**Course File**

***Subject Title/Subject Code: Advanced Engineering Mathematics***

Semester: IV Year 2023-24

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

**Class Schedule**

**Total Number of Lectures:** 40

i**)Course Objective**

By going through this course, students will be able to use appropriate statistical terms to describe the data and to identify the nature of data whether it is qualitative, quantitative, discrete, and continuous. **O**ptimization can be defined as the process of finding the conditions that give the minimum or maximum value of a function, where the function represents the effort required or the desired benefit. The students will be able to formulate optimization problems as mathematical programming problems and classify optimization problems to suitably choose the method needed to solve the particular type of problems.

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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 & 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. |

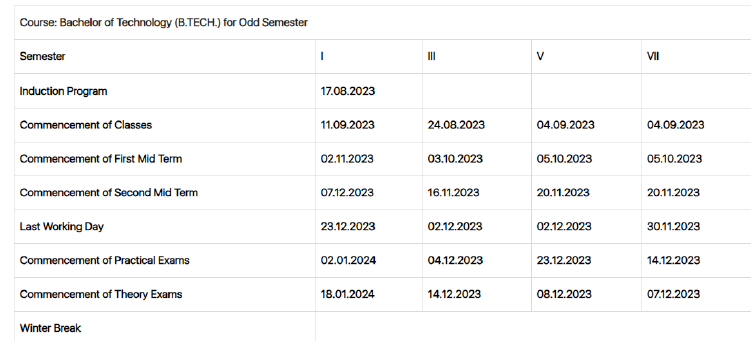
**COURSE OUTCOMES (COs) OF THE SUBJECT**

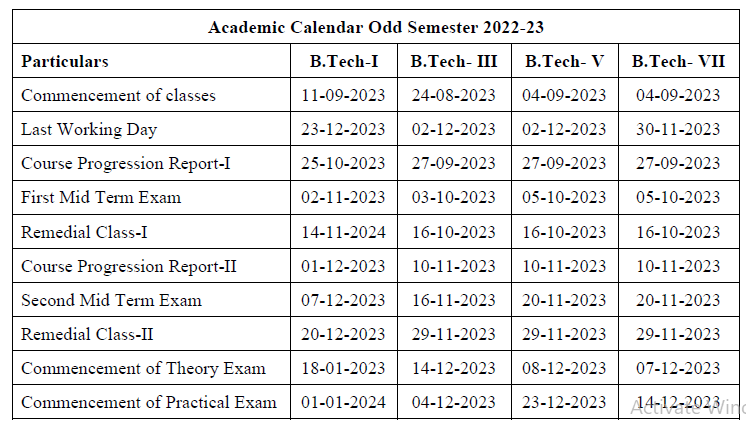
| CO No. | Mapping | Statement |
| --- | --- | --- |
| 1 | Understanding | Students are able to learn the concepts and principles of Random variable and Probability distribution. |
| 2 | Applying | Students are able to learn the concepts and able to apply different probability distribution to identify and solve real life problem |
| 3 | Understanding | Students are able to formulate different mathematical problems into optimization Problems |
| 4 | Applying | Students are able to apply the principles of optimization using differential calculus |
| 5 | Understanding | Students are able to formulate and solve the concepts of Linear Programming. |

**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**





**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

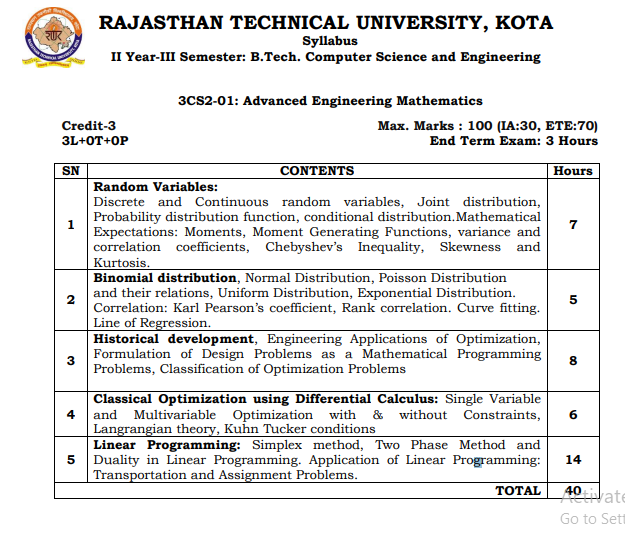
2.5. Semester Examination Others\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. 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 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. Advanced Engineering Mathematics, Erwin and Kreyszig, Wiley-India
2. Advanced Engineering Mathematics, H.K. Dass, Sultan Chand & Sons.
3. Operations Research, Theory and application, J. K. Sharma, Macmillan.
4. Probability, Random Variables and Random Processes, Hwei P. HSU. Tata McGraw-hills.
5. Optimization Techniques (RTU), Gokharoo & Saini, Navkar Publications.
6. Advanced Engineering Mathematics, Gokharoo & Saini, Navakar Publications.

**WEEKLY TIME TABLE OF THE TEACHER**

First Time Table: with effect from 15-4-2024:

Section A

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

Section B

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

Section C

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

**COURSE-PLAN**

| UNIT | Lect.  No. | TOPICS | **Teaching Methods/ Teaching Aids** |
| --- | --- | --- | --- |
|  | **1** | Discrete and Continuous variables | White Board, Demonstration |
|  | 2 | Joint distribution and probability distribution | White Board, Demonstration |
|  | 3 | Conditional distribution and mathematical expectation | White Board |
|  | 4 | Moments: Central Moments, Moments about any point. | White Board |
|  | 5 | Variance and correlation coefficient, Chebychev Inequality | White Board |
|  | 6 | Skewness and Kurtosis | White Board |
|  | 7 | Problem discussion and doubt clearing session | White Board |
|  | 8 | Normal, Poission distribution, | White Board |
|  | 9 | Uniform, exponent distribution | White Board |
|  | 10 | Karl Pearsons correlation coefficient | White Board |
|  | 11 | Rank correlation, Curve fitting | White Board |
|  | 12 | Line of regression/Doubt solving | White Board |
|  | 13 | Engineering application of optimization | White Board |
|  | 14 | Engineering application of optimization | White Board |
|  | 15 | Design Problems | White Board |
|  | 16 | Design Problems | White Board |
|  | 17 | Mathematical formulation of Design problems | White Board |
|  | 18 | Mathematical formulation of Design problems | White Board |
|  | 19 | Classification of design problems | White Board |
|  | 20 | Classification of design problems | White Board |
|  | 21 | Single variable optimization without constraint | White Board |
|  | 22 | Single variable optimization with constraint | White Board |
|  | 23 | Multivaribale variable optimization without constraint | White Board |
|  | 24 | Multivaribale variable optimization with constraint | White Board |
|  | **25** | Kuhn-Tucker method | White Board |
|  | 26 | Kuhn-Tucker method | White Board |
|  | 27 | Linear Programming Problem | White Board |
|  | 28 | Simplex Method | White Board |
|  | 29 | Simplex Method | White Board |
|  | 30 | Unbounded Problem | White Board |
|  | **31** | No solution Problem | White Board |
|  | 32 | Two Phase method | White Board |
|  | 33 | Two Phase Method | White Board |
|  | 34 | Duality Problem | White Board |
|  | 35 | Duality Problem | White Board |
|  | 36 | Transportation problem | White Board, ICT Tool |
|  | 37 | Modi Method | White Board, ICT Tool |
|  | 38 | Transportation problem with loops | White Board, ICT Tool |
|  | 39 | Assignment Problem | White Board, ICT Tool |
|  | 40 | Assignment Problem | White Board, ICT Tool |

**Signature of Faculty: Signature of HOD**

**Assignment – 1**

1. Explain the concept of random variable with examples.
2. What is the mathematical expectation and variance of 7X+8Y?
3. Write the rth moment about the mean.
4. State the theorems on expectation.
5. Two random variables have the least square regression lines with equations :

3x+2y-26=0 and 6x+y-31=0

1. Find the mean values and the coefficient of correlation between x and y.
2. Calculate the regression coefficient and obtain the lines of regression for the following data:



1. Ten competitors in a beauty contest got marks by three judges in the following orders: [CO 2]

| Judge1 | 1 | 6 | 5 | 10 | 3 | 2 | 4 | 9 | 7 | 8 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Judge2 | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 |
| Judge3 | 3 | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 |

Find the correlation coefficient.

1. A random variable X has the following probability distribution:

| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P(X) | 0 | k | 2k | 2k | 3k | K2 | 2 K2 | 7 K2+k |

1. Find k.
2. Evaluate P(X<6) and P(0<X<5)
3. If P(X<=c)>1\2 , find the value of c.
4. Determine distribution function of X
5. Find P()
6. The amount of bread X(in Hundreds of pounds) that a certain bakery is able to sell in a day is found to be numerical valued random phenomenon, with pdf as :

f(x)=kx for 

=k(10-x) for 

=0 otherwise

1. Find k.
2. If A, B and C be the events that the number of pounds of bread sold is more than 500 pounds, less than 500 pounds and between 250 and 750 pounds respectively then find P(A), P(B) and P(C).

**Assignment – 2**

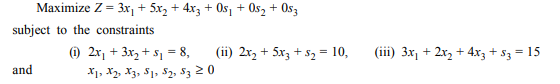
1. What is the optimization?

2. What are the application of optimization in engineering field ?

3. Consider the following N.L.P.P:

Minimize Z=2x12 -24x1+2x22-8x2+2x32-12x3+200 .

4. Solve the following LPP :



5. Show that the following LPP has no FS (use graphical method):

Max



s.t.



6. Use duality to solve the following problem using simplex method:

Min



s.t.



7. Solve the following transportation problem using VAM and also perform the optimality test.

|  | D1 | D2 | D3 | D4 |  |
| --- | --- | --- | --- | --- | --- |
| O1 | 1 | 2 | 1 | 4 | 30 |
| O2 | 3 | 3 | 2 | 1 | 50 |
| O3 | 4 | 2 | 5 | 9 | 20 |
|  | 20 | 40 | 30 | 10 | 100 |

**SAMPLE QUIZ QUESTIONS**

1. What are the applications of optimizations in the engineering field ?
2. List the optimization techniques.
3. What do you mean by Random Variable?
4. Differentiate between continuous and discrete variable ?
5. What do you mean by Probability distribution function?
6. Explain binomial theorem.
7. What do you understand by the terms skewness and kurtosis?
8. Skewness measures\_\_\_\_\_\_\_of a give set of data?
9. What is the shape of Normal distribution?
10. In a Normal distribution N(\_ , \_)?
11. What do you understand by Exponential distribution?
12. What do you mean by mean deviations?
13. State the formula for correlation function?
14. When we need to apply spearman correlation coefficient?
15. List the steps involved in fitting of a straight line?
16. What do you mean by LPP?
17. What are the non-linear programming?
18. What are the application of transportation?
19. Explain the steps involved in solving the assignment problems?
20. Assignment problems are applied to a \_\_\_matrix?
21. Explain Langrangian theory?
22. what is the difference between a transportation and assignment problem?
23. µ2=\_\_\_\_\_\_\_\_\_\_?
24. 
25. ?

**MCQ**

1. There are 4 letters and 4 envelopes for them. If the letter are placed in the envelopes at random, what is the probability that all the letters are not placed in the right envelope.

a) 23/24

b) 2/5

c) both a) and b)

d) None of the above

2 Tossing a coin n times, is called

a) binomial trial

b) random trial

c) both a) and b)

d) Bernoulli trial

3. Skewness = -?

a) mean-mode

b) mean-median

c) neither a) nor b)

d) mean-3mode

4) Which of the terms are related to Kurtosis Peaked curve

* 1. Leptokurtic
  2. Mesokurtic
  3. both a and b
  4. None of these

5) 

a) 

1. generating functions
2. 
3. None of the above

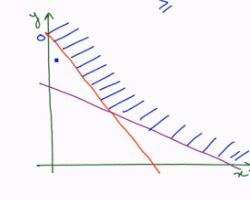
6) for a certain normal distribution the first moment about 10 is 40 and that the fourth moment about 50 is 48. What is the variance of the distribution?

1. 2
2. -1
3. Both a and b
4. None of the above

7) Degeneracy means\_\_\_\_\_\_?

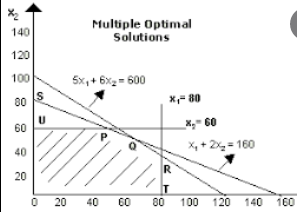
* 1. One or more of the basic variables are zero.
  2. One must be a vector space.
  3. Both a) and b)
  4. None of the above

8) In the following figure, LPP has



* 1. Feasible solution
  2. Unbounded solution
  3. Non-feasible solution
  4. None of the above

9) In the following figure, LPP has



* 1. Feasible solution
  2. Unbounded solution
  3. Non-feasible solution
  4. Multiple optimal solution

10) Two parallel lines a lpp graph shows that LPP has

a) no solution

b) unbounded solution  
 c) basic feasible solution

d) all of the mentioned

**ANSWER KEY**

1.a)

2. d)

3. a)

4. c)

5. c)

6. a)

7. a)

8. b)

9. d)

10. a)

**TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR**

**B. TECH 2nd – YEAR (III SEM.) – MT-I**

**Advanced Engineering Mathematics (3CS2-01)**

**Time:** **3 Hr.** **Max. Marks:** 70

Note: 1) The paper is divided into 2 parts Part A and Part B.

2) Part A contains 10 questions and carries 2 marks each.

3) Part B contains 5 questions. Each question is having two options and carries 10

Marks each.

**Part- A (20 Marks)**

|  | Is the following function is a p.d.f. | **CO1** |
| --- | --- | --- |
|  | If E(X) =3 and E(Y) =5, then find the value of E (2X+3Y)? | **CO1** |
|  | Explain Chebyshev’s inequality. | **CO1** |
|  | A shipment of 10 television sets contains 3 defective sets. A hotel makes a random purchase of 3 sets. If X is the number of defective sets purchased by the hotel, find the probability distribution of X. | **CO1** |
|  | Define Poisson distribution. | **CO2** |
|  | On an average one telephone out of 10 is busy. Find the probability that 4 out of 6 telephones called, would be found busy. | **CO2** |
|  | Explain the rectangular distribution. | **CO2** |
|  | Explain the Uniform distribution. | **CO2** |
|  | Explain the Kuhn-Tucker condition? | **CO3** |
|  | What do you understand by multivariable optimization. | **CO3** |

**Part- B (50 Marks)**

| **1**). A random variable X has following probability distribution.     | X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | P(X) | 0 | K | 2K | 2K | 3K |  | 2 | 7 |   Find i) K ii)  .  iii) Distribution function. iv) )  v) If | **CO1** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **OR** |  |
| **1).** The first four moment of distribution about the value 5 of the variable are  2, 20, 40 and 50 .i) Find  and . Also give the classification of distribution.  ii) Find moment about origin. | **CO1** |

| **2**) The joint probability distribution of random variable (X, Y ) is given by  where x and y can assume only the integer  Values 0, 1, 2. Find i) K ii) Marginal distribution of X and Y.  iii) Are X and Y independent? iv) Conditional distribution of Y for X=2. | **CO1** |
| --- | --- |
| **OR** |  |
| 2). The problem that a teacher will give an unannounced test during any class meeting is ⅕. If a student is absent twice, what is the probability that he will miss at least one test ? | **CO1** |

| **3**) What is the Binomial distribution and show that its mean and variance are np and npq. | **CO2** |
| --- | --- |
| **OR** |  |
| **3**) Ten competitors in beauty contest are ranked by three judges in the following  Order.   | First judge (R1) | 1 | 6 | 5 | 10 | 3 | 2 | 4 | 9 | 7 | 8 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | First judge (R2) | 3 | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 | | First judge (R3) | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 |   Make use of the rank correlation method and discuss which pair of judges have the Nearest approach to common test in beauty. | **CO2** |
| **4**) Calculate the coefficient of correlation between x and y using the following  Data.   | X | 1 | 3 | 5 | 7 | 9 | 11 | | --- | --- | --- | --- | --- | --- | --- | | Y | 8 | 12 | 15 | 17 | 18 | 20 | | **CO2** |
| **OR** |  |
| **4**) Prove that Poisson distribution is the limiting case of binomial distribution. | **CO2** |
| **5)** Explain the formulation of design problems. | **CO3** |
| **OR** |  |
| 5) Explain the classification of operation research. | **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 | 40 | N |
| 2 | 22ETCCS002 | ABDUL ATTIF | 42 | N |
| 3 | 22ETCCS003 | ABHIJEET GARG | 54 | N |
| 4 | 22ETCCS004 | ADITYA CHHIPA | 70 | N |
| 5 | 22ETCCS005 | ADITYA GIRI GOSWAMI | 70 | N |
| 6 | 22ETCCS006 | ADITYA SHARMA | 70 | N |
| 7 | 22ETCCS007 | AJIT KUMAR | 43 | N |
| 8 | 22ETCCS008 | AKASH SONI | 44 | N |
| 9 | 22ETCCS009 | AKSHAT JANGID | 67 | N |
| 10 | 22ETCCS010 | AKSHAT KUMAR SAINI | 45 | N |
| 11 | 22ETCCS011 | AKSHI BARGURJAR | 57 | N |
| 12 | 22ETCCS012 | AKSHIT NALWAYA | 65 | N |
| 13 | 22ETCCS013 | AKSHITA KUMAWAT | 61 | N |
| 14 | 22ETCCS014 | AKSHITA PANCHAL | 57 | N |
| 15 | 22ETCCS015 | ALI ASGAR ORA WALA | 45 | N |
| 16 | 22ETCCS017 | ANGHA VARANGAONKAR | 67 | N |
| 17 | 22ETCCS018 | ANKIT DHANAWAT | 46 | N |
| 18 | 22ETCCS019 | ANSHIKA JAIN | 68 | N |
| 19 | 22ETCCS020 | ARCHIT JAIN | 48 | N |
| 20 | 22ETCCS021 | ARIN UPADHAYAY | 55 | N |
| 21 | 22ETCCS022 | ARUSH MENARIA | 70 | N |
| 22 | 22ETCCS023 | ARYAN TALWAR | 68 | N |
| 23 | 22ETCCS024 | AVIKA SURANA | 58 | N |
| 24 | 22ETCCS025 | BHAWANA KUMARI | 62 | N |
| 25 | 22ETCCS026 | BHUMI JAIN | 68 | N |
| 26 | 22ETCCS027 | BHUWAN SUTHAR | 31 | Y |
| 27 | 22ETCCS028 | CHETAN NAGDA | 32 | Y |
| 28 | 22ETCCS029 | CHIRAG SHARMA | 33 | Y |
| 29 | 22ETCCS030 | MS. CIA SHARMMA | 62 | N |
| 30 | 22ETCCS031 | DAIVIK SHARMA | 46 | N |
| 31 | 22ETCCS032 | DAKSH JAIN | 47 | N |
| 32 | 22ETCCS033 | DAKSH MENARIA | 50 | N |
| 33 | 22ETCCS034 | DEV PARAKH | 68 | N |
| 34 | 22ETCCS035 | DHANESH JOSHI | 68 | N |
| 35 | 22ETCCS036 | DHEERAJ SINGH THAPA | 36 | N |
| 36 | 22ETCCS037 | DHWANI KHUSHLANI | 70 | N |
| 37 | 22ETCCS038 | DIKSHIT DARJI | 50 | N |
| 38 | 22ETCCS039 | MSDIKSHITA SHARMA | 64 | N |
| 39 | 22ETCCS040 | DIVYA BAGORA | 62 | N |
| 40 | 22ETCCS041 | DIVYANSHU SHARMA | 63 | N |
| 41 | 22ETCCS042 | DIVYASHAKTI PAL | 65 | N |
| 42 | 22ETCCS043 | DIYA JAIN | 62 | N |
| 43 | 22ETCCS044 | DIYA PALIWAL | 68 | N |
| 44 | 22ETCCS045 | FALGUN CHOUDHARY | 70 | N |
| 45 | 22ETCCS046 | GARGI SHARMA | 68 | N |
| 46 | 22ETCCS047 | GARV BAKLIWAL | 68 | N |
| 47 | 22ETCCS048 | GARVIT NANDAWAT | 49 | N |
| 48 | 22ETCCS049 | GAURAV JAIN | 68 | N |
| 49 | 22ETCCS050 | GAURAVI NEGI | 55 | N |
| 50 | 22ETCCS051 | GAURI SUTHAR | 70 | N |
| 51 | 22ETCCS053 | GOURAV POKHARNA | 62 | N |
| 52 | 22ETCCS054 | HARDIK BATWAL | 70 | N |
| 53 | 22ETCCS055 | HARSH DANGI | 63 | N |
| 54 | 22ETCCS056 | HARSH KAWADIA | 58 | N |
| 55 | 22ETCCS057 | HARSH TAMBOLI | 56 | N |
| 56 | 22ETCCS058 | HARSHAL JAIN | 68 | N |
| 57 | 22ETCCS059 | HARSHIT POKHARNA | 67 | N |
| 58 | 22ETCCS060 | HARSHVARDHAN SINGH CHAUHAN | 67 | N |
| 59 | 22ETCCS061 | HARSHVARDHAN SINGH KITAWAT | 56 | N |
| 60 | 22ETCCS062 | HEMANT AHUJA | 62 | N |
| 61 | 22ETCCS064 | HIMANK LOHAR | 34 | Y |
| 62 | 22ETCCS065 | HIMANSHI PRAJAPAT | 70 | N |
| 63 | 22ETCCS066 | HIMANSHU KALAL | 51 | N |
| 64 | 22ETCCS067 | HONHAR RAWAL | 54 | N |
| 65 | 22ETCCS068 | HUSAIN BOHRA TIDIWALA | 57 | N |
| 66 | 22ETCCS069 | JAINISH JAIN | 50 | N |
| 67 | 22ETCCS070 | JAYESH JOSHI | 64 | N |
| 68 | 22ETCCS071 | JAYESH MANDAWAT | 36 | N |
| 69 | 22ETCCS072 | JINENDRA SINGH DODIYA | 37 | N |
| 70 | 22ETCCS073 | KANIKA GUPTA | 56 | N |
| 71 | 22ETCCS074 | KANISHK GUPTA | 59 | N |
| 72 | 22ETCCS075 | KAPIL KALAL | 39 | N |
| 73 | 22ETCCS076 | KARAN SWAMI | 67 | N |
| 74 | 22ETCCS077 | KARTIK JAIN | 58 | N |
| 75 | 22ETCCS078 | KARTIK KRISHNA KALE | 55 | N |
| 76 | 22ETCCS079 | KAVYA PALIWAL | 44 | N |
| 77 | 22ETCCS080 | KETAN OJHA | 63 | N |
| 78 | 22ETCCS081 | KHUSH JAIN | 70 | N |
| 79 | 22ETCCS082 | KHUSHI SHARMA | 67 | N |
| 80 | 22ETCCS083 | KIRTAN TAMBOLI | 65 | N |
| 81 | 22ETCCS085 | KONPAL SHARMA | 59 | N |
| 82 | 22ETCCS086 | KRITI PATWA | 70 | N |
| 83 | 22ETCCS087 | KUSH PARSAI | 55 | N |
| 84 | 22ETCCS088 | KUSHAL MEENA | 50 | N |
| 85 | 22ETCCS089 | LAKSHIT PALIWAL | 52 | N |
| 86 | 22ETCCS090 | LAKSHY JAIN | 60 | N |
| 87 | 22ETCCS091 | LAKSHYARAJ CHOUDHARY | 68 | N |
| 88 | 22ETCCS092 | LAL SINGH JHALA | 58 | N |
| 89 | 22ETCCS093 | LUCKY LOHAR | 69 | N |
| 90 | 22ETCCS094 | MAHATV BHATNAGAR | 45 | N |
| 91 | 22ETCCS095 | MAHENDRA SINGH SISODIYA | 60 | N |
| 92 | 22ETCCS096 | MSMAHIMA CHOUHAN | 60 | N |
| 93 | 22ETCCS097 | MAHIPAL SINGH JHALA | 69 | N |
| 94 | 22ETCCS098 | MAHIRAJ SINGH SANKHLA | 59 | N |
| 95 | 22ETCCS099 | MANAS PARWANI | 60 | N |
| 96 | 22ETCCS100 | MANASVI SHARMA | 58 | N |
| 97 | 22ETCCS101 | MANASWINI SHARMA | 64 | N |
| 98 | 22ETCCS102 | MANSI DUBE | 70 | N |
| 99 | 22ETCCS103 | MAYANK KASERA | 65 | N |
| 100 | 22ETCCS104 | MAYANK TRIVEDI | 49 | N |
| 101 | 22ETCCS105 | MEDHAVI KAUSHIK | 60 | N |
| 102 | 22ETCCS106 | MEETRAJ SINGH | 61 | N |
| 103 | 22ETCCS107 | MITALI PALIWAL | 61 | N |
| 104 | 22ETCCS108 | MITVESH AMETA | 63 | N |
| 105 | 22ETCCS109 | MOHAMMED YASAR | 49 | N |
| 106 | 22ETCCS110 | MOHIT KALAL | 66 | N |
| 107 | 22ETCCS111 | MOHIT KUMAWAT | 62 | N |
| 108 | 22ETCCS112 | MONIL SETH | 68 | N |
| 109 | 22ETCCS113 | NAKUL PANDYA | 61 | N |
| 110 | 22ETCCS114 | NEERAJ DANGI | 50 | N |
| 111 | 22ETCCS115 | NIKHIL RAJ MALI | 68 | N |
| 112 | 22ETCCS116 | NIMISHKA CHAUHAN | 67 | N |
| 113 | 22ETCCS117 | NISHANT MENARIA | 70 | N |
| 114 | 22ETCCS118 | MSPALAK KUMAWAT | 70 | N |
| 115 | 22ETCCS119 | PARSHVI HARKAWAT | 58 | N |
| 116 | 22ETCCS120 | PRAGYA BUJ | 59 | N |
| 117 | 22ETCCS121 | PRATIBHA SINGH | 67 | N |
| 118 | 22ETCCS122 | PRINCE DANGI | 66 | N |
| 119 | 22ETCCS123 | PRIYANSH JAIN | 70 | N |
| 120 | 22ETCCS124 | PURVAM CHATURVEDI | 40 | N |
| 121 | 22ETCCS125 | PUSHKAR GAMETI | 58 | N |
| 122 | 22ETCCS126 | PUSHPENDRA MENARIA | 68 | N |
| 123 | 22ETCCS127 | QAIDJOHAR JUKKER | 62 | N |
| 124 | 22ETCCS128 | RAGHAVENDRA BAHETI | 58 | N |
| 125 | 22ETCCS129 | RAJ LAXKAR | 66 | N |
| 126 | 22ETCCS130 | RAJ SHRIMALI | 68 | N |
| 127 | 22ETCCS131 | RAM MUNDRA | 63 | N |
| 128 | 22ETCCS132 | RAMMITH K R | 62 | N |
| 129 | 22ETCCS133 | RANITH BISWAS | 67 | N |
| 130 | 22ETCCS134 | RANJIT SINGH SHAKTAWAT | 63 | N |
| 131 | 22ETCCS135 | MSRAUNAK TAK | 68 | N |
| 132 | 22ETCCS136 | RAVI JOSHI | 62 | N |
| 133 | 22ETCCS137 | RAVI MENARIYA | 68 | N |
| 134 | 22ETCCS138 | RITIK SHARMA | 66 | N |
| 135 | 22ETCCS139 | RITISHA SEN | 68 | N |
| 136 | 22ETCCS140 | ROHIT AGARWAL | 57 | N |
| 137 | 22ETCCS141 | ROSHAN SHARMA | 52 | N |
| 138 | 22ETCCS142 | ROSHNI MENARIA | 54 | N |
| 139 | 22ETCCS143 | RUDRA PUROHIT | 65 | N |
| 140 | 22ETCCS144 | RUDRAVEER SINGH PANWAR | 66 | N |
| 141 | 22ETCCS145 | SHAAN SANADHYA | 56 | N |
| 142 | 22ETCCS146 | SHACHI JAIN | 67 | N |
| 143 | 22ETCCS147 | SHAURYA KUNDAR | 67 | N |
| 144 | 22ETCCS148 | SHOURYA BORDIA | 68 | N |
| 145 | 22ETCCS149 | SHUBHAM YADAV | 68 | N |
| 146 | 22ETCCS150 | SIDDHARTH KUMAR SINGH | 69 | N |
| 147 | 22ETCCS151 | SIDDHARTH MENARIA | 68 | N |
| 148 | 22ETCCS152 | SRAJAN MENARIA | 55 | N |
| 149 | 22ETCCS154 | SUMIT DANGI | 68 | N |
| 150 | 22ETCCS155 | SURBHI TAILOR | 66 | N |
| 151 | 22ETCCS156 | SURYANSH MADHUKAR | 66 | N |
| 152 | 22ETCCS157 | TALENT JAIN | 65 | N |
| 153 | 22ETCCS158 | TANISHK VYAS | 68 | N |
| 154 | 22ETCCS159 | TANVI SHARMA | 63 | N |
| 155 | 22ETCCS160 | TOHEED AKHTAR | 64 | N |
| 156 | 22ETCCS161 | TUSHAR PRAJAPAT | 56 | N |
| 157 | 22ETCCS162 | TUSHAR SINGH RAWAT | 59 | N |
| 158 | 22ETCCS163 | UJJWAL SINGH CHOUHAN | 62 | N |
| 159 | 22ETCCS164 | USHIT SHARMA | 64 | N |
| 160 | 22ETCCS165 | UTKARSH BAJPAI | 61 | N |
| 161 | 22ETCCS166 | VAIBHAV GOYAL | 70 | N |
| 162 | 22ETCCS167 | VANSH BHATNAGAR | 63 | N |
| 163 | 22ETCCS168 | VINAY VADERA | 66 | N |
| 164 | 22ETCCS169 | VINITA MENARIA | 70 | N |
| 165 | 22ETCCS170 | VISHAL MENARIYA | 70 | N |
| 166 | 22ETCCS171 | VISHAL SINGH RAO | 67 | N |
| 167 | 22ETCCS172 | VIVEK SHARMA | 70 | N |
| 168 | 22ETCCS173 | VIVEK SHRIMALI | 68 | N |
| 169 | 22ETCCS174 | YANA OZHA | 62 | N |
| 170 | 22ETCCS175 | YASH VAGHELA | 69 | N |
| 171 | 22ETCCS300 | KEVALI ASHOK KANAGALE | 70 | N |
| 172 | 22ETCCS301 | KARAN SUTHAR | 43 | N |
| 173 | 22ETCCS302 | VINEET SHARMA | 58 | N |
| 174 | 23ETCCS200 | GOPAL PALIWAL | 48 | N |
| 175 | 23ETCCS201 | MANISH VYAS | 59 | N |
| 176 | 23ETCCS202 | RAHUL RAJPUROHIT | 66 | N |
| 177 | 23ETCCS203 | VAISHALI H PUROHIT | 63 | N |
| 178 | 23ETCCS204 | YASH SINGHATWADIA | 63 | N |

**Signature of Faculty: Signature of HOD**

**Remedial Action Taken to Remove the Gaps (After Mid- Term 1)**

| S.no. | University Roll no. | Name of Student | Topics to be discussed in Remedial Class | Schedule Date of Remedial Class | Outcome  Achieved |
| --- | --- | --- | --- | --- | --- |
| 1 | 22ETCCS027 | BHUWAN SUTHAR | PYQ from unit 1, 2 and 3 other important questions |  |  |
| 2 | 22ETCCS028 | CHETAN NAGDA | PYQ from unit 1, 2 and 3 other important questions |  |  |
| 3 | 22ETCCS029 | CHIRAG SHARMA | PYQ from unit 1, 2 and 3 other important questions |  |  |
| 4 | 22ETCCS064 | HIMANK LOHAR | PYQ from unit 1, 2 and 3 other important questions |  |  |

# TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY

# B. TECH II – YEAR (III SEM.)

# Computer Science Engineering

**Advance Engineering Mathematics**

**Mid Term II**

## 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 marks each.

3) Part B contains 5 questions. Each question is having two options and carries 10

Marks each.

## PART – A

|  | A company produces two types of hats. Each hat of the first type requires twice as much labour time as the second type. If all hats are of the second type only, the company can produce a total of 500 hats a day. The market limit daily sales of the first and second type to 150 and 250 hats. Assuming that the profit per hat are Rs 5 for type A and Rs 8 for type B, formulate the problem in order to determine the number of hats to be produced of each type so to maximize the profit. | [CO3] |
| --- | --- | --- |
|  | Write the short note on the history of optimization. | [CO3] |
|  | Determine the maximum value of the function f(x) = x5 -5x4 +5x3 -1 | [CO4] |
|  | Determine the nature of the given matrix A= | [CO4] |
|  | What is multivariable optimization. | [CO4] |
|  | List the design constraint. | [CO4] |
|  | For non-degenerate feasible solution of (m\*n) (m\*n) transformation problem. How many independence individual positive assignments will be required? | [CO5] |
|  | Solve by graphically. | [CO5] |
|  | What is the difference between slack and surplus variable? | [CO5] |
|  | Write the dual of the given linear programming problem. | [CO5] |

PART – B

| 1 | Write Application of optimization techniques in Engineering. | CO3 |
| --- | --- | --- |
|  | OR |  |
| 3 | Explain in brief the classification of operation research. | CO3 |
| 4 | Solve Minimize  Subject to  By method of constrained variation. | CO4 |
|  | OR |  |
|  | Use K . T . Condition to  Min. Z = f (x,y,z) = x2 + y2 +z2 +20x +10y  s. to i)  ii)  iii) | CO4 |
|  | Explain the Lagrangian theory. | CO4 |
|  | OR |  |
|  | Throw light on Single variable and multivariable optimization technique with and without constraint. | CO4 |
|  | **3**) Solve by Simplex method. | CO5 |
|  | **OR** |  |
|  | **3**) Obtain the optimal transportation plan from the following table giving the  plant to market shipping costs and quantities required at each market and  available at each plant. (first use Vogel’s method)     | Market Plant | M1 | M2 | M3 | M4 | Availability | | --- | --- | --- | --- | --- | --- | | P1 | 4 | 6 | 8 | 13 | **50** | | P2 | 13 | 11 | 10 | 8 | **70** | | P3 | 14 | 4 | 10 | 13 | **30** | | P4 | 9 | 11 | 13 | 8 | **50** | | **Requirement** | **25** | **35** | **105** | **20** |  | | CO5 |
|  | A certain equipment’s needs five repair jobs, which have to be assigned to five  Mechanics. The estimated time (in hours)that each mechanics requires to do the  Repairs is given by the following table.  Assuming that each mechanic can be assigned to only one job, determine the Minimum time assignment.     | **Jobs** | **J1** | **J2** | **J3** | **J4** | **J5** | | --- | --- | --- | --- | --- | --- | | **M1** | 7 | 5 | 9 | 8 | 11 | | **M2** | 9 | 12 | 7 | 11 | 10 | | **M3** | 8 | 5 | 1 | 6 | 9 | | **M4** | 7 | 3 | 6 | 9 | 5 | | **M5** | 4 | 6 | 7 | 5 | 11 | | CO5 |
|  | **4) A)** Write the dual of.    **B)** Find the initial basic feasible solution to the foll.tranfortation problem.  Using North –West Corner Method.     | **factory** | **W1** | **W2** | **W3** | **W4** | **W5** | **supply** | | --- | --- | --- | --- | --- | --- | --- | | **F1** | 7 | 6 | 4 | 5 | 9 | **40** | | **F2** | 8 | 5 | 6 | 7 | 8 | **30** | | **F3** | 6 | 8 | 9 | 6 | 5 | **20** | | **F4** | 5 | 7 | 7 | 8 | 6 | **10** | | **Demand** | **30** | **30** | **15** | **20** | **5** | **100** | | CO5 |

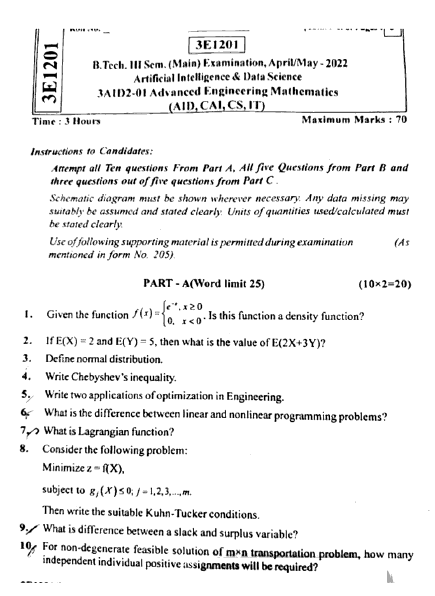
**Mid Term Exam – II**

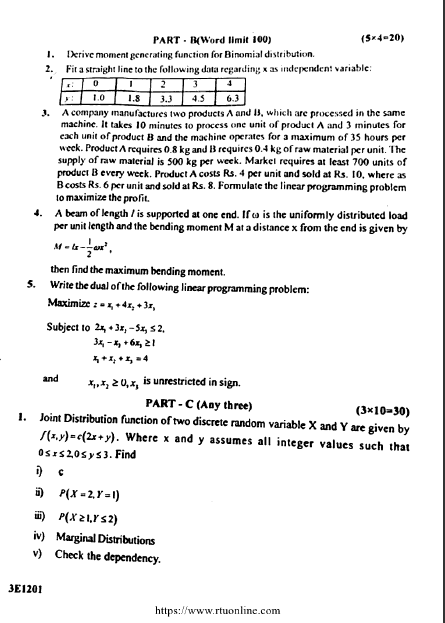
**Marks and Gap Analysis of Mid-Term II**

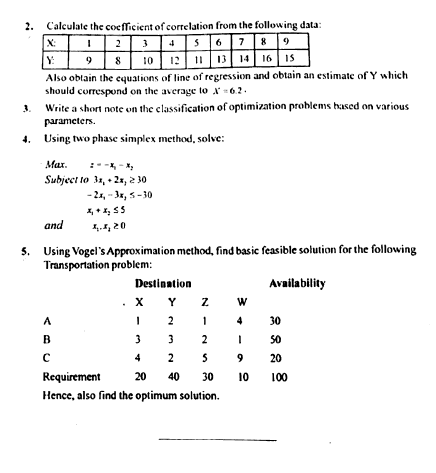
| Sr. No | RTU Roll Number | Name of the Student | M-2 Marks (70) | Remark ( Remedial Class need or not – Y/N ) |
| --- | --- | --- | --- | --- |
| 1 | 22ETCCS001 | AADARSH SONI | 67 | N |
| 2 | 22ETCCS002 | ABDUL ATTIF | 65 | N |
| 3 | 22ETCCS003 | ABHIJEET GARG | 67 | N |
| 4 | 22ETCCS004 | ADITYA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

**Signature of Faculty: Signature of HOD**

**Model Question Paper**

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**RESULT ANALYSIS**

| **S.NO.** | **RTU ROLL NUMBER** | **NAME OF STUDENT** | **END TERM MARKS** | **SESSIONAL MARKS** | **TOTAL** |
| --- | --- | --- | --- | --- | --- |
| **MAX MARKS** | **70** | **30** | **100** |
| **Set Target Level** | | | **60%** | **75%** |  |
|  | 22ETCCS001 | AADARSH SONI | 34 | 23 | 57 |
|  | 22ETCCS002 | ABDUL ATTIF | 25 | 23 | 48 |
|  | 22ETCCS003 | ABHIJEET GARG | 53 | 26 | 79 |
|  | 22ETCCS004 | ADITYA CHHIPA | 27 | 30 | 57 |
|  | 22ETCCS005 | ADITYA GIRI GOSWAMI | 27 | 30 | 57 |
|  | 22ETCCS006 | ADITYA SHARMA | 53 | 30 | 83 |
|  | 22ETCCS007 | AJIT KUMAR | 37 | 23 | 60 |
|  | 22ETCCS008 | AKASH SONI | 33 | 24 | 57 |
|  | 22ETCCS009 | AKSHAT JANGID | 50 | 29 | 79 |
|  | 22ETCCS010 | AKSHAT KUMAR SAINI | 23 | 24 | 47 |
|  | 22ETCCS011 | AKSHI BARGURJAR | 31 | 27 | 58 |
|  | 22ETCCS012 | AKSHIT NALWAYA | 35 | 25 | 60 |
|  | 22ETCCS013 | AKSHITA KUMAWAT | 28 | 28 | 56 |
|  | 22ETCCS014 | AKSHITA PANCHAL | 49 | 27 | 76 |
|  | 22ETCCS015 | ALI ASGAR ORA WALA | 26 | 23 | 49 |
|  | 22ETCCS017 | ANGHA VARANGAONKAR | 42 | 29 | 71 |
|  | 22ETCCS018 | ANKIT DHANAWAT | 32 | 23 | 55 |
|  | 22ETCCS019 | ANSHIKA JAIN | 66 | 29 | 95 |
|  | 22ETCCS020 | ARCHIT JAIN | 20 | 23 | 43 |
|  | 22ETCCS021 | ARIN UPADHAYAY | 17 | 26 | 43 |
|  | 22ETCCS022 | ARUSH MENARIA | 42 | 30 | 72 |
|  | 22ETCCS023 | ARYAN TALWAR | 46 | 29 | 75 |
|  | 22ETCCS024 | AVIKA SURANA | 52 | 27 | 79 |
|  | 22ETCCS025 | BHAWANA KUMARI | 44 | 28 | 72 |
|  | 22ETCCS026 | BHUMI JAIN | 45 | 29 | 74 |
|  | 22ETCCS027 | BHUWAN SUTHAR | 14 | 21 | 35 |
|  | 22ETCCS028 | CHETAN NAGDA | 15 | 21 | 36 |
|  | 22ETCCS029 | CHIRAG SHARMA | 27 | 21 | 48 |
|  | 22ETCCS030 | MS. CIA SHARMMA | 51 | 28 | 79 |
|  | 22ETCCS031 | DAIVIK SHARMA | 28 | 24 | 52 |
|  | 22ETCCS032 | DAKSH JAIN | 30 | 24 | 54 |
|  | 22ETCCS033 | DAKSH MENARIA | 21 | 21 | 42 |
|  | 22ETCCS034 | DEV PARAKH | 40 | 29 | 69 |
|  | 22ETCCS035 | DHANESH JOSHI | 33 | 29 | 62 |
|  | 22ETCCS036 | DHEERAJ SINGH THAPA | 23 | 22 | 45 |
|  | 22ETCCS037 | DHWANI KHUSHLANI | 51 | 30 | 81 |
|  | 22ETCCS038 | DIKSHIT DARJI | 32 | 24 | 56 |
|  | 22ETCCS039 | MSDIKSHITA SHARMA | 20 | 25 | 45 |
|  | 22ETCCS040 | DIVYA BAGORA | 48 | 28 | 76 |
|  | 22ETCCS041 | DIVYANSHU SHARMA | 22 | 28 | 50 |
|  | 22ETCCS042 | DIVYASHAKTI PAL | 17 | 25 | 42 |
|  | 22ETCCS043 | DIYA JAIN | 23 | 28 | 51 |
|  | 22ETCCS044 | DIYA PALIWAL | 23 | 29 | 52 |
|  | 22ETCCS045 | FALGUN CHOUDHARY | 45 | 30 | 75 |
|  | 22ETCCS046 | GARGI SHARMA | 59 | 29 | 88 |
|  | 22ETCCS047 | GARV BAKLIWAL | 42 | 29 | 71 |
|  | 22ETCCS048 | GARVIT NANDAWAT | 0 | 23 | 23 |
|  | 22ETCCS049 | GAURAV JAIN | 33 | 25 | 58 |
|  | 22ETCCS050 | GAURAVI NEGI | 29 | 26 | 55 |
|  | 22ETCCS051 | GAURI SUTHAR | 36 | 30 | 66 |
|  | 22ETCCS053 | GOURAV POKHARNA | 43 | 28 | 71 |
|  | 22ETCCS054 | HARDIK BATWAL | 51 | 30 | 81 |

| 53 | 22ETCCS055 | HARSH DANGI | 40 | 28 | 68 |
| --- | --- | --- | --- | --- | --- |
| 54 | 22ETCCS056 | HARSH KAWADIA | 36 | 27 | 63 |
| 55 | 22ETCCS057 | HARSH TAMBOLI | 33 | 26 | 59 |
| 56 | 22ETCCS058 | HARSHAL JAIN | 28 | 25 | 53 |
| 57 | 22ETCCS059 | HARSHIT POKHARNA | 45 | 28 | 73 |
| 58 | 22ETCCS060 | HARSHVARDHAN SINGH CHAUHAN | 54 | 28 | 82 |
| 59 | 22ETCCS061 | HARSHVARDHAN SINGH KITAWAT | 26 | 21 | 47 |
| 60 | 22ETCCS062 | HEMANT AHUJA | 45 | 25 | 70 |
| 61 | 22ETCCS064 | HIMANK LOHAR | 37 | 21 | 58 |
| 62 | 22ETCCS065 | HIMANSHI PRAJAPAT | 35 | 30 | 65 |
| 63 | 22ETCCS066 | HIMANSHU KALAL | 32 | 24 | 56 |
| 64 | 22ETCCS067 | HONHAR RAWAL | 32 | 24 | 56 |
| 65 | 22ETCCS068 | HUSAIN BOHRA TIDIWALA | 32 | 26 | 58 |
| 66 | 22ETCCS069 | JAINISH JAIN | 11 | 23 | 34 |
| 67 | 22ETCCS070 | JAYESH JOSHI | 32 | 25 | 57 |
| 68 | 22ETCCS071 | JAYESH MANDAWAT | 13 | 21 | 34 |
| 69 | 22ETCCS072 | JINENDRA SINGH DODIYA | 23 | 22 | 45 |
| 70 | 22ETCCS073 | KANIKA GUPTA | 36 | 26 | 62 |
| 71 | 22ETCCS074 | KANISHK GUPTA | 28 | 27 | 55 |
| 72 | 22ETCCS075 | KAPIL KALAL | 10 | 22 | 32 |
| 73 | 22ETCCS076 | KARAN SWAMI | 33 | 28 | 61 |
| 74 | 22ETCCS077 | KARTIK JAIN | 22 | 26 | 48 |
| 75 | 22ETCCS078 | KARTIK KRISHNA KALE | 25 | 24 | 49 |
| 76 | 22ETCCS079 | KAVYA PALIWAL | 8 | 22 | 30 |
| 77 | 22ETCCS080 | KETAN OJHA | 12 | 25 | 37 |
| 78 | 22ETCCS081 | KHUSH JAIN | 49 | 30 | 79 |
| 79 | 22ETCCS082 | KHUSHI SHARMA | 43 | 28 | 71 |
| 80 | 22ETCCS083 | KIRTAN TAMBOLI | 37 | 25 | 62 |
| 81 | 22ETCCS085 | KONPAL SHARMA | 41 | 27 | 68 |
| 82 | 22ETCCS086 | KRITI PATWA | 58 | 30 | 88 |
| 83 | 22ETCCS087 | KUSH PARSAI | 41 | 24 | 65 |
| 84 | 22ETCCS088 | KUSHAL MEENA | 28 | 23 | 51 |
| 85 | 22ETCCS089 | LAKSHIT PALIWAL | 37 | 23 | 60 |
| 86 | 22ETCCS090 | LAKSHY JAIN | 28 | 27 | 55 |
| 87 | 22ETCCS091 | LAKSHYARAJ CHOUDHARY | 35 | 28 | 63 |
| 88 | 22ETCCS092 | LAL SINGH JHALA | 22 | 23 | 45 |
| 89 | 22ETCCS093 | LUCKY LOHAR | 7 | 28 | 35 |
| 90 | 22ETCCS094 | MAHATV BHATNAGAR | 6 | 22 | 28 |
| 91 | 22ETCCS095 | MAHENDRA SINGH SISODIYA | 34 | 27 | 61 |
| 92 | 22ETCCS096 | MSMAHIMA CHOUHAN | 29 | 27 | 56 |
| 93 | 22ETCCS097 | MAHIPAL SINGH JHALA | 42 | 28 | 70 |
| 94 | 22ETCCS098 | MAHIRAJ SINGH SANKHLA | 14 | 23 | 37 |
| 95 | 22ETCCS099 | MANAS PARWANI | 24 | 23 | 47 |
| 96 | 22ETCCS100 | MANASVI SHARMA | 28 | 24 | 52 |
| 97 | 22ETCCS101 | MANASWINI SHARMA | 12 | 25 | 37 |
| 98 | 22ETCCS102 | MANSI DUBE | 45 | 30 | 75 |
| 99 | 22ETCCS103 | MAYANK KASERA | 4 | 25 | 29 |
| 100 | 22ETCCS104 | MAYANK TRIVEDI | 4 | 22 | 26 |
| 101 | 22ETCCS105 | MEDHAVI KAUSHIK | 37 | 24 | 61 |
| 102 | 22ETCCS106 | MEETRAJ SINGH | 46 | 24 | 70 |
| 103 | 22ETCCS107 | MITALI PALIWAL | 33 | 24 | 57 |
| 104 | 22ETCCS108 | MITVESH AMETA | 28 | 24 | 52 |
| 105 | 22ETCCS109 | MOHAMMED YASAR | 14 | 22 | 36 |
| 106 | 22ETCCS110 | MOHIT KALAL | 33 | 24 | 57 |
| 107 | 22ETCCS111 | MOHIT KUMAWAT | 29 | 27 | 56 |
| 108 | 22ETCCS112 | MONIL SETH | 53 | 29 | 82 |
| 109 | 22ETCCS113 | NAKUL PANDYA | 29 | 23 | 52 |
| 110 | 22ETCCS114 | NEERAJ DANGI | 21 | 22 | 43 |
| 111 | 22ETCCS115 | NIKHIL RAJ MALI | 25 | 25 | 50 |
| 112 | 22ETCCS116 | NIMISHKA CHAUHAN | 36 | 29 | 65 |
| 113 | 22ETCCS117 | NISHANT MENARIA | 45 | 30 | 75 |
| 114 | 22ETCCS118 | MSPALAK KUMAWAT | 34 | 28 | 62 |
| 115 | 22ETCCS119 | PARSHVI HARKAWAT | 59 | 26 | 85 |
| 116 | 22ETCCS120 | PRAGYA BUJ | 33 | 26 | 59 |
| 117 | 22ETCCS121 | PRATIBHA SINGH | 40 | 29 | 69 |
| 118 | 22ETCCS122 | PRINCE DANGI | 24 | 23 | 47 |
| 119 | 22ETCCS123 | PRIYANSH JAIN | 36 | 30 | 66 |
| 120 | 22ETCCS124 | PURVAM CHATURVEDI | 16 | 21 | 37 |
| 121 | 22ETCCS125 | PUSHKAR GAMETI | 24 | 25 | 49 |
| 122 | 22ETCCS126 | PUSHPENDRA MENARIA | 38 | 29 | 67 |
| 123 | 22ETCCS127 | QAIDJOHAR JUKKER | 12 | 28 | 40 |
| 124 | 22ETCCS128 | RAGHAVENDRA BAHETI | 24 | 25 | 49 |
| 125 | 22ETCCS129 | RAJ LAXKAR | 34 | 23 | 57 |
| 126 | 22ETCCS130 | RAJ SHRIMALI | 37 | 29 | 66 |
| 127 | 22ETCCS131 | RAM MUNDRA | 40 | 26 | 66 |
| 128 | 22ETCCS132 | RAMMITH K R | 34 | 27 | 61 |
| 129 | 22ETCCS133 | RANITH BISWAS | 20 | 23 | 43 |
| 130 | 22ETCCS134 | RANJIT SINGH SHAKTAWAT | 28 | 28 | 56 |
| 131 | 22ETCCS135 | MSRAUNAK TAK | 49 | 29 | 78 |
| 132 | 22ETCCS136 | RAVI JOSHI | 21 | 26 | 47 |
| 133 | 22ETCCS137 | RAVI MENARIYA | 43 | 29 | 72 |
| 134 | 22ETCCS138 | RITIK SHARMA | 29 | 24 | 53 |
| 135 | 22ETCCS139 | RITISHA SEN | 41 | 29 | 70 |
| 136 | 22ETCCS140 | ROHIT AGARWAL | 44 | 25 | 69 |
| 137 | 22ETCCS141 | ROSHAN SHARMA | 16 | 22 | 38 |
| 138 | 22ETCCS142 | ROSHNI MENARIA | 35 | 22 | 57 |
| 139 | 22ETCCS143 | RUDRA PUROHIT | 20 | 23 | 43 |
| 140 | 22ETCCS144 | RUDRAVEER SINGH PANWAR | 20 | 27 | 47 |
| 141 | 22ETCCS145 | SHAAN SANADHYA | 30 | 22 | 52 |
| 142 | 22ETCCS146 | SHACHI JAIN | 33 | 28 | 61 |
| 143 | 22ETCCS147 | SHAURYA KUNDAR | 40 | 23 | 63 |
| 144 | 22ETCCS148 | SHOURYA BORDIA | 26 | 23 | 49 |
| 145 | 22ETCCS149 | SHUBHAM YADAV | 17 | 23 | 40 |
| 146 | 22ETCCS150 | SIDDHARTH KUMAR SINGH | 32 | 23 | 55 |
| 147 | 22ETCCS151 | SIDDHARTH MENARIA | 21 | 24 | 45 |
| 148 | 22ETCCS152 | SRAJAN MENARIA | 25 | 22 | 47 |
| 149 | 22ETCCS154 | SUMIT DANGI | 31 | 24 | 55 |
| 150 | 22ETCCS155 | SURBHI TAILOR | 29 | 27 | 56 |
| 151 | 22ETCCS156 | SURYANSH MADHUKAR | 31 | 27 | 58 |
| 152 | 22ETCCS157 | TALENT JAIN | 21 | 23 | 44 |
| 153 | 22ETCCS158 | TANISHK VYAS | 20 | 29 | 49 |
| 154 | 22ETCCS159 | TANVI SHARMA | 19 | 25 | 44 |
| 155 | 22ETCCS160 | TOHEED AKHTAR | 17 | 23 | 40 |
| 156 | 22ETCCS161 | TUSHAR PRAJAPAT | 25 | 22 | 47 |
| 157 | 22ETCCS162 | TUSHAR SINGH RAWAT | 14 | 22 | 36 |
| 158 | 22ETCCS163 | UJJWAL SINGH CHOUHAN | 21 | 26 | 47 |
| 159 | 22ETCCS164 | USHIT SHARMA | 15 | 26 | 41 |
| 160 | 22ETCCS165 | UTKARSH BAJPAI | 24 | 24 | 48 |
| 161 | 22ETCCS166 | VAIBHAV GOYAL | 58 | 30 | 88 |
| 162 | 22ETCCS167 | VANSH BHATNAGAR | 43 | 24 | 67 |
| 163 | 22ETCCS168 | VINAY VADERA | 28 | 27 | 55 |
| 164 | 22ETCCS169 | VINITA MENARIA | 53 | 30 | 83 |
| 165 | 22ETCCS170 | VISHAL MENARIYA | 43 | 30 | 73 |
| 166 | 22ETCCS171 | VISHAL SINGH RAO | 17 | 27 | 44 |
| 167 | 22ETCCS172 | VIVEK SHARMA | 38 | 30 | 68 |
| 168 | 22ETCCS173 | VIVEK SHRIMALI | 28 | 27 | 55 |
| 169 | 22ETCCS174 | YANA OZHA | 38 | 25 | 63 |
| 170 | 22ETCCS175 | YASH VAGHELA | 28 | 28 | 56 |
| 171 | 22ETCCS300 | KEVALI ASHOK KANAGALE | 47 | 30 | 77 |
| 172 | 22ETCCS301 | KARAN SUTHAR | 19 | 21 | 40 |
| 173 | 22ETCCS302 | VINEET SHARMA | 25 | 25 | 50 |
| 174 | 23ETCCS200 | GOPAL PALIWAL | 14 | 21 | 35 |
| 175 | 23ETCCS201 | MANISH VYAS | 16 | 22 | 38 |
| 176 | 23ETCCS202 | RAHUL RAJPUROHIT | 30 | 23 | 53 |
| 177 | 23ETCCS203 | VAISHALI H PUROHIT | 17 | 26 | 43 |
| 178 | 23ETCCS204 | YASH SINGHATWADIA | 16 | 22 | 38 |

| TOTAL | PASS | FAIL | ABSENT | PASS % |
| --- | --- | --- | --- | --- |
| 178 | 167 | 11 | 0 | 94 |

**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 topic taught in previous class, I start with making students recalling it and ask MCQ questions.