	ITER, SIKSHA 'O' ANUSANDHAN (Deemed to be University)		ASSIGN-MENT
Branch	CSE & CSIT	Programme	B.Tech
Course Name	Intermediate Discrete Mathematics	Semester	V
Course Code	CSE 2733	Year/Period	2023/Odd
	Submit All Assignments	Maximum Marks	10
Learning Level (LL)	**L1**: Remembering	**L3**: Applying	**L5**: Evaluating
	L2: Understanding	**L4**: Analysing	**L6**: Creating

No.	Assignment-2	COs	LL
Q.1	**a)** Find the generating function for the number of ways to select 10 candy bars from large supplies of six different kinds. **b)** Find the generating function for the number of ways to select, with repetitions allowed, r objects from a collection of n distinct objects.	CO3	L2
Q.2	For $n \in \mathbf{Z}^+$, find in $(1 + x + x^2)(1 + x)^n$ the coefficient of (a) x^7; (b) x^8; and (c) x^r for $0 \leq r \leq n + 2, r \in \mathbf{Z}$.	CO3	L3
Q.3	Find the coefficient of x^{15} in each of the following. **a)** $x^3(1 - 2x)^{10}$ **b)** $(x^3 - 5x)/(1 - x)^3$ **c)** $(1 + x)^4/(1 - x)^4$	CO3	L2
Q.4	In how many ways can two dozen identical robots be assigned to four assembly lines with (a) at least three robots assigned to each line? (b) at least three, but no more than nine, robots assigned to each line?	CO3	L2
Q.5	Show that $(1 - 4x)^{-1/2}$ generates the sequence $\binom{2n}{n}$, $n \in \mathbf{N}$.	CO3	L2
Q.6	Paul invested the stock profits he received 15 years ago in an account that paid 8% interest compounded quarterly. If his account now has $7218.27 in it, what was his initial investment?	CO3	L2

Q.7	Solve the recurrence relation $a_{n+2} = a_{n+1}a_n, n \geq 0, a_0 = 1, a_1 = 2.$	CO3	L2
Q.8	Solve the recurrence relation: $$2a_{n+2} = 5a_n - 3a_{n+1}, \quad n \geq 0, \ a_0 = 1, \ a_1 = 0$$	CO3	L2
Q.9	Solve the recurrence relation: $$a_{n+3} + 2a_{n+2} - a_{n+1} - 2a_n = 0,$$ $$n \geq 0, \ a_0 = 1, \ a_1 = 0, \ a_2 = -1$$	CO3	L2
Q.10	Solve the recurrence relation: $$a_{n+2} - 4a_{n+1} + 8a_n = 0, \quad n \geq 0, \ a_0 = 0, \ a_1 = 2$$	CO3	L2

Note:
1. Marks distribution will be as per course instructor.
2. Assignments need to be submitted before due date.
3. The Assignments/Quiz in total carry weightage of **20 marks out of 100**

	Course Outcomes	Program Outcomes
CO1	Able to understand the concept of languages and finite state machines as well as its various applications.	PO1, PO2,
CO2	Able to apply relations and its properties to analyze equivalence relations and partial orderings.	PO1, PO2
CO3	Able to understand the concepts of generating functions and recurrence relations as well as apply generating functions to solve recurrence relations.	PO1, PO2
CO4	Able to understand and analyze the concepts of rings and modular arithmetic.	PO2,
CO5	Able to understand and apply the concepts of Boolean algebra and switching functions.	PO2
CO6	Able to understand and analyze the concepts of groups, coding theory and finite fields.	PO2