**Course File**

***Subject Title/Subject Code: Discrete Mathematics Structure***

Semester: IV Year 2023-24

| Name of the Faculty: |  |
| --- | --- |
|  |  |
| E-mail id: |  |

**Total Number of Lectures:** 40

i**)Course Objective**

This course provides the students with an overview of discrete structures from this 40-hour course. In this course, students will learn about various functions which form the basis for the input, output and processing concept. They will learn the concepts of relations which are very useful in better understanding of SQL query. Moreover, the aim of this course is to introduce generating functions, recurrence relations, group theory and graph theory.

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**VISION & MISSION OF INSTITUTE**

## Vision

**Empowering student with recent and emerging technologies to create innovative technical leaders**

**capable of contributing to industrial and societal needs for betterment of mankind across the globe.**

## Mission

**M1: To provide dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.**

**M2: To establish effective interface with industry to obtain live problems to enhance critical thinking and problem solving skills among students and consultancy projects for faculty.**

**M3: To provide avenues and opportunities to faculty for domain specific trainings and qualification upgradation.**

**M4: To develop ethical leaders with strong communication skills.**

**VISION & MISSION OF DEPARTMENT**

**Department Vision**

To be among top five well known department of Computer Science and Engineering in the state of Rajasthan in placing the students at premier industry.

**Department Mission**

M1: To equip students with ability to be innovative and excellence to face the challenges in the digital world.

M2: To prepare students with high quality employability skills catering to current trends in industries, problem solving skills, innovative pursuits and ready to face challenges in the domain and allied disciplines.

M3: To provide ambience for entrepreneurship and start-ups through incubation center among students.

M4: To encourage continuous faculty training on industry-based Development, and Innovation.

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

Technical Proficiency Graduates will have a strong foundation in core concepts, tools, and

technologies relevant to their discipline.

Career Development Graduate will be capable of pursuing diverse career paths in field of

Computer Science &amp; Engineering with proficiency in software development/ pursue higher education an or become entrepreneurs.

Problem-Solving Graduates will have a strong math foundation so that they will be proficient problem solvers, capable of identifying, analyzing , and solving complex technical problems using critical thinking and creative approaches.

Professional Attitude Graduates will be sensitive to societal and professional environment,

possess strong communication skills and will be skilled in working collaboratively within diverse teams adhering to ethical standards and professional practices.

Learning Environment To create a learning environment that ensures graduates continue learning throughout their careers, effortlessly adopting new technologies to stay innovative in their chosen fields and remain effective contributors in their chosen field.

**PROGRAM SPECIFIC OUTCOMES (PSO's)**

PSO1: Students will be able to design, develop, test, debug, deploy, analyze , troubleshoot, maintain,

manage, and ensure security during the complete product lifecycle.

PSO2: Student will be able to apply software engineering/ information system development skills to

solve problems across diverse domains.

PSO3: Students will be well-prepared to initiate and oversee innovative startups within their respective

sectors. **PROGRAMME OUTCOMES (POs)**

**A student will develop:**

| 1 | **Engineering knowledge:** | Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. |
| --- | --- | --- |
| 2 | **Problem analysis:** | Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. |
| 3 | **Design/development of solutions:** | Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| 4 | **Conduct investigations of complex problems:** | Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. |
| 5 | **Modern tool usage:** | Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with and understanding of the limitations. |
| 6 | **The engineer and society:** | Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| 7 | **Environment and sustainability:** | Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| 8 | **Ethics:** | Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| 9 | **Individual and team work:** | Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| 10 | **Communication:** | Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| 11 | **Project management and finance:** | Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| 12 | **Life-long learning:** | Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

**COURSE OUTCOMES (COs) OF THE SUBJECT**

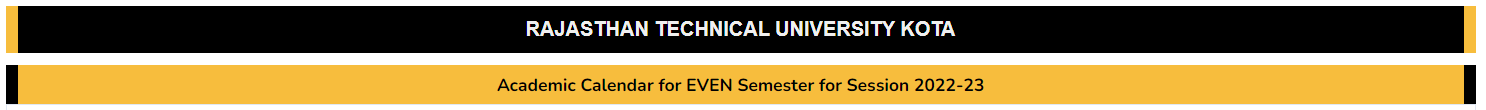
| CO No. | Mapping | Statement |
| --- | --- | --- |
| CO1 | Apply | Students will be able to apply fundamental concepts of set theory, relations, functions and pigeon hole principle in solving various mathematical problems. |
| CO2 | Analyze | Students will be able to examine the relationship between varieties of arguments using logical notations and classify them as valid/invalid. |
| CO3 | Apply | Students will be able to demonstrate the ability to find permutation, combination and lattice. |
| CO4 | Understand | Students will be able to learn fundamental concepts of groups and rings. |
| CO5 | Evaluate | Students will be able to calculate distances among the nodes of graph using different traversal methods. |

**COS MAPPING WITH POs AND PSOs**

| **Course Outcome** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO1** | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **CO2** | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **CO3** | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **CO4** | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **CO5** | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |

**UNIVERSITY ACADEMIC CALENDAR**







| **Academic Calendar Even Semester 2022-23** | | | | |
| --- | --- | --- | --- | --- |
| **Particulars** | **B.Tech-II** | **B.Tech- IV** | **B.Tech- VI** | **B.Tech- VIII** |
| Commencement of classes | 10-04-2023 | 27-02-2023 | 27-02-2023 | 02-02-2023 |
| Last Working Day | 08-07-2023 | 03-06-2023 | 03-06-2023 | 16-05-2023 |
| Course Progression Report-I | 10-05-2023 | 05-04-2023 | 05-04-2023 | 10-03-2023 |
| First Mid Term Exam | 15-05-2023 | 10-04-2023 | 10-04-2023 | 16-03-2023 |
| Remedial Class-I | 24-05-2023 | 20-04-2023 | 20-04-2023 | 27-03-2023 |
| Course Progression Report-II | 16-06-2023 | 13-05-2023 | 13-05-2023 | 26-04-2023 |
| Second Mid Term Exam | 19-06-2023 | 18-05-2023 | 18-05-2023 | 01-05-2023 |
| Remedial Class-II | 30-07-2023 | 27-05-2023 | 27-05-2023 | 10-05-2023 |
| Commencement of Theory Exam | 20-07-2023 | 15-06-2023 | 16-06-2023 | 26-05-2023 |
| Commencement of Practical Exam | 10-07-2023 | 05-06-2023 | 05-06-2023 | 18-05-2023 |

**Evaluation Scheme**

FACULTY DETAILS:

Name of the Faculty :

Designation :

Department :

1. TARGET

a) Percentage Pass : 100%

b) Percentage I class: 60 %

2. METHOD OF EVALUATION

2.1. Continuous Assessment Examinations (Mid-Term 1, Mid-Term 2)

2.2. Assignments

2.3. Quiz

2.4. Semester Examination

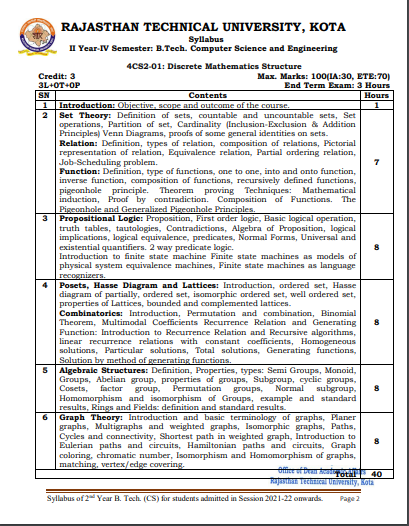
Others- MCQ.

List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.

1. Take the help of creative tools to stimulate creativity. Include slide presentations, demonstration or forms of visual exercises that will excite the young minds and capture their interest.

Signature of Faculty: **Signature of HOD**

**UNIVERSITY SYLLABUS**



**PRESCRIBED BOOKS**

1. Elements of Discrete Mathematics, C.L. Liu, Tata Mcgraw-Hill.
2. Discrete Mathematics, Semyour Lipschutz and Marc Lipson, Tata Mcgraw-Hill.
3. Discrete Mathematics, Dr .Gokharoo and Dr. Jain, Unique Books.

**Teaching and learning resources**

**Unit 1**

<https://nptel.ac.in/content/storage2/courses/111106086/Lecture1.pdf>

**Unit 2**

<https://nptel.ac.in/content/storage2/courses/111106086/Lecture2.pdf>

**Unit 3**

<https://www.math.fsu.edu/~pkirby/mad2104/SlideShow/s2_2.pdf>

**Unit 4**

<https://cse.iitkgp.ac.in/~debdeep/courses_iitkgp/FOC/slidespdf/POS.pdf>

**Unit 5**

<https://nptel.ac.in/noc/courses/noc21/SEM1/noc21-cy16/>

<https://math.berkeley.edu/~apaulin/AbstractAlgebra.pdf>

**Unit 6**

<https://nptel.ac.in/noc/courses/noc21/SEM1/noc21-cy16/>

Lecture notes (whole syllabus)

<https://drive.google.com/file/d/1wIz8aaMO16miMWrwGTzCLzwIBgHtWBlh/view?usp=drive_link>

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**WEEKLY TIME TABLE OF THE TEACHER**

First Time Table: With effected from 15-2-2024

Section A

| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Monday |  |  | DMS |  |  |  |  |
| Tuesday |  |  |  | DMS |  |  |  |
| Wednesday |  |  |  |  |  |  |  |
| Thursday |  |  |  |  |  |  |  |
| Friday | DMS |  |  |  |  |  |  |
| Saturday | DMS | DMS |  |  |  |  |  |

Section B

| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Monday |  |  |  |  |  |  |  |
| Tuesday |  |  | DMS |  |  |  |  |
| Wednesday |  |  | DMS |  |  |  |  |
| Thursday |  |  | DMS |  |  |  |  |
| Friday |  | DMS |  |  |  |  |  |
| Saturday |  |  |  | DMS |  |  |  |

Section C

| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Monday |  |  |  | DMS |  |  |  |
| Tuesday |  | DMS |  |  |  |  |  |
| Wednesday |  |  |  | DMS |  |  |  |
| Thursday |  |  |  |  |  |  |  |
| Friday |  | DMS |  |  |  |  |  |
| Saturday |  |  | DMS |  |  |  |  |

**Revision:** With effected from 10-4-2024

**Section A**

| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Monday |  |  |  |  |  |  |  |
| Tuesday | DMS |  |  |  |  |  |  |
| Wednesday | DMS |  |  |  |  |  |  |
| Thursday |  |  |  |  |  |  |  |
| Friday |  | DMS |  |  |  |  |  |
| Saturday |  | DMS |  |  |  |  |  |

Section B

| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Monday |  |  |  |  |  |  |  |
| Tuesday |  | DMS |  |  |  |  |  |
| Wednesday |  | DMS |  |  |  |  |  |
| Thursday | DMS |  |  |  |  |  |  |
| Friday |  |  | DMS |  |  |  |  |
| Saturday |  |  |  |  |  |  |  |

Section C

| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Monday |  |  |  | DMS |  |  |  |
| Tuesday |  | DMS |  |  |  |  |  |
| Wednesday |  |  |  | DMS |  |  |  |
| Thursday |  |  |  |  |  |  |  |
| Friday |  | DMS |  |  |  |  |  |
| Saturday |  |  | DMS |  |  |  |  |

**COURSE-PLAN**

| UNIT | Lect.  No. | TOPICS | **Teaching Methods/ Teaching Aids** |
| --- | --- | --- | --- |
| **1** |  | Objective of Discrete mathematics elements. | Verbalization |
| 2 |  | Introduction to set theory. | White Board, Demonstration |
|  |  | Cardinality, inclusion-exclusion principal and venn diagram | White Board |
|  |  | Relation, types of relations, POR | White Board |
|  |  | Job sequencing problem, PMI | White Board |
|  |  | Pigeonhole Principle, functions | Verbalization, White Board |
|  |  | Composition of function, Proof by contradiction | White Board |
|  |  | Revision | White Board |
| 3 |  | Statement and proposition, FOL, Universal and existential quantifier | White Board, PPT, Demonstration |
|  |  | Truth table, tautology, contradiction | White Board |
|  |  | Logical equivalence | White Board |
|  |  | DNF, CNF, PDNF, PCNF | White Board |
|  |  | FSM | White Board |
|  |  | FSM as language recognizer | White Board |
|  |  | REVISION | White Board |
| 4 |  | Ordered set Hasse diagram | White Board |
|  |  | POset and Lattice | White Board |
|  |  | Binomial theorem, permutation | White Board |
|  |  | Permutation, combination | White Board |
|  |  | combination | White Board |
|  |  | Recurrence relation, linear RR with constant coefficient | White Board |
|  |  | Homogeneous solution | White Board |
|  |  | Particular solution, Total solution | White Board |
|  |  | Generating functions | White Board |
|  |  | Solution of RR by method of generating functions | White Board |
|  |  | Revision | White Board |
| 5 |  | Group: definition and properties | ICT Tools, White Board |
|  |  | subgroups | ICT Tools, White Board |
|  |  | Cosets, cyclic group | ICT Tools, White Board |
|  |  | Factor group, permutation group | White Board |
|  |  | Normal subgroup | White Board |
|  |  | Homomorphism and isomorphism of a group | White Board |
|  |  | Rings and fields: basic definition | White Board |
|  |  | Revision | White Board |
|  |  | Basic terminology of graph theory | White Board |
|  |  | Planar graph, multigraph | White Board |
|  |  | Weighted graph, isomorphic graph | White Board |
|  |  | Path, cycles and connectivity | White Board |
|  |  | Shortest path in weighted graph | White Board |
|  |  | Eulerian path and Hamilton path | White Board |
|  |  | Chromatic number | White Board |
|  |  | Isomorphism and homomorphism of graph | White Board |
|  |  | Matching | White Board |
|  |  | Vertex\edge covering | White Board |

**Signature of Faculty: Signature of HOD**

**Assignment – 1**

**Unit 1-2 (CO1-CO2)**

1. Write the application of DMS in computer science.
2. Determine the number of positive n where n lies between 1 to 50 and n is not divisible by 2 or 3.
3. Explain the inclusion and exclusion principal.
4. Explain the extended Pigeonhole principle.
5. Out of 200 students, 50 of them offer Pure Mathematics, 140 of them offer Applied mathematics and 24 of them offer both subject. Since both Subjects have scheduled examinations for the following day, only students who are not in either one of these course will be able to go to club the night before. How many students will be in the club?
6. If the number of elements in Sets A and B are m and n respectively, then what will be the number of elements in their product set.
7. Prove that the relation R in the set N of natural numbers defined by ‘|x-y| is divisible by ‘n’ is an equivalence relation.

**Assignment – 3**

**Unit 3 (CO3)**

1. Prepare truth table for p^q.
2. Prove the De Morgan' law with the help of truth table.
3. Prove that there is no rational number whose square is 3.
4. Examine the validity of the following argument:
5. ‘If prices are high then wages are high. Prices are high or there are price controls. If there are price controls then there is not an inflation, there is an inflation. Therefore wages are high.’
6. Prove that “2^n> n^2 if “n >= 5.”
7. Solve the following third order recurrence :
8. un-9 un-1+26un-2-24 un-3=0, n>=3
9. Show that (Z+, |) is a POset.
10. Draw the Hasse diagram and answer the following concerning the poset (3,6,18,36,54).
11. In how many ways the 26 letters of the English alphabet can be permuted so that none of the word SUN, TEA, BOY or GIRL occur ?
12. What are the recurrence relations ?
13. Write the examples of the recurrence relation which are (1) linear homogenous (2) non-linear and non-homogenous. Also write the characteristic equation for T(n)=T(n-1) +1.

**Assignment – 4**

**Unit 4(CO4)**

1. Prove that (Z, +) is a group.
2. Define Cyclic group and show that {1, w, w2} is a cyclic group.
3. Show that the order of a subgroup divides the order of group .
4. Show that (R,+,\* ) is a group.
5. If 

then find  and by expressing the permutation  as the product of disjoint cycles, find whether is an even permutation or odd permutation. Also find its order.

**Assignment – 5**

**Unit 5(CO5)**

1. explain walk and path.
2. Explain homomorphic graph?
3. Suppose that a connected planar graph has 30 vertices, each of degree three. Into how many regions the plane divided by a planar representation of this graph?
4. Draw a graph which is both Hamilton and Eulerian and differentiate circuit and path.
5. If f is a homomorphism from a group G to G’ with kernel K, then k is normal subgroup of G.
6. What are the matching graph.

**SAMPLE QUIZ QUESTIONS**

1. What are the applications discrete mathematics in the engineering field ?
2. What is the scope of discrete mathematics.
3. What do you mean by countable and uncountable set?
4. Differentiate between relations and equivalence relations ?
5. What do you mean by Venn diagramme?
6. ~p^q stands for what.
7. What do you understand by the term finite state machine?
8. Convert the statement “Roy and Raagavi both wants to do dance” in logical prepositions.
9. What do you understand by poset?
10. What do you mean by Lattice?
11. What do you understand by cardinality of a set?
12. What do you mean by mean deviations?
13. What is the inverse function of f(x)=2x+7?
14. What is an identity function?
15. List the steps involved in proving an algebraic structure, a group?
16. What is the difference between algebraic structure and group?
17. What are the cosets?
18. What is the (R, +, \*)?
19. Explain the steps involved in solving identifying the shortest path?
20. What do you mean by multigraph?
21. Explain the concept of cyclic group?
22. The group G={e,a,b,c} is generated by \_\_\_\_\_
23. What do you understand by handshaking theorem?
24. What is the degree of a graph?
25. How many ways are there to arrange a group of 5 students a line?
26. What are the matching graph.

# TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY

# B. TECH II – YEAR (IV SEM.)

**Discrete Mathematics Structure (4CS201)**

**Mid Term Paper-I**

## Max Marks: 70 Time:3 Hrs

**Note:**1) The paper is divided into 2 parts: Part-A and, Part-B  
2) Part-A contains 10 questions and carries 2 mark each.  
3) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

Part- A (20 Marks)

| 1. Prove that A-B=B’ ∩A’. | CO1 |
| --- | --- |
| 1. For a relation R on a set A={1,2,3,4} given by R={(1,3)(1,2),(2,2),(3,4)}, then find reflexive and transitive closure of R on set A. | CO1 |
| 1. If f(x)=ex and g(x)=sinx, then find the composition f*0*g. | CO1 |
| 1. Check if the following function is a bijection: f: N->N such that f(x)=2x-7. | CO1 |
| 1. If p->q means “If X is a labourer, then he is poor”, then what does the statement ~p->~q mean? | CO2 |
| 1. Draw the truth table of p->q. | CO2 |
| 1. What is FSM? | CO2 |
| 1. Show that pV~p is a tautology. | CO2 |
| 1. Explain the term POset. | CO3 |
| 1. Show that the “set inclusion” on the power set P(A), is a POset. | CO3 |

Part- B (50 Marks)

| 1. If in a city 60% of the residents can speak German and 50% can speak French. What percentage of residents can speak both the language, if 20% residents cannot speak any of these two languages? | CO1 |
| --- | --- |
| OR | |
| 1. In the set Z of integers, a relation R is defined by aRb<->a=b(mod4). Show that R is an equivalence relation. | CO1 |

| 1. Prove that (i) (A ∪ B)’ = A’ ∩ B’ and (ii) (A ∩ B)’ = A’ ∪ B’. | CO1 |
| --- | --- |
| OR | |
| 2. Prove the following statement: P(x): 2n>n2, n>=5. | CO1 |

| 1. Find the DNF of P->(P->Q)^ ~(~PV~P)) | CO2 |
| --- | --- |
| OR | |
| 3. Obtain the PCNF of the form (~p->r)^(p<->q) | CO2 |
| 1. State and prove the distributive law for propositional logics. | CO2 |
| OR | |
| 4. Draw the transition diagram of FSM represented by the following table:   | State | Transition  0 | function  1 | Output  0 | Function  1 | | --- | --- | --- | --- | --- | | S0 | S3 | S1 | 0 | 1 | | S1 | S0 | S1 | 0 | 1 | | S2 | S3 | S1 | 0 | 1 | | S3 | S1 | S3 | 0 | 0 | | CO2 |

| 1. Show that the relation | “a divides b” on the set of positive integers is a Partial ordering set (POset). | CO3 |
| --- | --- |
| OR | |
| 5. Draw the Hasse Diagram of the poset (A,≤) where A={1,2,3,4,12,24} and “ ≤” stands for the divisibility on A (i.e. if a divides b). Also find maximal and minimal elements. | CO3 |

**Marks and Gap Analysis of Mid-Term 1**

| Sr. No | RTU Roll Number | Name of the Student | M-1 Marks (70) | Remark ( Remedial Class need or not – Y/N ) |
| --- | --- | --- | --- | --- |
| 1 | 22ETCCS001 | AADARSH SONI | 64 | N |
| 2 | 22ETCCS002 | ABDUL ATTIF | 52 | N |
| 3 | 22ETCCS003 | ABHIJEET GARG | 54 | N |
| 4 | 22ETCCS004 | ADITYA CHHIPA | 68 | N |
| 5 | 22ETCCS005 | ADITYA GIRI GOSWAMI | 55 | N |
| 6 | 22ETCCS006 | ADITYA SHARMA | 70 | N |
| 7 | 22ETCCS007 | AJIT KUMAR | 53 | N |
| 8 | 22ETCCS008 | AKASH SONI | 56 | N |
| 9 | 22ETCCS009 | AKSHAT JANGID | 64 | N |
| 10 | 22ETCCS010 | AKSHAT KUMAR SAINI | 55 | N |
| 11 | 22ETCCS011 | AKSHI BARGURJAR | 56 | N |
| 12 | 22ETCCS012 | AKSHIT NALWAYA | 56 | N |
| 13 | 22ETCCS013 | AKSHITA KUMAWAT | 58 | N |
| 14 | 22ETCCS014 | AKSHITA PANCHAL | 59 | N |
| 15 | 22ETCCS015 | ALI ASGAR ORA WALA | 58 | N |
| 16 | 22ETCCS017 | ANGHA VARANGAONKAR | 66 | N |
| 17 | 22ETCCS018 | ANKIT DHANAWAT | 62 | N |
| 18 | 22ETCCS019 | ANSHIKA JAIN | 67 | N |
| 19 | 22ETCCS020 | ARCHIT JAIN | 54 | N |
| 20 | 22ETCCS021 | ARIN UPADHAYAY | 55 | N |
| 21 | 22ETCCS022 | ARUSH MENARIA | 66 | N |
| 22 | 22ETCCS023 | ARYAN TALWAR | 56 | N |
| 23 | 22ETCCS024 | AVIKA SURANA | 64 | N |
| 24 | 22ETCCS025 | BHAWANA KUMARI | 66 | N |
| 25 | 22ETCCS026 | BHUMI JAIN | 55 | N |
| 26 | 22ETCCS027 | BHUWAN SUTHAR | 63 | N |
| 27 | 22ETCCS028 | CHETAN NAGDA | 44 | N |
| 28 | 22ETCCS029 | CHIRAG SHARMA | 45 | N |
| 29 | 22ETCCS030 | MS. CIA SHARMMA | 62 | N |
| 30 | 22ETCCS031 | DAIVIK SHARMA | 46 | N |
| 31 | 22ETCCS032 | DAKSH JAIN | 64 | N |
| 32 | 22ETCCS033 | DAKSH MENARIA | 60 | N |
| 33 | 22ETCCS034 | DEV PARAKH | 63 | N |
| 34 | 22ETCCS035 | DHANESH JOSHI | 57 | N |
| 35 | 22ETCCS036 | DHEERAJ SINGH THAPA | 47 | N |
| 36 | 22ETCCS037 | DHWANI KHUSHLANI | 70 | N |
| 37 | 22ETCCS038 | DIKSHIT DARJI | 54 | N |
| 38 | 22ETCCS039 | MSDIKSHITA SHARMA | 55 | N |
| 39 | 22ETCCS040 | DIVYA BAGORA | 61 | N |
| 40 | 22ETCCS041 | DIVYANSHU SHARMA | 56 | N |
| 41 | 22ETCCS042 | DIVYASHAKTI PAL | 62 | N |
| 42 | 22ETCCS043 | DIYA JAIN | 55 | N |
| 43 | 22ETCCS044 | DIYA PALIWAL | 63 | N |
| 44 | 22ETCCS045 | FALGUN CHOUDHARY | 65 | N |
| 45 | 22ETCCS046 | GARGI SHARMA | 62 | N |
| 46 | 22ETCCS047 | GARV BAKLIWAL | 64 | N |
| 47 | 22ETCCS048 | GARVIT NANDAWAT | 50 | N |
| 48 | 22ETCCS049 | GAURAV JAIN | 51 | N |
| 49 | 22ETCCS050 | GAURAVI NEGI | 65 | N |
| 50 | 22ETCCS051 | GAURI SUTHAR | 70 | N |
| 51 | 22ETCCS053 | GOURAV POKHARNA | 54 | N |
| 52 | 22ETCCS054 | HARDIK BATWAL | 56 | N |
| 53 | 22ETCCS055 | HARSH DANGI | 57 | N |
| 54 | 22ETCCS056 | HARSH KAWADIA | 56 | N |
| 55 | 22ETCCS057 | HARSH TAMBOLI | 58 | N |
| 56 | 22ETCCS058 | HARSHAL JAIN | 59 | N |
| 57 | 22ETCCS059 | HARSHIT POKHARNA | 58 | N |
| 58 | 22ETCCS060 | HARSHVARDHAN SINGH CHAUHAN | 62 | N |
| 59 | 22ETCCS061 | HARSHVARDHAN SINGH KITAWAT | 53 | N |
| 60 | 22ETCCS062 | HEMANT AHUJA | 58 | N |
| 61 | 22ETCCS064 | HIMANK LOHAR | 64 | N |
| 62 | 22ETCCS065 | HIMANSHI PRAJAPAT | 70 | N |
| 63 | 22ETCCS066 | HIMANSHU KALAL | 63 | N |
| 64 | 22ETCCS067 | HONHAR RAWAL | 54 | N |
| 65 | 22ETCCS068 | HUSAIN BOHRA TIDIWALA | 55 | N |
| 66 | 22ETCCS069 | JAINISH JAIN | 56 | N |
| 67 | 22ETCCS070 | JAYESH JOSHI | 64 | N |
| 68 | 22ETCCS071 | JAYESH MANDAWAT | 58 | N |
| 69 | 22ETCCS072 | JINENDRA SINGH DODIYA | 62 | N |
| 70 | 22ETCCS073 | KANIKA GUPTA | 52 | N |
| 71 | 22ETCCS074 | KANISHK GUPTA | 52 | N |
| 72 | 22ETCCS075 | KAPIL KALAL | 55 | N |
| 73 | 22ETCCS076 | KARAN SWAMI | 53 | N |
| 74 | 22ETCCS077 | KARTIK JAIN | 66 | N |
| 75 | 22ETCCS078 | KARTIK KRISHNA KALE | 63 | N |
| 76 | 22ETCCS079 | KAVYA PALIWAL | 54 | N |
| 77 | 22ETCCS080 | KETAN OJHA | 54 | N |
| 78 | 22ETCCS081 | KHUSH JAIN | 68 | N |
| 79 | 22ETCCS082 | KHUSHI SHARMA | 55 | N |
| 80 | 22ETCCS083 | KIRTAN TAMBOLI | 56 | N |
| 81 | 22ETCCS085 | KONPAL SHARMA | 62 | N |
| 82 | 22ETCCS086 | KRITI PATWA | 70 | N |
| 83 | 22ETCCS087 | KUSH PARSAI | 55 | N |
| 84 | 22ETCCS088 | KUSHAL MEENA | 55 | N |
| 85 | 22ETCCS089 | LAKSHIT PALIWAL | 56 | N |
| 86 | 22ETCCS090 | LAKSHY JAIN | 44 | N |
| 87 | 22ETCCS091 | LAKSHYARAJ CHOUDHARY | 45 | N |
| 88 | 22ETCCS092 | LAL SINGH JHALA | 56 | N |
| 89 | 22ETCCS093 | LUCKY LOHAR | 55 | N |
| 90 | 22ETCCS094 | MAHATV BHATNAGAR | 56 | N |
| 91 | 22ETCCS095 | MAHENDRA SINGH SISODIYA | 60 | N |
| 92 | 22ETCCS096 | MSMAHIMA CHOUHAN | 58 | N |
| 93 | 22ETCCS097 | MAHIPAL SINGH JHALA | 59 | N |
| 94 | 22ETCCS098 | MAHIRAJ SINGH SANKHLA | 58 | N |
| 95 | 22ETCCS099 | MANAS PARWANI | 62 | N |
| 96 | 22ETCCS100 | MANASVI SHARMA | 64 | N |
| 97 | 22ETCCS101 | MANASWINI SHARMA | 63 | N |
| 98 | 22ETCCS102 | MANSI DUBE | 70 | N |
| 99 | 22ETCCS103 | MAYANK KASERA | 64 | N |
| 100 | 22ETCCS104 | MAYANK TRIVEDI | 46 | N |
| 101 | 22ETCCS105 | MEDHAVI KAUSHIK | 63 | N |
| 102 | 22ETCCS106 | MEETRAJ SINGH | 61 | N |
| 103 | 22ETCCS107 | MITALI PALIWAL | 54 | N |
| 104 | 22ETCCS108 | MITVESH AMETA | 55 | N |
| 105 | 22ETCCS109 | MOHAMMED YASAR | 62 | N |
| 106 | 22ETCCS110 | MOHIT KALAL | 56 | N |
| 107 | 22ETCCS111 | MOHIT KUMAWAT | 55 | N |
| 108 | 22ETCCS112 | MONIL SETH | 56 | N |
| 109 | 22ETCCS113 | NAKUL PANDYA | 56 | N |
| 110 | 22ETCCS114 | NEERAJ DANGI | 62 | N |
| 111 | 22ETCCS115 | NIKHIL RAJ MALI | 59 | N |
| 112 | 22ETCCS116 | NIMISHKA CHAUHAN | 58 | N |
| 113 | 22ETCCS117 | NISHANT MENARIA | 59 | N |
| 114 | 22ETCCS118 | MSPALAK KUMAWAT | 59 | N |
| 115 | 22ETCCS119 | PARSHVI HARKAWAT | 64 | N |
| 116 | 22ETCCS120 | PRAGYA BUJ | 58 | N |
| 117 | 22ETCCS121 | PRATIBHA SINGH | 64 | N |
| 118 | 22ETCCS122 | PRINCE DANGI | 62 | N |
| 119 | 22ETCCS123 | PRIYANSH JAIN | 64 | N |
| 120 | 22ETCCS124 | PURVAM CHATURVEDI | 47 | N |
| 121 | 22ETCCS125 | PUSHKAR GAMETI | 65 | N |
| 122 | 22ETCCS126 | PUSHPENDRA MENARIA | 66 | N |
| 123 | 22ETCCS127 | QAIDJOHAR JUKKER | 53 | N |
| 124 | 22ETCCS128 | RAGHAVENDRA BAHETI | 63 | N |
| 125 | 22ETCCS129 | RAJ LAXKAR | 54 | N |
| 126 | 22ETCCS130 | RAJ SHRIMALI | 60 | N |
| 127 | 22ETCCS131 | RAM MUNDRA | 64 | N |
| 128 | 22ETCCS132 | RAMMITH K R | 63 | N |
| 129 | 22ETCCS133 | RANITH BISWAS | 60 | N |
| 130 | 22ETCCS134 | RANJIT SINGH SHAKTAWAT | 54 | N |
| 131 | 22ETCCS135 | MSRAUNAK TAK | 55 | N |
| 132 | 22ETCCS136 | RAVI JOSHI | 55 | N |
| 133 | 22ETCCS137 | RAVI MENARIYA | 56 | N |
| 134 | 22ETCCS138 | RITIK SHARMA | 64 | N |
| 135 | 22ETCCS139 | RITISHA SEN | 56 | N |
| 136 | 22ETCCS140 | ROHIT AGARWAL | 55 | N |
| 137 | 22ETCCS141 | ROSHAN SHARMA | 56 | N |
| 138 | 22ETCCS142 | ROSHNI MENARIA | 56 | N |
| 139 | 22ETCCS143 | RUDRA PUROHIT | 62 | N |
| 140 | 22ETCCS144 | RUDRAVEER SINGH PANWAR | 58 | N |
| 141 | 22ETCCS145 | SHAAN SANADHYA | 52 | N |
| 142 | 22ETCCS146 | SHACHI JAIN | 59 | N |
| 143 | 22ETCCS147 | SHAURYA KUNDAR | 50 | N |
| 144 | 22ETCCS148 | SHOURYA BORDIA | 58 | N |
| 145 | 22ETCCS149 | SHUBHAM YADAV | 51 | N |
| 146 | 22ETCCS150 | SIDDHARTH KUMAR SINGH | 52 | N |
| 147 | 22ETCCS151 | SIDDHARTH MENARIA | 62 | N |
| 148 | 22ETCCS152 | SRAJAN MENARIA | 53 | N |
| 149 | 22ETCCS154 | SUMIT DANGI | 64 | N |
| 150 | 22ETCCS155 | SURBHI TAILOR | 63 | N |
| 151 | 22ETCCS156 | SURYANSH MADHUKAR | 54 | N |
| 152 | 22ETCCS157 | TALENT JAIN | 55 | N |
| 153 | 22ETCCS158 | TANISHK VYAS | 64 | N |
| 154 | 22ETCCS159 | TANVI SHARMA | 56 | N |
| 155 | 22ETCCS160 | TOHEED AKHTAR | 63 | N |
| 156 | 22ETCCS161 | TUSHAR PRAJAPAT | 55 | N |
| 157 | 22ETCCS162 | TUSHAR SINGH RAWAT | 54 | N |
| 158 | 22ETCCS163 | UJJWAL SINGH CHOUHAN | 60 | N |
| 159 | 22ETCCS164 | USHIT SHARMA | 55 | N |
| 160 | 22ETCCS165 | UTKARSH BAJPAI | 56 | N |
| 161 | 22ETCCS166 | VAIBHAV GOYAL | 66 | N |
| 162 | 22ETCCS167 | VANSH BHATNAGAR | 55 | N |
| 163 | 22ETCCS168 | VINAY VADERA | 54 | N |
| 164 | 22ETCCS169 | VINITA MENARIA | 62 | N |
| 165 | 22ETCCS170 | VISHAL MENARIYA | 70 | N |
| 166 | 22ETCCS171 | VISHAL SINGH RAO | 60 | N |
| 167 | 22ETCCS172 | VIVEK SHARMA | 63 | N |
| 168 | 22ETCCS173 | VIVEK SHRIMALI | 56 | N |
| 169 | 22ETCCS174 | YANA OZHA | 62 | N |
| 170 | 22ETCCS175 | YASH VAGHELA | 61 | N |
| 171 | 22ETCCS300 | KEVALI ASHOK KANAGALE | 68 | N |
| 172 | 22ETCCS301 | KARAN SUTHAR | 62 | N |
| 173 | 22ETCCS302 | VINEET SHARMA | 62 | N |
| 174 | 23ETCCS200 | GOPAL PALIWAL | 62 | N |
| 175 | 23ETCCS201 | MANISH VYAS | 55 | N |
| 176 | 23ETCCS202 | RAHUL RAJPUROHIT | 64 | N |
| 177 | 23ETCCS203 | VAISHALI H PUROHIT | 56 | N |
| 178 | 23ETCCS204 | YASH SINGHATWADIA | 65 | N |
| 179 | 20ETCSS095 | RAUNAK JAIN | 62 | N |

**\***(Y, if obtained marks are <50%)

**Signature of Faculty: Signature of HOD**

# TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY

# B. TECH II – YEAR (IV SEM.)

**Discrete Mathematics Structure (4CS201)**

**Mid Term Paper-II**

## Max Marks: 70 Time:2 Hrs

**Note:**1) The paper is divided into 2 parts: Part-A and, Part-B  
2) Part-A contains 10 questions and carries 2 mark each.  
3) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

**Part- A (20 Marks)**

|  | Show that the proposition  (p˅q) is a contradiction. | CO3 |
| --- | --- | --- |
|  | Find the generating function of 1,7,72,73,……. | CO3 |
|  | Find the cosets of 3Z. | CO4 |
|  | Define Homomorphism and isomorphism of group. | CO4 |
|  | Write the properties of ring. | CO4 |
|  | Check if (Z, \*) is group. | CO4 |
|  | What do you mean by a circuit ? | CO5 |
|  | What is the directed graph. | CO5 |
|  | Define Isomorphic graph with example. | CO5 |
|  | Define Euler graph with example. | CO5 |

**Part- B (50 Marks)**

| **1.A**.State and prove DE Morgan’s law using only set rules.  **B**. Find the generating function for Tower of Hanoi. | CO3 |
| --- | --- |
| **OR** | |
| **1.A.** Let A={a,b,c} ,then find its power set and Hasse diagram.  **B.** Let X be a set and P(A) be its power set.Show that (P ,⸦) is a Poset. | CO3 |

| 2. Show that the order an element and its inverse is same in a group. | CO4 |
| --- | --- |
| OR | |
| 2 State and prove Lagrange's theorem. | CO4 |

| 3. Let H =<4Z> is a subgroup of Z. find all the cosets of H in Z and show that it forms a group. | CO4 |
| --- | --- |
| OR | |
| 3. Show that the set S={a+b \root 2| a,b belongs to Z} is a ring but not a field. | CO4 |

| 4. Write short note on (1) Chromatic Number (2) Euler graph (3) Hamilton Graph | CO5 |
| --- | --- |
| **OR** | |
| 4. Explain the vertex and edge connectivity by suitable example. | CO5 |

| **5. A.** Find the minimum distance between two vertices K and L of graph. | CO5 |
| --- | --- |
| **OR** | |
| **5.**  Define Adjacency matrix and Incidence matrix with suitable examples. | CO5 |

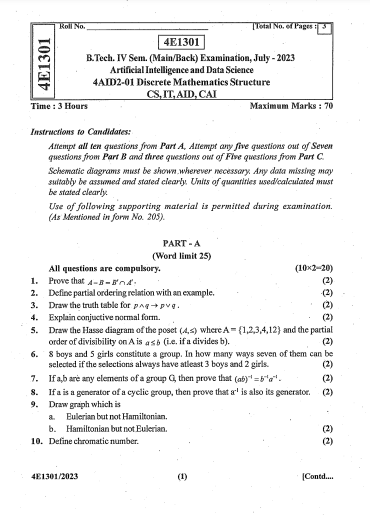
**Marks and Gap Analysis of Mid-Term II**

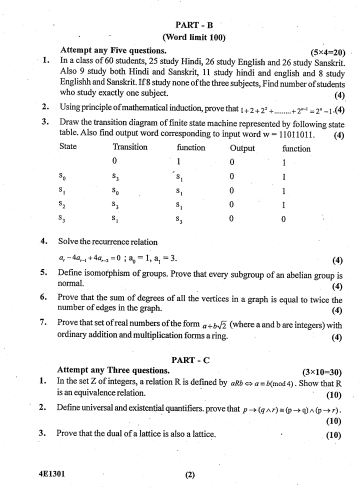
| Sr. No | RTU Roll Number | Name of the Student | M-2 Marks (70) | Remark ( Remedial Class need or not – Y/N ) |
| --- | --- | --- | --- | --- |
| 1 | 22ETCCS001 | AADARSH SONI | 67 | N |
| 2 | 22ETCCS002 | ABDUL ATTIF | 65 | N |
| 3 | 22ETCCS003 | ABHIJEET GARG | 67 | N |
| 4 | 22ETCCS004 | ADITYA CHHIPA | 67 | N |
| 5 | 22ETCCS005 | ADITYA GIRI GOSWAMI | 66 | N |
| 6 | 22ETCCS006 | ADITYA SHARMA | 70 | N |
| 7 | 22ETCCS007 | AJIT KUMAR | 64 | N |
| 8 | 22ETCCS008 | AKASH SONI | 65 | N |
| 9 | 22ETCCS009 | AKSHAT JANGID | 67 | N |
| 10 | 22ETCCS010 | AKSHAT KUMAR SAINI | 66 | N |
| 11 | 22ETCCS011 | AKSHI BARGURJAR | 65 | N |
| 12 | 22ETCCS012 | AKSHIT NALWAYA | 65 | N |
| 13 | 22ETCCS013 | AKSHITA KUMAWAT | 63 | N |
| 14 | 22ETCCS014 | AKSHITA PANCHAL | 62 | N |
| 15 | 22ETCCS015 | ALI ASGAR ORA WALA | 63 | N |
| 16 | 22ETCCS017 | ANGHA VARANGAONKAR | 65 | N |
| 17 | 22ETCCS018 | ANKIT DHANAWAT | 59 | N |
| 18 | 22ETCCS019 | ANSHIKA JAIN | 68 | N |
| 19 | 22ETCCS020 | ARCHIT JAIN | 63 | N |
| 20 | 22ETCCS021 | ARIN UPADHAYAY | 62 | N |
| 21 | 22ETCCS022 | ARUSH MENARIA | 69 | N |
| 22 | 22ETCCS023 | ARYAN TALWAR | 61 | N |
| 23 | 22ETCCS024 | AVIKA SURANA | 57 | N |
| 24 | 22ETCCS025 | BHAWANA KUMARI | 65 | N |
| 25 | 22ETCCS026 | BHUMI JAIN | 62 | N |
| 26 | 22ETCCS027 | BHUWAN SUTHAR | 58 | N |
| 27 | 22ETCCS028 | CHETAN NAGDA | 68 | N |
| 28 | 22ETCCS029 | CHIRAG SHARMA | 67 | N |
| 29 | 22ETCCS030 | MS. CIA SHARMMA | 69 | N |
| 30 | 22ETCCS031 | DAIVIK SHARMA | 66 | N |
| 31 | 22ETCCS032 | DAKSH JAIN | 57 | N |
| 32 | 22ETCCS033 | DAKSH MENARIA | 57 | N |
| 33 | 22ETCCS034 | DEV PARAKH | 58 | N |
| 34 | 22ETCCS035 | DHANESH JOSHI | 69 | N |
| 35 | 22ETCCS036 | DHEERAJ SINGH THAPA | 65 | N |
| 36 | 22ETCCS037 | DHWANI KHUSHLANI | 70 | N |
| 37 | 22ETCCS038 | DIKSHIT DARJI | 67 | N |
| 38 | 22ETCCS039 | MSDIKSHITA SHARMA | 66 | N |
| 39 | 22ETCCS040 | DIVYA BAGORA | 56 | N |
| 40 | 22ETCCS041 | DIVYANSHU SHARMA | 65 | N |
| 41 | 22ETCCS042 | DIVYASHAKTI PAL | 55 | N |
| 42 | 22ETCCS043 | DIYA JAIN | 66 | N |
| 43 | 22ETCCS044 | DIYA PALIWAL | 68 | N |
| 44 | 22ETCCS045 | FALGUN CHOUDHARY | 70 | N |
| 45 | 22ETCCS046 | GARGI SHARMA | 55 | N |
| 46 | 22ETCCS047 | GARV BAKLIWAL | 53 | N |
| 47 | 22ETCCS048 | GARVIT NANDAWAT | 62 | N |
| 48 | 22ETCCS049 | GAURAV JAIN | 61 | N |
| 49 | 22ETCCS050 | GAURAVI NEGI | 52 | N |
| 50 | 22ETCCS051 | GAURI SUTHAR | 70 | N |
| 51 | 22ETCCS053 | GOURAV POKHARNA | 58 | N |
| 52 | 22ETCCS054 | HARDIK BATWAL | 65 | N |
| 53 | 22ETCCS055 | HARSH DANGI | 69 | N |
| 54 | 22ETCCS056 | HARSH KAWADIA | 65 | N |
| 55 | 22ETCCS057 | HARSH TAMBOLI | 63 | N |
| 56 | 22ETCCS058 | HARSHAL JAIN | 62 | N |
| 57 | 22ETCCS059 | HARSHIT POKHARNA | 63 | N |
| 58 | 22ETCCS060 | HARSHVARDHAN SINGH CHAUHAN | 59 | N |
| 59 | 22ETCCS061 | HARSHVARDHAN SINGH KITAWAT | 64 | N |
| 60 | 22ETCCS062 | HEMANT AHUJA | 68 | N |
| 61 | 22ETCCS064 | HIMANK LOHAR | 57 | N |
| 62 | 22ETCCS065 | HIMANSHI PRAJAPAT | 70 | N |
| 63 | 22ETCCS066 | HIMANSHU KALAL | 58 | N |
| 64 | 22ETCCS067 | HONHAR RAWAL | 63 | N |
| 65 | 22ETCCS068 | HUSAIN BOHRA TIDIWALA | 62 | N |
| 66 | 22ETCCS069 | JAINISH JAIN | 61 | N |
| 67 | 22ETCCS070 | JAYESH JOSHI | 57 | N |
| 68 | 22ETCCS071 | JAYESH MANDAWAT | 68 | N |
| 69 | 22ETCCS072 | JINENDRA SINGH DODIYA | 55 | N |
| 70 | 22ETCCS073 | KANIKA GUPTA | 65 | N |
| 71 | 22ETCCS074 | KANISHK GUPTA | 65 | N |
| 72 | 22ETCCS075 | KAPIL KALAL | 57 | N |
| 73 | 22ETCCS076 | KARAN SWAMI | 64 | N |
| 74 | 22ETCCS077 | KARTIK JAIN | 69 | N |
| 75 | 22ETCCS078 | KARTIK KRISHNA KALE | 58 | N |
| 76 | 22ETCCS079 | KAVYA PALIWAL | 67 | N |
| 77 | 22ETCCS080 | KETAN OJHA | 63 | N |
| 78 | 22ETCCS081 | KHUSH JAIN | 67 | N |
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| 80 | 22ETCCS083 | KIRTAN TAMBOLI | 65 | N |
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| 83 | 22ETCCS087 | KUSH PARSAI | 66 | N |
| 84 | 22ETCCS088 | KUSHAL MEENA | 62 | N |
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| 116 | 22ETCCS120 | PRAGYA BUJ | 63 | N |
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| 152 | 22ETCCS157 | TALENT JAIN | 62 | N |
| 153 | 22ETCCS158 | TANISHK VYAS | 57 | N |
| 154 | 22ETCCS159 | TANVI SHARMA | 61 | N |
| 155 | 22ETCCS160 | TOHEED AKHTAR | 58 | N |
| 156 | 22ETCCS161 | TUSHAR PRAJAPAT | 62 | N |
| 157 | 22ETCCS162 | TUSHAR SINGH RAWAT | 67 | N |
| 158 | 22ETCCS163 | UJJWAL SINGH CHOUHAN | 57 | N |
| 159 | 22ETCCS164 | USHIT SHARMA | 66 | N |
| 160 | 22ETCCS165 | UTKARSH BAJPAI | 65 | N |
| 161 | 22ETCCS166 | VAIBHAV GOYAL | 65 | N |
| 162 | 22ETCCS167 | VANSH BHATNAGAR | 66 | N |
| 163 | 22ETCCS168 | VINAY VADERA | 58 | N |
| 164 | 22ETCCS169 | VINITA MENARIA | 69 | N |
| 165 | 22ETCCS170 | VISHAL MENARIYA | 70 | N |
| 166 | 22ETCCS171 | VISHAL SINGH RAO | 66 | N |
| 167 | 22ETCCS172 | VIVEK SHARMA | 68 | N |
| 168 | 22ETCCS173 | VIVEK SHRIMALI | 65 | N |
| 169 | 22ETCCS174 | YANA OZHA | 69 | N |
| 170 | 22ETCCS175 | YASH VAGHELA | 56 | N |
| 171 | 22ETCCS300 | KEVALI ASHOK KANAGALE | 67 | N |
| 172 | 22ETCCS301 | KARAN SUTHAR | 64 | N |
| 173 | 22ETCCS302 | VINEET SHARMA | 55 | N |
| 174 | 23ETCCS200 | GOPAL PALIWAL | 55 | N |
| 175 | 23ETCCS201 | MANISH VYAS | 57 | N |
| 176 | 23ETCCS202 | RAHUL RAJPUROHIT | 53 | N |
| 177 | 23ETCCS203 | VAISHALI H PUROHIT | 65 | N |
| 178 | 23ETCCS204 | YASH SINGHATWADIA | 52 | N |
| 179 | 20ETCSS095 | RAUNAK JAIN | 64 | N |

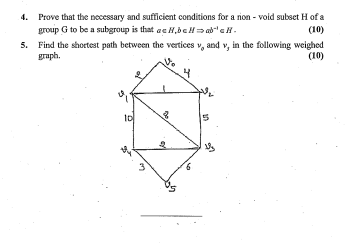
**\***(Y, if obtained marks are <50%)

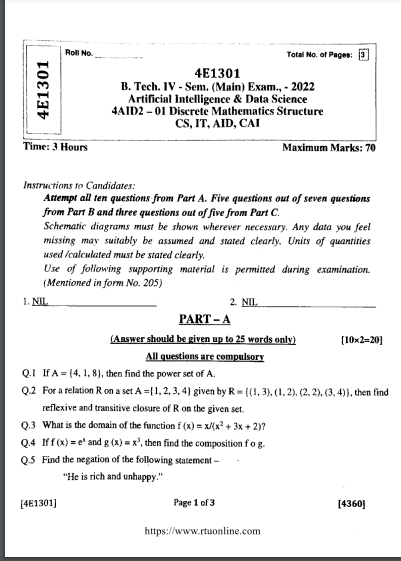
**Signature of Faculty: Signature of HOD**

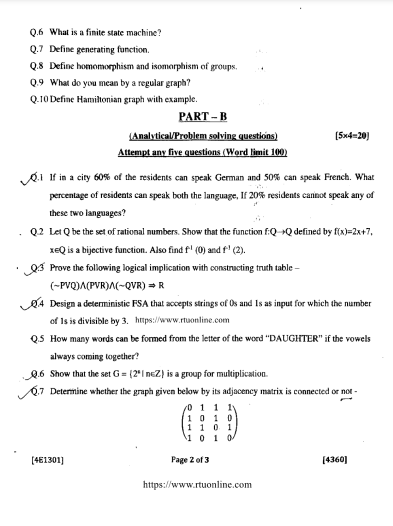
**Model Question Paper**

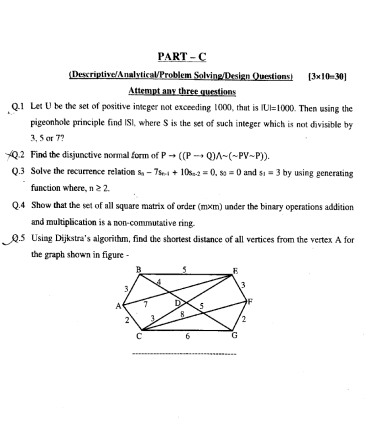












**RESULT ANALYSIS**

| **S.NO.** | **RTU ROLL NUMBER** | **NAME OF STUDENT** | **END TERM MARKS** | **SESSIONAL MARKS** | **TOTAL** |
| --- | --- | --- | --- | --- | --- |
| **MAX MARKS** | **70** | **30** | **100** |
| 1 | 22ETCCS001 | AADARSH SONI |  | 27 |  |
| 2 | 22ETCCS002 | ABDUL ATTIF |  | 25 |  |
| 3 | 22ETCCS003 | ABHIJEET GARG |  | 26 |  |
| 4 | 22ETCCS004 | ADITYA CHHIPA |  | 29 |  |
| 5 | 22ETCCS005 | ADITYA GIRI GOSWAMI |  | 26 |  |
| 6 | 22ETCCS006 | ADITYA SHARMA |  | 30 |  |
| 7 | 22ETCCS007 | AJIT KUMAR |  | 25 |  |
| 8 | 22ETCCS008 | AKASH SONI |  | 26 |  |
| 9 | 22ETCCS009 | AKSHAT JANGID |  | 28 |  |
| 10 | 22ETCCS010 | AKSHAT KUMAR SAINI |  | 26 |  |
| 11 | 22ETCCS011 | AKSHI BARGURJAR |  | 26 |  |
| 12 | 22ETCCS012 | AKSHIT NALWAYA |  | 26 |  |
| 13 | 22ETCCS013 | AKSHITA KUMAWAT |  | 26 |  |
| 14 | 22ETCCS014 | AKSHITA PANCHAL |  | 26 |  |
| 15 | 22ETCCS015 | ALI ASGAR ORA WALA |  | 26 |  |
| 16 | 22ETCCS017 | ANGHA VARANGAONKAR |  | 28 |  |
| 17 | 22ETCCS018 | ANKIT DHANAWAT |  | 26 |  |
| 18 | 22ETCCS019 | ANSHIKA JAIN |  | 29 |  |
| 19 | 22ETCCS020 | ARCHIT JAIN |  | 25 |  |
| 20 | 22ETCCS021 | ARIN UPADHAYAY |  | 25 |  |
| 21 | 22ETCCS022 | ARUSH MENARIA |  | 29 |  |
| 22 | 22ETCCS023 | ARYAN TALWAR |  | 25 |  |
| 23 | 22ETCCS024 | AVIKA SURANA |  | 26 |  |
| 24 | 22ETCCS025 | BHAWANA KUMARI |  | 27 |  |
| 25 | 22ETCCS026 | BHUMI JAIN |  | 25 |  |
| 26 | 22ETCCS027 | BHUWAN SUTHAR |  | 26 |  |
| 27 | 22ETCCS028 | CHETAN NAGDA |  | 24 |  |
| 28 | 22ETCCS029 | CHIRAG SHARMA |  | 24 |  |
| 29 | 22ETCCS030 | MS. CIA SHARMMA |  | 28 |  |
| 30 | 22ETCCS031 | DAIVIK SHARMA |  | 24 |  |
| 31 | 22ETCCS032 | DAKSH JAIN |  | 26 |  |
| 32 | 22ETCCS033 | DAKSH MENARIA |  | 25 |  |
| 33 | 22ETCCS034 | DEV PARAKH |  | 26 |  |
| 34 | 22ETCCS035 | DHANESH JOSHI |  | 27 |  |
| 35 | 22ETCCS036 | DHEERAJ SINGH THAPA |  | 24 |  |
| 36 | 22ETCCS037 | DHWANI KHUSHLANI |  | 30 |  |
| 37 | 22ETCCS038 | DIKSHIT DARJI |  | 26 |  |
| 38 | 22ETCCS039 | MSDIKSHITA SHARMA |  | 26 |  |
| 39 | 22ETCCS040 | DIVYA BAGORA |  | 25 |  |
| 40 | 22ETCCS041 | DIVYANSHU SHARMA |  | 26 |  |
| 41 | 22ETCCS042 | DIVYASHAKTI PAL |  | 25 |  |
| 42 | 22ETCCS043 | DIYA JAIN |  | 26 |  |
| 43 | 22ETCCS044 | DIYA PALIWAL |  | 28 |  |
| 44 | 22ETCCS045 | FALGUN CHOUDHARY |  | 29 |  |
| 45 | 22ETCCS046 | GARGI SHARMA |  | 25 |  |
| 46 | 22ETCCS047 | GARV BAKLIWAL |  | 25 |  |
| 47 | 22ETCCS048 | GARVIT NANDAWAT |  | 24 |  |
| 48 | 22ETCCS049 | GAURAV JAIN |  | 24 |  |
| 49 | 22ETCCS050 | GAURAVI NEGI |  | 25 |  |
| 50 | 22ETCCS051 | GAURI SUTHAR |  | 30 |  |
| 51 | 22ETCCS053 | GOURAV POKHARNA |  | 24 |  |
| 52 | 22ETCCS054 | HARDIK BATWAL |  | 26 |  |
| 53 | 22ETCCS055 | HARSH DANGI |  | 27 |  |
| 54 | 22ETCCS056 | HARSH KAWADIA |  | 26 |  |
| 55 | 22ETCCS057 | HARSH TAMBOLI |  | 26 |  |
| 56 | 22ETCCS058 | HARSHAL JAIN |  | 26 |  |
| 57 | 22ETCCS059 | HARSHIT POKHARNA |  | 26 |  |
| 58 | 22ETCCS060 | HARSHVARDHAN SINGH CHAUHAN |  | 26 |  |
| 59 | 22ETCCS061 | HARSHVARDHAN SINGH KITAWAT |  | 25 |  |
| 60 | 22ETCCS062 | HEMANT AHUJA |  | 27 |  |
| 61 | 22ETCCS064 | HIMANK LOHAR |  | 26 |  |
| 62 | 22ETCCS065 | HIMANSHI PRAJAPAT |  | 30 |  |
| 63 | 22ETCCS066 | HIMANSHU KALAL |  | 26 |  |
| 64 | 22ETCCS067 | HONHAR RAWAL |  | 25 |  |
| 65 | 22ETCCS068 | HUSAIN BOHRA TIDIWALA |  | 25 |  |
| 66 | 22ETCCS069 | JAINISH JAIN |  | 25 |  |
| 67 | 22ETCCS070 | JAYESH JOSHI |  | 26 |  |
| 68 | 22ETCCS071 | JAYESH MANDAWAT |  | 27 |  |
| 69 | 22ETCCS072 | JINENDRA SINGH DODIYA |  | 25 |  |
| 70 | 22ETCCS073 | KANIKA GUPTA |  | 25 |  |
| 71 | 22ETCCS074 | KANISHK GUPTA |  | 25 |  |
| 72 | 22ETCCS075 | KAPIL KALAL |  | 24 |  |
| 73 | 22ETCCS076 | KARAN SWAMI |  | 25 |  |
| 74 | 22ETCCS077 | KARTIK JAIN |  | 29 |  |
| 75 | 22ETCCS078 | KARTIK KRISHNA KALE |  | 26 |  |
| 76 | 22ETCCS079 | KAVYA PALIWAL |  | 26 |  |
| 77 | 22ETCCS080 | KETAN OJHA |  | 25 |  |
| 78 | 22ETCCS081 | KHUSH JAIN |  | 29 |  |
| 79 | 22ETCCS082 | KHUSHI SHARMA |  | 26 |  |
| 80 | 22ETCCS083 | KIRTAN TAMBOLI |  | 26 |  |
| 81 | 22ETCCS085 | KONPAL SHARMA |  | 28 |  |
| 82 | 22ETCCS086 | KRITI PATWA |  | 30 |  |
| 83 | 22ETCCS087 | KUSH PARSAI |  | 26 |  |
| 84 | 22ETCCS088 | KUSHAL MEENA |  | 25 |  |
| 85 | 22ETCCS089 | LAKSHIT PALIWAL |  | 25 |  |
| 86 | 22ETCCS090 | LAKSHY JAIN |  | 24 |  |
| 87 | 22ETCCS091 | LAKSHYARAJ CHOUDHARY |  | 24 |  |
| 88 | 22ETCCS092 | LAL SINGH JHALA |  | 26 |  |
| 89 | 22ETCCS093 | LUCKY LOHAR |  | 25 |  |
| 90 | 22ETCCS094 | MAHATV BHATNAGAR |  | 26 |  |
| 91 | 22ETCCS095 | MAHENDRA SINGH SISODIYA |  | 25 |  |
| 92 | 22ETCCS096 | MSMAHIMA CHOUHAN |  | 26 |  |
| 93 | 22ETCCS097 | MAHIPAL SINGH JHALA |  | 26 |  |
| 94 | 22ETCCS098 | MAHIRAJ SINGH SANKHLA |  | 26 |  |
| 95 | 22ETCCS099 | MANAS PARWANI |  | 26 |  |
| 96 | 22ETCCS100 | MANASVI SHARMA |  | 26 |  |
| 97 | 22ETCCS101 | MANASWINI SHARMA |  | 26 |  |
| 98 | 22ETCCS102 | MANSI DUBE |  | 30 |  |
| 99 | 22ETCCS103 | MAYANK KASERA |  | 26 |  |
| 100 | 22ETCCS104 | MAYANK TRIVEDI |  | 24 |  |
| 101 | 22ETCCS105 | MEDHAVI KAUSHIK |  | 26 |  |
| 102 | 22ETCCS106 | MEETRAJ SINGH |  | 25 |  |
| 103 | 22ETCCS107 | MITALI PALIWAL |  | 26 |  |
| 104 | 22ETCCS108 | MITVESH AMETA |  | 26 |  |
| 105 | 22ETCCS109 | MOHAMMED YASAR |  | 25 |  |
| 106 | 22ETCCS110 | MOHIT KALAL |  | 26 |  |
| 107 | 22ETCCS111 | MOHIT KUMAWAT |  | 26 |  |
| 108 | 22ETCCS112 | MONIL SETH |  | 26 |  |
| 109 | 22ETCCS113 | NAKUL PANDYA |  | 26 |  |
| 110 | 22ETCCS114 | NEERAJ DANGI |  | 25 |  |
| 111 | 22ETCCS115 | NIKHIL RAJ MALI |  | 27 |  |
| 112 | 22ETCCS116 | NIMISHKA CHAUHAN |  | 26 |  |
| 113 | 22ETCCS117 | NISHANT MENARIA |  | 27 |  |
| 114 | 22ETCCS118 | MSPALAK KUMAWAT |  | 26 |  |
| 115 | 22ETCCS119 | PARSHVI HARKAWAT |  | 25 |  |
| 116 | 22ETCCS120 | PRAGYA BUJ |  | 26 |  |
| 117 | 22ETCCS121 | PRATIBHA SINGH |  | 28 |  |
| 118 | 22ETCCS122 | PRINCE DANGI |  | 26 |  |
| 119 | 22ETCCS123 | PRIYANSH JAIN |  | 26 |  |
| 120 | 22ETCCS124 | PURVAM CHATURVEDI |  | 24 |  |
| 121 | 22ETCCS125 | PUSHKAR GAMETI |  | 25 |  |
| 122 | 22ETCCS126 | PUSHPENDRA MENARIA |  | 28 |  |
| 123 | 22ETCCS127 | QAIDJOHAR JUKKER |  | 25 |  |
| 124 | 22ETCCS128 | RAGHAVENDRA BAHETI |  | 26 |  |
| 125 | 22ETCCS129 | RAJ LAXKAR |  | 25 |  |
| 126 | 22ETCCS130 | RAJ SHRIMALI |  | 27 |  |
| 127 | 22ETCCS131 | RAM MUNDRA |  | 26 |  |
| 128 | 22ETCCS132 | RAMMITH K R |  | 26 |  |
| 129 | 22ETCCS133 | RANITH BISWAS |  | 27 |  |
| 130 | 22ETCCS134 | RANJIT SINGH SHAKTAWAT |  | 26 |  |
| 131 | 22ETCCS135 | MSRAUNAK TAK |  | 25 |  |
| 132 | 22ETCCS136 | RAVI JOSHI |  | 26 |  |
| 133 | 22ETCCS137 | RAVI MENARIYA |  | 25 |  |
| 134 | 22ETCCS138 | RITIK SHARMA |  | 28 |  |
| 135 | 22ETCCS139 | RITISHA SEN |  | 26 |  |
| 136 | 22ETCCS140 | ROHIT AGARWAL |  | 26 |  |
| 137 | 22ETCCS141 | ROSHAN SHARMA |  | 26 |  |
| 138 | 22ETCCS142 | ROSHNI MENARIA |  | 26 |  |
| 139 | 22ETCCS143 | RUDRA PUROHIT |  | 25 |  |
| 140 | 22ETCCS144 | RUDRAVEER SINGH PANWAR |  | 26 |  |
| 141 | 22ETCCS145 | SHAAN SANADHYA |  | 25 |  |
| 142 | 22ETCCS146 | SHACHI JAIN |  | 26 |  |
| 143 | 22ETCCS147 | SHAURYA KUNDAR |  | 24 |  |
| 144 | 22ETCCS148 | SHOURYA BORDIA |  | 26 |  |
| 145 | 22ETCCS149 | SHUBHAM YADAV |  | 24 |  |
| 146 | 22ETCCS150 | SIDDHARTH KUMAR SINGH |  | 25 |  |
| 147 | 22ETCCS151 | SIDDHARTH MENARIA |  | 26 |  |
| 148 | 22ETCCS152 | SRAJAN MENARIA |  | 25 |  |
| 149 | 22ETCCS154 | SUMIT DANGI |  | 26 |  |
| 150 | 22ETCCS155 | SURBHI TAILOR |  | 26 |  |
| 151 | 22ETCCS156 | SURYANSH MADHUKAR |  | 25 |  |
| 152 | 22ETCCS157 | TALENT JAIN |  | 25 |  |
| 153 | 22ETCCS158 | TANISHK VYAS |  | 26 |  |
| 154 | 22ETCCS159 | TANVI SHARMA |  | 25 |  |
| 155 | 22ETCCS160 | TOHEED AKHTAR |  | 26 |  |
| 156 | 22ETCCS161 | TUSHAR PRAJAPAT |  | 25 |  |
| 157 | 22ETCCS162 | TUSHAR SINGH RAWAT |  | 26 |  |
| 158 | 22ETCCS163 | UJJWAL SINGH CHOUHAN |  | 25 |  |
| 159 | 22ETCCS164 | USHIT SHARMA |  | 26 |  |
| 160 | 22ETCCS165 | UTKARSH BAJPAI |  | 26 |  |
| 161 | 22ETCCS166 | VAIBHAV GOYAL |  | 28 |  |
| 162 | 22ETCCS167 | VANSH BHATNAGAR |  | 26 |  |
| 163 | 22ETCCS168 | VINAY VADERA |  | 24 |  |
| 164 | 22ETCCS169 | VINITA MENARIA |  | 28 |  |
| 165 | 22ETCCS170 | VISHAL MENARIYA |  | 30 |  |
| 166 | 22ETCCS171 | VISHAL SINGH RAO |  | 27 |  |
| 167 | 22ETCCS172 | VIVEK SHARMA |  | 28 |  |
| 168 | 22ETCCS173 | VIVEK SHRIMALI |  | 26 |  |
| 169 | 22ETCCS174 | YANA OZHA |  | 28 |  |
| 170 | 22ETCCS175 | YASH VAGHELA |  | 25 |  |
| 171 | 22ETCCS300 | KEVALI ASHOK KANAGALE |  | 29 |  |
| 172 | 22ETCCS301 | KARAN SUTHAR |  | 27 |  |
| 173 | 22ETCCS302 | VINEET SHARMA |  | 25 |  |
| 174 | 23ETCCS200 | GOPAL PALIWAL |  | 25 |  |
| 175 | 23ETCCS201 | MANISH VYAS |  | 24 |  |
| 176 | 23ETCCS202 | RAHUL RAJPUROHIT |  | 25 |  |
| 177 | 23ETCCS203 | VAISHALI H PUROHIT |  | 26 |  |
| 178 | 23ETCCS204 | YASH SINGHATWADIA |  | 25 |  |
| 179 | 20ETCSS095 | RAUNAK JAIN |  | 27 |  |

| Total students appear |  |
| --- | --- |
| Pass |  |
| Fail |  |
| % result |  |

**Indirect Assessment:**

**Overall Teacher Self Assessment (at the completion of course) in terms of course objective and outcomes**

At the completion of course I find that the set outcomes (see course outcome table) were achieved at the satisfactory level.

**Methodology to identify bright student**

I follow very simple techniques of observation and interaction. I observe the intellectual level of the students by asking simple questions which are basics of the mathematics and interact with them regularly. I pay attention to each and every students to know how they are utilizing their brain to perform the different tasks or activities.

**Efforts to keep students engaged**

I start my lecture by asking school level problems and move towards the topic to be taught. In between I ask short questions to which they can answer by looking at their notes, so that they can remember. One problem I solve with the help of the students and at the end I conduct MCQ. If I am continuing the topic taught in previous class, I start with making students recalling it and ask MCQ questions.