4th semester
2nd Unit Test (Assignment)
Sub - Biotechnology
Paper - Molecular Biology
Code - BTCH -C- 401

Answer any two (7x2 = 14)

1. DNA as genetic material
2. Replication complex
3. DNA damage and repair
4. Post translational modification of proteins
5. Regulation of gene expression in prokaryotes and eukaryotes.

4th semester
2nd Unit Test (Assignment)
Sub - Biotechnology
Paper - Immunology
Code - BTCH -C- 402

Answer any two (7x2 = 14)

1. Molecular structure of immunoglobulin or antibodies
2. Mejor histocompatibility complex
3. Recombinant vaccine and their applications
4. Pathogen recognition and defence strategies
5. Genetic basis of antibody diversity.

4th semester
2nd Unit Test (Assignment)
Sub - Biotechnology
Paper - Chemistry 2
Code - BTCH -C- 403

Answer any two (7x2 = 14)

1. Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry
2. Homolytic and Heterolytic fission with suitable examples.
3. Halogenation - relative reactivity and selectivity.
4. Friedel-Craft's alkylation/acylation with their mechanism.
5. resonance and mesomeric effects.

6th semester (CBCS)
2nd Unit Test (Assignment)

Sub - Biotechnology
Paper - Bioanalytical tools
Code - BTCH -C- 601

Answer any two (7x2 = 14)

1. Absorption and emission spectroscopy
2. Principle and application of colorimetry
3. Gas chromatography
4. Principle and application of gas chromatography
5. Nanotechnology and its applications.

6th semester (CBCS)
2nd Unit Test (Assignment)
Sub - Biotechnology
Paper - Genomics and Proteomics
Code - BTCH -C- 602

Answer any two (7x2 = 14)

1. Web based server and softwares for genome analysis
2. Genome sequence assembly software
3. Chemical properties of protein
4. Mass spectrometry and it's applications
5. Analysis of Proteomes .

6th semester (CBCS)
2nd Unit Test (Assignment)
Sub - Biotechnology
Paper - Plant Biotechnology
Code - BTCH -DSE- 601

Answer any two (7x2 = 14)

1. Organogenesis and embryogenesis
2. Significance and importance of haploids
3. Methods of protoplast isolation, fusion and it's importance
4. Plant growth promoting bacteria
5. Introduction to Biocontrol of pathogens and it's principales

6th semester (CBCS)
2nd Unit Test (Assignment)
Sub - Biotechnology
Paper - Bioinformatics

Code - BTCH -DSE- 602

Answer any two (7x2 = 14)

1. Understanding the structure of databases and their use on the web
2. Introduction of data generating techniques
3. Detecting Open Reading Frame
4. Phylogenetic analysis and it's applications
5. Sequence similarity search

2nd UNIT TEST (Assignment)
4th Semester (CBCS)
Subject: BOTANY
Paper Code: BOTH CC 401T.
Name of the paper : Plant Systematics.

Answer any two: 7×2= 14

1. Herbaria and its Importance.
2. Botanical Garden and its role in Conservation of Phytodiversity.
3. Taxonomic Hierarchy & Concept.
4. Character Variation, Charcter Weighing, OTUs
5. Origin and Evolution if Angiosperms.

Subject: BOTANY
Paper Code: BOTH CC 402T.
Name of the paper: Plant Ecology and Phytogeography.

Answer any two: 7×2= 14

1.Interdependence of Living & Non living in an Ecosystem.
2.Food Chain and Food Web.
3.Ecological Pyramids and its Types.
4.Soil Profile and Hydrological Cycle.
5. Phytogeographical Divisions of India.

Subject: BOTANY
Paper Code: BOT CC403T.
Name of the Paper: Molecular Biology.

Answer any two: 7×2= 14

1. Double Helical Structure of DNA.
2. Replication of DNA.
3. Genetic Code and its Characteristics.
4. Concept of Gene.
5. RNA: Types and Functions.

Subject: BOTANY
Paper Code: BOT DSC/GE (DSC/GE. 401 T).
Name of the paper :Plant Physiology& Metabolism.

Answer any two : 7×2=14

1. Transpiration and its Significance.
2. Transport of ions accross membrane.
3. Comparative account on C3, C4 and CAM plants.
4. Plant Growth Regulators: Types and Roles.
5. Photoperiodism : types with examples.

2nd UNIT TEST (Assignment)
6th Semester (CBCS)
Subject: BOTANY
Paper Code: BOTH CC 601
Name of the paper : Plant Metabolism

Answer any two: 7×2= 14

1. Mechanism of photosynthesis.
2. Biological nitrogen fixation.
3. Signal transduction and MAP kinase cascade pathway
4. Regulation of Krebs' Cycle and Oxidative Phosphorylation.

Subject: BOTANY
Paper Code: BOTH CC 602
Name of the paper: Plant Biotechnology

Answer any two: 7×2= 14

1. Micro-injection
2. BAC and YAC
3. Selectable markers and Reporter gene
4. Protoplast culture and Protoplast fusion
5. Endosperm culture and its applications.

Subject: BOTANY
Paper Code: BOT DSE-I (DSE 601)
Name of the paper : Industrial and Environmental Microbiology

Answer any two: 7×2= 14

1. Scope of microbes in industry and environment
2. Solid state fermentation and fermentation Conditions
3. Production of citric acid and liquid state fermentation
4. Culture media and Bio-remediation of contaminated soil

Subject: BOTANY
Paper Code: BOT DSE-II (DSE 602)
Name of the paper : Biostatistics

Answer any two : 7×2=14

1. Chi-Square test
2. Tabulation and presentation of data
3. t- Test

4. Methods of data collection
5. Detailed account of Regression and methods of correlation.

Unit Test-II(Assignment)

2024

Chemistry

B.Sc. 2nd Semester

Course No-CHMDSC/GE-201T

Total Marks-14

Answer all the questions

1.	Describe Nucleophilic Substitution Reaction. What are its classes? Write the general mechanism and describe the stereochemistry of SN^1 reaction.	1+2+4=7
2	Explain Chirality, Geometrical Isomerism, Optical Isomerism,Enantiomerism, Diastereomerism and meso compounds.	7

…..

Unit Test-II(Assignment)

2024

Chemistry

B.Sc. 4th Semester

Course No-CHMCC-402T

(Organic Chemistry)

Total Marks-14

Answer all the questions

1	Describe the process to establish the structure of nicotine.	7
2	Describe a suitable process to synthesis Furan, Pyrimidine and Indole	7

……

Unit Test-II(Assignment)

2024

Chemistry

B.Sc. 6th Semester

Course No-CHMCC-602T

(Organic Chemistry)

Total Marks-14

Answer all the questions

1	Describe briefly the theory of UV and NMR Spectroscopy	7
2	Describe with suitable example, how you can use different spectroscopic methods to differentiate various isomers ?	7

Unit Test-II
2024
Chemistry
B.Sc. 4th Semester
Course No. : CHMDSC-401T/CHMGEC-401T

Full Marks-14

(Answer all the questions)

1. Briefly describe the PV isotherm of CO_2. 7
2. Explain Lanthanide Contraction. Write the cause and consequences of Lanthanide Contraction. 2+5=7

Unit Test-II

2024

Chemistry

B.Sc. 6th Semester

Course No. : CHMDSE-601T

(*Inorganic Materials of Industrial Importance*)

Full Marks-14

(Answer all the questions)

1. What is Portland Cement? Write the composition of Portland Cement. 2+2=4
2. Describe the process of manufacture of cement. 5
3. Describe the process of setting of cement. 5

Unit Test-II (Assignment)
2024
Chemistry
B.Sc. 4th Semester
Course No. : CHMHCC-401T
(Inorganic Chemistry)

Full Marks-14

(Answer all the questions)

1. Explain chelation therapy with suitable examples. 5
2. Give a brief account on isomerism of six coordinated metal complexes. 9

*****

Assignment -1

2024

Chemistry

B.Sc. 4th Semester

Course No. : CHMHCC-403T

(Physical Chemistry)

Full marks-14

1. Write short note on following 7x2=14
   i. Degree of dissiociation of weak electrolyte.
   ii. Ionic product of water.
   iii. Solubility and solubility product of sparingly soluble salts.
   iv. Conductometric Titration.
   v. Hydrolysis constants of salts.
   vi. Diamagnetism and paramagnetism
   vii. Ferromagnetism and antiferromagnetism.

Unit Test-II (Assignment)
2024
Chemistry
B.Sc. 6th Semester
Course No. : CHMHCC-601T
(Inorganic Chemistry)
Full Marks-14
(Answer all the questions)

1. There is distinct role of Fischer-Tropsch reaction in industry. Describe it in detail. 7
2. Give a detail view of separation of cations to groups for qualitative inorganic analysis. Mention the group reagents and formula of precipitates for each group. 7

*****

Karimganj College
Department of Computer Science & application
Computer Application (Core)
2nd Semester
CACCC-201T: Introduction to Programming
Unit Test 2 :: Assignment
Marks: 14

Answer all questions:

1. Explain storage class specifier. [4]
2. Write a C/C++ program to implement Tower of Hanoi using recursion. [5]
3. Explain virtual function with example. [5]

Karimganj College
Department of Computer Science & application
Computer Application (Core)
2nd Semester
CACCC-202T: Computer System Architecture
Unit Test 2 :: Assignment
Marks: 20

1. Answer **Any Two** of the following questions. 2 x 7 = 14

a) Differentiate between NAND Gate and NOR Gate. Explain with diagram and truth table.
b) What do you mean combinational circuit? Explain with example
c) Differentiate between RISC and CISC characteristics.

2. Write short notes(**Any Two**) 2 x3 = 6

a) D-Flip Flop.
b) Different addressing modes
c) Logic gates

Karimganj College
Department of Computer Science & application
Computer Application (Core)
4th Semester
CACCC-401T: Design and Analysis of Algorithms
Unit Test 2 :: Assignment
Marks: 20

1. Answer any two questions. **2x4=8**

a) What is sorting? Difference between Quick Sort and Selection sort.
b) Write the definition of the Following:
   i. Binary Search
   ii. Minimum Spanning Tree
c) What is Selection Sort? Explain with an Example

2. Answer any two questions. **6x2=12**

a) How to find the maximum and minimum values using divide and conquer technique? Explain with Example. What is the time complexity of finding maximum and minimum?
b) What is Dynamic Programming? How it differs from Greedy method ? Write the algorithm of Dynamic Programming.
c) What is Optimal Binary Search tree? Explain with the help of an Example. What is the time Complexity of constructing an OBST?

Karimganj College
Department of Computer Science & application
Computer Application (Core)
4th Semester
CACCC-402T: Computer Graphics
Unit Test 2 :: Assignment
Marks: 14

*1. Answer **Any Two** of the following questions.* 6x2=12

a) Explain Graphics Primitives briefly.
b) What do you mean by Graphics Software and Standards?
c) What are the different types of display devices? Explain with example.
d) What do you mean by horizontal retrace and vertical retrace?

2. *Write Short notes **(Any One)**.* *1x2=2*

a) Graphics input devices
b) Scan Conversion
c) Resolution

Karimganj College
Department of Computer Science & application
Computer Application (Core)
4th Semester
CACCC-403T: Introduction to Database Systems
Unit Test 2 :: Assignment
Marks: 14

Answer all questions.

1. Explain different database constraints with examples. [5]
2. Draw the E-R diagram of Hotel Management System showing different types of attributes. Also explain the schema of the entities mentioned in the E-R diagram. [5]
3. Explain different relational algebra operations in database approach. [4]

Karimganj College
Department of Computer Science & application
Computer Application (Core)
6th Semester
CACCC-601T: Fundamentals of Ecommerce
Unit Test 2 :: Assignment
Marks: 20

Answer all questions.

1. Explain different emerging client server security threats. [7]
2. Explain the process of secret Key Encryption and Public Key Encryption with examples. [7]
3. Explain different digital payment systems used in e-commerce transactions. [6]

Karimganj College
Department of Computer Science & application
Computer Application (Core)
6th Semester
CACCC-602T: Software Engineering
Unit Test 2 :: Assignment
Marks: 20

Answer all questions.

1. Explain COCOMO Model with advantages and disadvantages. [7]
2. Explain different testing strategies in software development phases. [7]
3. Explain different software myths. [6]

Karimganj College
Department of Computer Science & application
Computer Application (DSE)
6th Semester
CADSE-601T: PHP Programming
Unit Test 2 :: Assignment
Marks: 14

Answer all questions.

1. Write a PHP code to explain how to handle HTML form with PHP. [6]
2. Write a PHP code to explain how to deal with multi value fields using PHP. [5]
3. Using PHP code how GET and POST form methods are used. [3]

Karimganj College
Department of Computer Science & application
Computer Science (Core)
2nd Semester
CSCHCC-201T: Computer System Architecture
Unit Test 2 :: Assignment
Marks: 20

1. Answer **Any Two** of the following questions. 2 x 7 = 14

a) Differentiate between NAND Gate and NOR Gate. Explain with diagram and truth table.
b) What do you mean combinational circuit? Explain with example
c) Differentiate between RISC and CISC characteristics.

2. Write short notes(**Any Two**) 2 x3 = 6

a) D-Flip Flop.
b) Different addressing modes
c) Logic gates

Karimganj College
Department of Computer Science & application
Computer Science (Core)
2nd Semester
CSCHCC-202T: Data Structure
Unit Test 2 :: Assignment
Marks: 14

Answer all questions.

1. Explain the algorithm of deque. [5]
2. Explain the algorithm of insertion and deletion from doubly linked list. [5]
3. Explain how recursion is implemented through stack. [4]

Karimganj College
Department of Computer Science & application
Computer Science (DSC/GE)
2nd Semester
CSCDSC/GE-201T: Computer System Architecture
Unit Test 2 :: Assignment
Marks: 20

1. Answer **Any Two** of the following questions. 2 x 7 = 14

a) Differentiate between NAND Gate and NOR Gate. Explain with diagram and truth table.
b) What do you mean combinational circuit? Explain with example
c) Differentiate between RISC and CISC characteristics.

2. Write short notes(**Any Two**) 2 x3 = 6

a) D-Flip Flop.
b) Different addressing modes
c) Logic gates

Karimganj College
Department of Computer Science & application
Computer Science (Core)
4th Semester
CSCHCC-401T: Computer Networks
Unit Test 2 :: Assignment
Marks: 20

Answer any five questions each carries 4 marks:

1. Differentiate between Circuit-switched network and Packet-switched network. 4
2. Explain Cyclic Redundancy check with an example. 4
3. Explain the working mechanism for Stop & wait ARQ protocol. 4
4. Explain the various Line coding Schemes. 4
5. Explain Repeater, Bridge. 4
6. Explain Distance Vector Routing. 4

Karimganj College
Department of Computer Science & application
Computer Science (Core)
4th Semester
CSCHCC-402T: DBMS
Unit Test 2 :: Assignment
Marks: 14

Answer all questions.

1. Explain different database constraints with examples. [5]
2. Draw the E-R diagram of Hotel Management System showing different types of attributes. Also explain the schema of the entities mentioned in the E-R diagram. [5]
3. Explain different relational algebra operations in database approach. [4]

Karimganj College
Department of Computer Science & application
Computer Science (Core)
4th Semester
CSCHCC-403T: Design and Analysis of Algorithms
Unit Test 2 :: Assignment
Marks: 20

Answer any four questions each carries 5 marks:

1. Explain Divide and Conquer algorithm and also explain its time complexity. 5
2. Explain multistage graph using Dynamic programming 5
3. Write the algorithm for Merge sort also explain its time complexity. 5
4. Explain Prim's Algorithm with an example. 5
5. Write an algorithm for Depth-First Search with an example. 5

Karimganj College
Department of Computer Science & application
Computer Science (DSC/GE)
4th Semester
CSCDSC/GE-401T: DBMS
Unit Test 2 :: Assignment
Marks: 14

Answer all questions.

1. Explain different database constraints with examples. [5]
2. Draw the E-R diagram of Hotel Management System showing different types of attributes. Also explain the schema of the entities mentioned in the E-R diagram. [5]
3. Explain different relational algebra operations in database approach. [4]

Karimganj College
Department of Computer Science & application
Computer Science (Core)
6th Semester
CSCHCC-601T: Artificial Intelligence
Unit Test 2 :: Assignment
Marks: 14

1. Answer any two questions. 2x2=4

a) Differentiate informed and uninformed search techniques.
b) Why heuristics are search techniques important in AI? Which searching algorithm uses heuristic function?
c) Write down the factors on which AI search problem depends?

2. Answer any two questions. 5x2=10

a) Write down the differences between Breadth First Search (BFS) and Depth First Search (DFS)?
b) Discuss A* algorithm with an example.
c) Explain the Mini-Max algorithm in Artificial Intelligence.

Karimganj College
Department of Computer Science & application
Computer Science (Core)
6th Semester
CSCHCC-602T: Software Engineering
Unit Test 2 :: Assignment
Marks: 20

Answer all questions.

1. Explain COCOMO Model with advantages and disadvantages. [7]
2. Explain different testing strategies in software development phases. [7]
3. Explain different software myths. [6]

Karimganj College
Department of Computer Science & application
Computer Science (DSE)
6th Semester
CSCDSE-602T: Information Security and Cyber Law
Unit Test 2 :: Assignment
Marks: 20

1. Answer **ANY TWO** of the following questions 2 x 7=14
   a) Discuss the tools of attackers.
   b) What do you mean by Computer Crime? Illustrate.
   c) Discuss hardware vulnerability briefly.
2. Write Short notes **(Any Two)**: 3 x 2 = 6
   a) Network as a threat
   b) Digital Crime
   c) Data Security

Assignment

Session 2023-24

Ecology and Environmental Science

Assignment topics for 2nd sem (any two) Marks : 2×7=14

1. Give a detailed account of human wildlife coexistence.
2. Give a detailed account of tribal rights in India.
3. Write a note on the status of current protected areas in India.
4. Write a note on the importance of forest produce to tribal populations.

Assignment topics for 4th sem (any two) Marks: 2×7=14

1. Write a note on waste reduction instead of recycling.
2. Write a note on role of green technologies towards a sustainable future.
3. Write a note on deforestration and landslide.

Assignment topics for 6th sem (any two) Marks : 2×7=14

1. Write a note on sand mining from river bank.
2. Write a note on the role of government bodies in disaster management.
3. Write a note on the role of public, education and media in hazard preparedness

Guidelines for submission of assignment:

1. Assignment should be written on one side of A4 size white paper leaving wide margins on both sides. Handwriting should be legible. Over writing and use of correction pen etc. are not allowed.
2. All pages should be numbered consecutively except cover page. Tables and figures should also be numbered serially.
3. At the end of the assignments reference list should be given.
4. Students should submit the assignment along with the below mentioned information on the cover page of the assignment.

Assignment Topic----------
Session:----------
Department:----------
Semester: _____
Subject: _____
Name of the paper: _____
Name of the student: _____
Roll No: _____
Registration No:_____
Contact No:_____

Email ID:_____

B.Sc 6th Semester (even)
Paper: MTMHDSE -602T(Hydrodynamics)
Subject- Mathematics(H)
Home Assignment/2023-24
Total marks- 20

Answer the following questions.

1. Does the three dimensional incompressible flow given by 6+1=7

$$u(x,y,z) = \frac{kx}{(x^2+y^2+z^2)^{3/2}}, v(x,y,z) = \frac{ky}{(x^2+y^2+z^2)^{3/2}},$$

$$w(x,y,z) = \frac{kz}{(x^2+y^2+z^2)^{3/2}}$$

Satisfy the equation of continuity? k is an arbitrary constant.

Thus show the above motion is kinematically possible for an incompressible fluid.

2. Show that the velocity potential $\varphi(x,y) = k^2 \tan^{-1}\left(\frac{x}{y}\right)$ satisfies Laplace's equation, k being constant. 5

3. A mass of fluid moves in such a way that each particle describes a circle in one plane about a fixed axis; show that the equation of continuity is

$$\frac{\partial \rho}{\partial t} + \frac{\partial}{\partial \theta}(\rho\omega) = 0$$

Where ω is the angular velocity of a particle whose azimuthal angle is θ *at time* t 5

4. The velocity potential of a two dimensional motion is $\varphi = xyk$. find the stream lines. 3

KARIMGANJ COLLEGE
TDC (CBCS) EVEN SEMESTER, 2023-2024
Unit Test-II
Semester: 6th
Course No.: MTMHDSE-602T (II)
(Theory of Equations)
Full Marks: 20

The figures in the margin indicate full marks for the questions.

1. Answer the following questions. $2\times4=8$
   i. Write the relations between roots and coefficients of a cubic equation.
   ii. Diminish roots of the equation $x^2-2x+2=0$ by 1.
   iii. If α *and* β are the roots of $px^2+qx+r=0$, find $\alpha^2+\beta^2$.
   iv. Define a symmetric function in three variables with an example.
2. Answer the following questions. $4\times3=12$
   i. Find the nature of the roots of the equation $x^5+2x^4-3x^3+x+1=0$.
   ii. Find the condition that the roots of the equation $px^3+qx^2+rx+s=0$ are in GP.
   iii. If α,β *and* γ are the roots of the equation $x^3-px+q=0$, find the values of $\sum\frac{1}{\alpha}$ and $\sum\alpha^3$.

KARIMGANJ COLLEGE
TDC (CBCS) EVEN SEMESTER, 2023-2024
Unit Test-II
Semester: 6th
Course No.: MTMHDSE-601T (I)
(Linear Programming)
Full Marks: 20

The figures in the margin indicate full marks for the questions.

1. Answer the following questions (any four). $2\times4=8$
   i. Define slack and surplus variables with examples.
   ii. Define non-degenerate and degenerate basic feasible solutions.
   iii. What is canonical form of a linear programming problem?
   iv. What are the characteristics of the standard form of a linear programming problem?
   v. Show that the intersection of two convex sets is a convex set.
   vi. Show that a hyperplane is a convex set.
2. Answer the following questions (any two). $6\times2=12$
   i. Solve the following LPP by the simplex method:
   $\max Z = 5x_1 + 3x_2$
   subject to
   $x_1 + x_2 \le 2$
   $5x_1 + 2x_2 \le 10$
   $3x_1 + 8x_2 \le 12$
   $x_1, x_2 \ge 0$
   ii. Solve the following LPP by Charne's penalty method:
   $\min Z = 2x_1 + x_2$
   Subject to
   $3x_1 + x_2 = 3$
   $4x_1 + 3x_2 \ge 6$
   $x_1 + 2x_2 \le 3$
   $x_1, x_2 \ge 0$
   iii. Define basic feasible solution of an LPP. Prove that the set of all the feasible solutions of an LPP is a convex set.

Karimganj College, Karimganj
Assignment: 2023-24
Subject: Mathematics
CBCS 6th SEMESTER (Honours)
Name of Paper: Linear Algebra
Paper Code: MTMHCC-602T
Marks:20

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1. Show that the set **{(1,1,1,1), (0,1,1,1), (0,0,1,1), (0,0,0,1}** form a basis for the vector space $\boldsymbol{R^4(R)}$. (3)
2. Let $\boldsymbol{T : R^3(R) \rightarrow R^3(R)}$ by $\boldsymbol{T(x, y, z) = (x, y, 0)}$**.** Show that **T** is a linear transformation. (3)
3. Let **V** and **W** be vector spaces over the field **F** and $\boldsymbol{T: V \rightarrow W}$ be linear. Then show that null space of **T** i.e. **N(T)** and range of **T** i.e. R(T) are subspaces of **V** and **W** respectively. (4)
4. Define eigen value and eigen vector of a linear operator. (2)
5. Find the eigen values and eigen vectors of $\boldsymbol{T: R^2 \rightarrow R^2}$ defined by $\boldsymbol{T(x, y) = (x,0),\ x, y \in R.}$ (3)
6. Define eigen space of a linear operator $\boldsymbol{T: V \rightarrow V}$ for an eigen value of $\boldsymbol{T}$ and prove that it is a subspace of the $\boldsymbol{V}$. (1+4= 5)

Assignment-2nd Unit Test'24
Subject: Mathematics
Paper: MTMHCC-601T (Complex Analysis)
Marks: 20

Answer all the questions:

1. If $z_1, z_2 \, and \, z_3$ are three complex number satisfying ${z_1}^2 + {z_2}^2 + {z_3}^2 - z_2z_3 - z_3z_1 - z_1z_2 = 0$, then prove that $|z_2 - z_3| = |z_3 - z_1| = |z_1 - z_2|$. 4
2. If $z_1 + z_2$ and $z_1\bar{z_2}$ are both real numbers, then prove that either z_1 and z_2 are both real numbers or $z_1 = -z_2$. 4
3. Show that the function $u = \frac{1}{2} log(x^2 + y^2)$ is harmonic function and find its harmonic conjugate. 2
4. Show that the function $f(z) = \frac{x^3 - y^3}{x^2 + y^2} + i\frac{x^3 + y^3}{x^2 + y^2} \;\; if \; x \neq 0, y \neq 0$ and 5

   $$0, if \; x = 0, y = 0$$

   satisfies Cauchy-Riemann equations at the origin, but the function is not differentiable at the origin.

5. If $f(z)$ is an analytic function of z , prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)[Ref(z)]^2 = 2|f'(z)|^2$ 5

Assignment
B.Sc 6th semester
Paper- Complex Analysis MTMDSE-601T)
Session : 2023-24
Marks : 20

1. Find the real Θ such that $\frac{3+2i\sin\theta}{1-2i\sin\theta}$ is purely real. 3
2. Find the conjugate of $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$. 3
3. Convert the complex number $\frac{-16}{1+i\sqrt{3}}$ into polar form. 4
4. Find the real numbers x and y if $(x-iy)(3+5i)$ is the conjugate of $-6-24i$. 3
5. If $(x+iy)^3 = u+iv$, then show that $\frac{u}{x}+\frac{v}{y} = 4(x^2-y^2)$. 4
6. If $(\frac{1+i}{1-i})^m = 1$, find the lest positive integral value of m. 3

KARIMGANJ COLLEGE
TDC (CBCS) EVEN SEMESTER, 2023-2024
Unit Test-II
Semester: 4th
Course No.: MTMHCC-403T
(Ring Theory)
Full Marks: 20

The figures in the margin indicate full marks for the questions.

1. Answer the following questions (any four). $2\times4=8$
   i. Show that a ring is commutative if it has the property that $ab=ca$ implies $b=c$ when $a\neq0$.
   ii. The set $\{0,2,4\}$ under addition and multiplication modulo 6 has unity. Find it.
   iii. Show that a ring that is cyclic under addition is commutative.
   iv. List all the zero divisors in Z_{20}. Can you see a relationship between the zero divisors of Z_{20} and the units of Z_{20}?
   v. Determine all elements of a ring that are both units and idempotents.
2. Answer the following questions (any three). $4\times3=12$
   i. Describe all the subrings of the ring of integers.
   ii. Determine the smallest subring of Q that contains $\frac{1}{2}$.
   iii. Show that every nonzero element of Z_n is a unit or a zero divisor.
   iv. Explain why a finite ring must have a nonzero characteristic.

B.Sc 4th semester
Paper- Reimann Integration and Series of Functions (MTMHCC-402T)
Assignment
Session : 2023-24
Marks : 20

1. If $f:[a,b]\to R$ is bounded function and $P\epsilon\, P[a,b]$, then show that $m(b-a)\le L(P,f)\le U(P,f)\le M(b-a)$,where m,M are the infimum and supremum f on $[a,b]$. Let, $f(x)=x,\forall\, x\,\epsilon\,[0,\ 1]$ and let $P=\{1,\frac{1}{3},\frac{2}{3},1\}$ be a partition of [0,1]. Compute $L(P,f)$ and $U(P,f)$. (3+2=5)
2. Show that a constant function is Reiman Integrable. (4)
3. Show by an example that every bounded function need not be Reiman Reiman Integrable. (5)
4. If f is defined on $[0,a];a>0$ by $f(x)=x^2,\forall\, x\,\epsilon\,[0,a]$ then show that $f\,\epsilon\, R[0,a]$ and $\int_0^a f(x).dx=\frac{a^3}{3}$. (3)
5. Show that, $f(x)=3x+1$ is Reiman Integrable on [0,1] and $\int_0^1(3x+1)dx=\frac{5}{2}$. (3)

Assignment-2nd Unit Test'24
Subject: Mathematics
Paper: MTMHCC-401T (Numerical Analysis)
Marks: 14

Answer all the questions:

1. Explain remainder term in Lagrange's interpolation formula. 4
2. Find the cubic polynomial from the following data 4

x	0	1	2	5
f(x)	2	3	12	147

3. Using Simpson's one-third rule, find $\int_0^6 \frac{dx}{(1+x)^2}$ 5
4. In Simpson's Three-eight rule, the number of subintervals should be taken as……. 1 (Fill in the blanks)

B.Sc 4th semester
Paper- Abstract Algebra (MTMGE/DSC-401T)
Assignment
Session : 2023-24
Marks : 20

1. Define a Ring. 1
2. Give examples of commutative ring and non-commutative ring. 2
3. Show that the set $\{ \begin{bmatrix} a & 0 \\ 0 & 0 \end{bmatrix} : a \in R \}$ is a ring under matrix addition and scalar multiplication. 4
4. Define integral domain and field with examples. 3
5. Let G be any abelian group with identity e. Let $H = \{x \in G \mid x^2 = e\}$, then show that H is a sub group of G. 3
6. Define centre of a group. Show that centre of a group is a sub group of the group. 4
7. Show that $Z(G) = G$ if and only if G is an abelian group. [$Z(G)$ is the centre of the group G]. 3

(Arrear)
B.Sc 2nd semester(even)
Paper: MTMGEC/DSC-201T(Differential Equations)
Subject- Mathematics(Pass)
Home Assignment /2023-24
Total marks- 20

Answer the following questions.

1. Obtain the differential equation of the family of plane curves, represented by parabolas with axis parallel to the x-axis. 4

2. Find the general solution of $xp^3 - yp^2 + 1 = 0$. Also find the singular solution. 4

3. Solve $(xy^2 + 2x^2y^3)dx + (x^2y - x^3y^2)dy = 0$ 4

4. Solve $(D^6 + 9D^4 + 24D^2 + 16)y = 0$ 4

5. Solve $(D^3 - D)y = 4e^{-x} + 3e^{2x}$, $where\ y(0) = 0,\ y'(0) = 1, y''(0) = 2$ 4

(Arrear)
B.Sc 2nd semester(even)
Paper:MTMHCC-202T(Differential Equations)
Subject- Mathematics(H)
Home Assignment /2023-24
Total marks- 14

Answer the following questions.

1. Define particular solution and singular solution. Give an example of each. 4

2. Find the differential equation of a family of circles whose centres are on the y-axis and touch the x-axis. 3

3. Solve the equation $xy' - (logx)y^2 + y = 0 \ , \ x > 0$ 4

4. $solve \quad t\frac{dx}{dt} = 6te^{2t} + x(2t - 1)$ 3

Karimganj College,Karimganj
Assignment: 2023-24
Subject:Mathematics
CBCS 2nd SEMESTER(Arrear)
Name of Paper: Real Analysis
Paper Code: MTMHCC-201T
Marks:20

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1. Check the convergence of the series
   I. $\sum_{n=1}^{\infty} \frac{1}{n^2-n+1}$ (3)
   II. $\sum_{n=1}^{\infty}(\sqrt{n^3+1} - \sqrt{n^3})$ (3)
   III. $\sum \frac{x^n}{3^n.n^2}$ $, x > 0$ (4)
2. Define finite, infinite, countable and uncountable sets with examples. (4)
3. Show that both ***N*** and ***Z*** are countable sets. (4)
4. Show that **(0,1)** is uncountable. (2)

TDC (CBCS) EVEN SEMESTER EXAMINATION, 2024
KARIMGANJ COLLEGE, KARIMGANJ
UNIT TEST – II
SEMESTER – IV

PHSHCC – 401T

(Mathematical Physics III)

Assignment
Full Marks: 14

Answer the following questions. All questions are compulsory.

1. Find the Laplace Transform of the following 7

(a) $f(t) = \begin{cases} \cos\left(t - \frac{2\pi}{3}\right), & t > \frac{2\pi}{3} \\ 0, & t < \frac{2\pi}{3} \end{cases}$

(b) $\int_0^t e^{-2t}\, t\, sin^3 t$ dt

(c) $t\, e^{-t} \cosh t$

2. Find the Inverse Laplace Transform of the following 7

(a) $\frac{s-4}{4(s-3)^2+16}$

(b) $\frac{e^{-2s}}{(s+1)(s^2+2s+2)}$

(c) S log $\frac{s}{\sqrt{(s^2+1)}} + cot^{-1}s$

TDC (CBCS) EVEN SEMESTER EXAMINATION, 2024
KARIMGANJ COLLEGE, KARIMGANJ
UNIT TEST – II
SEMESTER – IV

PHSHCC – 402T

(Elements of Modern Physics)
Assignment
Full Marks: 14

Answer the following questions. All questions are compulsory.

1.

(a) Explain the reasons behind the inadequacies of classical mechanics which led to the development of quantum mechanics. State the fundamental postulates of quantum mechanics. 4+3=7

(b) Explain the difference between observables and operators. 2

(c) State the conditions that are to be satisfied for a wave function to be physically acceptable. 3

(d) Explain the limitations of Schrodinger wave equation. 2

TDC (CBCS) EVEN SEMESTER EXAMINATION, 2024
KARIMGANJ COLLEGE, KARIMGANJ
UNIT TEST – II
SEMESTER – IV

PHSHCC – 403T

(Analog Systems and Applications)
Assignment
Full Marks: 14

Answer the following questions. All questions are compulsory.

1.(a) What are the merits of silicon over germanium as a semiconducting material?
(b) Explain the current flow mechanism in forward and reverse biased pn junction diode.

2+5=7

2. (a) What is a Zener diode?
(b) Distinguish between Zener breakdown and avalanche breakdown.
(c) Explain how a Zener diode can be used for the purpose of voltage regulation.

1+3+3=7

TDC (CBCS) EVEN SEMESTER EXAMINATION, 2024

KARIMGANJ COLLEGE, KARIMGANJ

UNIT TEST – II

SEMESTER – VI

PHSHCC – 601T

(Electromagnetic Theory)

Assignment

Full Marks: 14

Answer the following questions. All questions are compulsory.

1. State the composition and characteristics of plasma. 7
2. What do you mean by polarization of light? Describe the construction, action and uses of Nicol prism. 1+6=7

TDC (CBCS) EVEN SEMESTER EXAMINATION, 2024
KARIMGANJ COLLEGE, KARIMGANJ
UNIT TEST – II
SEMESTER – VI

PHSHCC – 602T

(Statistical Mechanics)
Assignment
Full Marks: 14

Answer the following questions. All questions are compulsory.

1. Write some applications of M.B. Distribution law. Find out the expressions for total internal energy and specific heat at constant volume of an ideal gas using the concept of M.B. statistics. 2+5

2. (a) What are the limitations of M.B. statistics over B.E. and F.D. statistics. 2

   (b) prove that : (i) $\langle V \rangle = \sqrt{\frac{8kT}{m}}$ 2

   (ii) $V_{rms} = \sqrt{\frac{3kT}{m}}$ 2

   (iii) $V_{mp} = \sqrt{\frac{2kT}{m}}$ 1

   (Symbols have their usual meanings.)

TDC (CBCS) EVEN SEMESTER EXAMINATION, 2024

KARIMGANJ COLLEGE, KARIMGANJ

UNIT TEST – II

SEMESTER – IV

PHSDSC/GE – 401T

(Waves and Optics)

Assignment

Full Marks: 14

Answer the following questions. All questions are compulsory.

1. Describe the pattern in Young's double slit experiment. What is the slit separation in Young's double slit experiment, which produces interference fringes 0.1^0 apart on the screen? The wavelength of light used is 589nm. 4+3=7
2. How can you determine the wavelength of light by Lloyd's mirror experiment? A source of light of wavelength $5000A^0$ is placed at one end of a table 200 cm long and 5 mm above its flat well-polished top. Find the fringe-width of the interference bands located on a screen at the end of the table. 4+3=7

TDC (CBCS) EVEN SEMESTER EXAMINATION, 2024
KARIMGANJ COLLEGE, KARIMGANJ
UNIT TEST – II
SEMESTER – VI

PHSHDSE 601T-A

(Astronomy & Astrophysics)

Assignment
Full Marks: 20

Answer the following questions. All questions are compulsory.

1. Describe celestial sphere and celestial co-ordinates. 10
2. What is light gathering power? Describe about space telescope. 10

Assignment,2024
STATISTICS
STSDSC/GE- 401T
Marks: 14

1. What is design of experiment?
Give the analysis of CRD and RBD. 14

Assignment 2024
STATISTICS
STS DSC/GE 601T
Marks:14

1 What is time series?
Describe the different components of time series.
Also state the applications of time series. 14

ZOOLOGY 4th Semester (CBCS)

2nd Unit Test-2024

DSC/GE-401

Write note on any one of the topic:

(i) Chromosomal Mutation

(ii) Natural Selection.

ZOOHCC-401

Write note on any one of the topic:

(i) Mechanoreceptor.

(ii) Integumentary derivatives.

ZOOHCC-402

Write note on any one of the topic.

(i) Transport of respiratory gases.

(ii) Blood and its composition.

ZOOHCC-403

Write note on any one of the topic.

(i) Glycolysis and its significance.

(ii) ATP as the energy currency of the cell.

6th Semester.

Assignment. Subject: Zoology 2021
2nd unit Test

ZOODSC-601 (B.Sc. 4)

Write assignment on any one topic.

1. Gametogenesis
2. Metamorphosis in Insects.

ZOODSC-602

Write assignment on any one topic.

1. Variation and its Sources.
2. Role of Migration and mutation in changing allele frequency.

ZOODSE-601 (For both para and Hons)

Write assignment on any one topic

1. Development and differentiation of gonads.
2. Folliculogenesis.

ZOODSE-602

Write assignment on any one topic

1. Chronopharmacology, chronomedicine, chronotherapy, and Role of melatonin in chronobiology.
2. Photoperiods and regulation of Seasonal reproduction in vertebrates.