW and unwrap UVW map modifier.
9. What is the use of bump and gradient texture?
10. Write a note on 3D texturing & explain the importance of it.
11. Write down the steps of creating golden trophy.
12. Explain about opacity map.
13. What are the steps to create a multi colored ball?

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SECTION - C

Answer any **TWO** of the following .

(2×15=30)

14. Define lights & explain its uses and properties.
15. Explain briefly about hair and fur modifier.
16. Write a brief note on all shaders and maps of 3D max?

(2021 Batch onwards)

G 110 DC3.5/ G 512 DC3.5

Reg No

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**St Aloysius College (Autonomous)
Mangaluru**

**B.A./B.Sc. Semester V – Degree Examination
November - 2024**

**COMPUTER ANIMATION – V (b)
WEB TECHNOLOGY**

Time : 2 ½ Hours

Max. Marks : 60

SECTION - A

Answer any FIVE of the following.

(5×2=10)

1. Mention any 2 advantages of CMS.
2. Define WWW. Mention any two unique features.
3. What is SEO? Mention any 2 advantages.
4. List out the uses of cellspacing and cellpadding.
5. What is a web browser? Mention any 2 web browsers.
6. Mention the tags used to import images in a webpage.
7. What is Dreamweaver? Mention its features.

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SECTION - B

Answer any FOUR of the following.

(4×5=20)

8. Write down the code to showcase 5 points each in ordered list and unordered list.
9. What is HTML? Explain the tools used to write HTML code.
10. Create a gallery webpage with the help of HTML and CSS.
11. What is Web Hosting? Explain the different types of web hosting service.
12. What is the purpose hyperlinks? Explain the different types of hyperlinks.
13. How to create a screen loader with the help of CSS.

SECTION - C

Answer any TWO of the following.

(2×15=30)

14. Explain the functioning of search engines and the key factors in ranking algorithms.
15. How to create a webpage using slice tool in photoshop and assign behaviour in Dreamweaver?
16. What is CMS? Mention its core components, key features, advantages and challenges.

(2021 Batch Onwards)

G 513 DC1.5

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. - Semester V - Degree Examination

November - 2024

ECONOMICS - V(a)

PUBLIC ECONOMICS

Time: 2½ hrs.

Max Marks: 60

PART - A

I Answer any FIVE of the following.

(2×5=10)

1. List out the two main causes of market failure?
2. Define taxable capacity.
3. What is a progressive tax?
4. What is an unbalanced budget?
5. Define external debt.
6. Give any two methods of debt redemption.
7. What is the difference between positive and negative externalities?
8. Define fiscal policy.

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PART - B

II Answer any SIX of the following.

(5×6=30)

9. Briefly explain the Keynesian views on public debt.
10. Differentiate between public finance and private finance.
11. Define Public Good and list out its main characteristics.
12. Discuss the reasons for the growth in public expenditure in welfare states.
13. Discuss the various methods of debt redemption.
14. Discuss the sources of public revenue.
15. What is fiscal deficit? Explain the causes and implications of it.
16. Explain the importance of addressing market failures.
17. What is fiscal policy? Explain the tools of it.

PART - C

III Answer any TWO of the following.

(10×2=20)

18. Examine the various methods of debt redemption.
19. Examine the key sections, objectives and priorities of Central Government Budget of India 2024-25.
20. Critically analyze the canons of taxation proposed by Adam Smith.
21. What is deficit financing? Critically evaluate the advantages and disadvantages of deficit financing.

(2022 Batch Onwards)

G 513 DC3.5

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. - Semester V – Degree Examination

November - 2024

ECONOMICS – V(b)

INTRODUCTION TO R SOFTWARE

Time: 2½ hrs.

Max. Marks: 60

PART - A

I Answer any FIVE of the following.

(2×5=10)

1. How do you insert data types as comments in R code?
2. `is.nan(myVector)` explain the function.
3. `A = A[-1,]` Explain the function.
4. Operation used to find a missing data in R.
5. State any four features of R.
6. What do you mean by matrix?
7. State the syntax for accessing first and second row in the given 2x3 matrix.
8. What do you mean by CRAN?

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PART - B

II Answer any SIX of the following.

(5×6=30)

9. How to create mean imputation in the data set?
10. Write a R syntax for while loop with break.
11. Team A consists of 3 players and Team B consists of 4 players. Write a code for nested loop and yield the output.
12. a) Assign the same value for 4 variables in one line and generate the output.
b) Which function is used to return the square root of a number? Which operation is used to compare two values?
13. a) Syntax used to justify center.
b) Syntax used to justify right.
c) `my.var <- format(102.848793834, digits = 7)` what is the output?
14. Create and write syntax for a random data frame of 10 samples with variable gender (Male & Female) and age (10:25).
15. a) Create and write a syntax for 3x3 matrix, dimension, number of columns and rows.
b) Execute the output.
16. `a=33, b=200`; write a valid syntax for if else statement in R.
17. `myVector <- c(NA, "TP", 4, 6.7, 'c', 1, 12, NA)` State the syntax for
a) Remove the missing value.
b) Identify the total number of missing value.
c) Position of the missing value.

Contd...2

PART – C

III Answer any TWO of the following.

(10×2=20)

18. array1 = c(5,10,15) array2 = c(15,20,25,30,35,40,45,50)

a) Write the code for 3x3 dimensions with 3 slice.

b) Write the output.

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19. Explain the following functions

format(char,width,scientific,justify,nsml,digits).

20. Describe the historical context of R programming.

21. a) Create and write the syntax matrix A & B of 4x4.

b) Perform matrix addition. Write the output matrix A- B.

(2022 Batch Onwards)

G 513 DC4.5

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. - Semester V – Degree Examination

November - 2024

ECONOMICS – V(c)

INDIAN BANKING AND FINANCE

Time: 2½ hrs.

Max Marks: 60

PART - A

I Answer any FIVE of the following.

(2×5=10)

1. Give the meaning of cooperative banks.
2. What are NPA's?
3. What are the three components of a bank loan?
4. Distinguish between mobile banking and E- banking.
5. What is biometrics?
6. Give the meaning of direct lending.
7. Distinguish between money market and capital market.
8. Distinguish between stock and shares.

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PART - B

II Answer any SIX of the following.

(5×6=30)

9. Write a note on the structure of Indian banking.
10. Briefly explain the instruments of monetary policy.
11. Write a note on account opening and importance of KYC.
12. Briefly explain the channels of remittance.
13. Distinguish between credit cards and debit cards.
14. Write a note on credit scoring.
15. Write a note on AI and machine learning in banking.
16. Write a note on participants in money market.
17. Write a note on capital market.

PART - C

III Answer any TWO of the following.

(10×2=20)

18. Explain the importance of banks in economic development.
19. Explain the powers and functions of central bank.
20. Explain the types and features of bank accounts.
21. Explain the role, objectives and functions of SEBI.

(2021 Batch onwards)

G 514 DC1.5

Reg. No. :

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St Aloysius College (Autonomous)
Mangaluru

B.Sc. Semester V – Degree Examination

November – 2024

FOOD SCIENCE – V(a)

INTRODUCTIONS TO DAIRY & FERMENTATION TECHNOLOGY

Max. Marks: 60

Time: 2½ Hours

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART – A

(2×5=10)

1. Answer any **FIVE** of the following.
 - a) What is Fermentation?
 - b) Give a note on lactic acid bacteria.
 - c) Give a note on HACCP.
 - d) What are Prebiotics?
 - e) List two nutritional benefits of consuming soy products.
 - f) Briefly explain what is meant by a batch fermentation system.
 - g) Define Whey.

PART – B

(5X6=30)

Answer any **SIX** of the following.

2. Explain in detail about Bioreactor.
3. Write short notes on Milk Processing.
4. Explain in detail about Probiotics.
5. Write a short note on Down Stream Processing.
6. Give a detail note on Yeast & its types.
7. Write a detail account on Carbohydrates.
8. Compare and contrast the preparation methods of idli and dhokla.
9. Write a brief note on antioxidants and their health benefits in human life.

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PART – C

Answer any **TWO** of the following:

(10×2=20)

10. Give a detail account on fermentation and their by products.
11. Elaborate on reverse osmosis, ultrafiltration, nanofiltration and microfiltration in milk processing using membrane technology.
12. Analyze the impact of food safety and FSSAI and their operating system in food industry.

(2021 Batch onwards)

G 514 DC3.5

Reg. No. :

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St Aloysius College (Autonomous)

Mangaluru

B.Sc. Semester V – Degree Examination

November – 2024

FOOD SCIENCE – V(b)

SPICES AND PLANTATION CROP TECHNOLOGY

Max. Marks: 60

Time: 2½ Hours

Note: i) Answer all the questions

ii) Draw diagrams wherever necessary

PART – A

(2×5=10)

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

- Define FDA.
- Give a note on Food Pigments.
- What are Phytochemicals?
- List out the types of Teas.
- What is the difference between a) Shrubs b) Herbs?
- What are the by-products obtained from palm oil extraction?
- Write a note on Nutraceuticals.

PART – B

(5X6=30)

Answer any **SIX** of the following.

- Write a detailed note on Vanilla Processing.
- Explain in detail about Saffron Processing.
- Write a detailed note on Cardamom Processing.
- Write short notes on Ginger Processing.
- Write a short note on Coffee Processing
- Elaborate on extraction of Cocoa butter and cocoa liquor from cocoa beans.
- Explain in detail about Turmeric Processing.
- Give a detail note on Arecanut Processing.

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PART – C

Answer any **TWO** of the following:

(10×2=20)

- Explain in detail about carbohydrates and protein with structure.
- Give a detail account on phytochemicals and essential oil and their health benefits.
- Give a detail note on tea and palm processing and their by products.

(2022 Batch onwards)

G 701 DC1.5

Reg. No.

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St Aloysius (Autonomous), Mangaluru

**B.Sc.(Visual Communication) Semester V -- Degree Examination
November- 2024**

Development Communication

Time: 2½ hrs.

Max Marks: 60

PART - A

Write short note in 2 to 3 sentences on any FIVE of the following (5x2=10)

1. What are the main economic policies that distinguish the Nehruvian model from the Gandhian model?
2. How does women's empowerment contribute to sustainable agricultural practices in India?
3. Mention any five ethical principles a development reporter needs to keep in mind.
4. List any two factors that influence social change.
5. How can the concept of sustainable development be applied to address global environmental challenges?
6. Identify a key challenge faced by Indian non-governmental organizations in development work.
7. Identify and analyze two major challenges faced by development reporters in conflict zones.

PART - B

Answer any FOUR of the following in 100 – 150 words each (4x5=20)

8. Propose a new strategy for enhancing the impact of development communication in India.
9. Explain diffusion innovation in detail.
10. Analyze a case study where media played a significant role in a social change movement. What ethical considerations arose during this process?
11. Given a development-related issue (e.g., poverty alleviation), describe how you would use mass media tools (such as social media, television, or newspapers) to raise awareness about this issue.
12. Evaluate the effectiveness of media campaigns aimed at promoting social issues such as health and education in India.

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PART - C

Write a detailed note on any TWO of the following in 500- 700 words each (2x15=30)

13. Define the concept of development and discuss its key characteristics using a specific case study in India, analyze how these characteristics are manifested in the country's development policies and practices. Provide examples to illustrate your points.
14. What are the development paradigms? Explain them.
15. Describe at least three specific folk communication techniques used in a particular community and explain how these methods facilitate social cohesion and information dissemination.

(2022 Batch onwards)

G 701 DC2.5

Reg. No.

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St Aloysius College (Autonomous), Mangaluru

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

November- 2024

Television Programme Production

Time: 2½ hrs.

Max Marks: 60

PART - A

Write short note in 2 to 3 sentences on any FIVE of the following (5x2=10)

1. Difference between Live and Recorded TV program.
2. When and where was first TV Broadcasted in India?
3. State the difference between a close-up shot and a wide shot
4. Which are the different lights used in TV Studio
5. What is the primary advantage of using compressed video formats for online streaming?
6. What is 4K format?
7. What is the primary function of a video switcher?

PART - B

Answer any FOUR of the following in 100 – 150 words each (4x5=20)

8. Describe how you would set up a multi-camera configuration for a live talk show.
9. Describe the key events that led to the invention of television.
10. Identify and discuss the characteristics of reality TV shows and why it has gained popularity.
11. Compare the impact of maintaining versus breaking the 180-degree rule in terms of audience immersion and narrative flow.
12. Compare and contrast the use of wide-angle, telephoto, and macro lenses in different genres of television.

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PART - C

Write a detailed note on any TWO of the following in 500– 700 words each (2x15=30)

13. Explain the differences between consumer and professional video cameras. How do these differences affect the choice of equipment for different projects?
14. Explain how each of the following settings (shutter speed, iris, focus, gain, white balance) impacts the overall quality of a video. Provide examples for clarity.
15. Explain the process of creating a floor plan for a television production set. How do you ensure that it meets both technical and aesthetic requirements?

(2022 Batch onwards)

G 701 DC3.5

Reg. No.

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St Aloysius College (Autonomous), Mangaluru

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

November- 2024

Cinematography and Lighting

Time: 2½ hrs.

Max Marks: 60

PART - A

Write short note in 2 to 3 sentences on any FIVE of the following (5x2=10)

1. Cinematography
2. Cinematographer
3. Two Shot
4. Drone
5. Frontal Lighting
6. Light meters
7. Medium Close Up

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PART - B

Answer any FOUR of the following in 100 – 150 words each (4x5=20)

8. What is soft light, and explain any two types of soft light sources
9. Name three significant early film cameras used in the 19th and early 20th centuries.
10. Explain the relationship between a director and a cinematographer.
11. How does a Dutch angle contribute to creating tension or unease in a scene?
12. Explain how a tracking shot differs from a zoom in terms of movement and effect.

PART - C

Write a detailed note on any TWO of the following in 500– 700 words each (2x15=30)

13. If shooting outdoors at midday, how would you manipulate the characteristics of natural light to avoid harsh shadows?
14. Compare and contrast the users of a spotlight and a scoop light in creating focused versus different light. In what scenarios would each be more suitable?
15. Discuss the importance of light diffusion and how accessories like soft boxes or scrims help achieve this effect.
