Printed page: 2 Subject Code:ACSE 0306

Roll No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute)

Affiliated to Dr. A.P. J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow

Course B.TechBranch CSE Semester-3 Second Sessional Examination

Year- (2021 - 2022)

Subject Name: DISCRETE STRUCTURE (ACSE 0306)

Time: 1.15Hours **[SET-A]** **Max. Marks:30**

General Instructions:

- This Question paper consists of .....pages & .....questions.It comprises of three Sections, A, B, and C
- Section A -Question No- 1 is objective type questions carrying 1 mark each, Question No- 2 is very short answer type carrying 2 mark each. You are expected to answer them as directed.
- Section B - Question No-3 is Short answer type questions carrying 5 marks each. Attempt any two out of three questions given.
- Section C -Question No. 4 &5are Long answer type (within unit choice) questions carrying 6marks each. Attempt any one part*a or b.*

		SECTION – A	[08Marks]	
1.	All questions are compulsory		(4×1=4)	
	a.	What is the identity element In the group G = {2, 4, 6, 8) under multiplication modulo 10? A. 5 B. 9 C. 6 D. 12	(1)	CO2
	b.	If f be greatest integer function and g be modulas function then find the value of (gof)(5/3)-(fog)(5/3) 1. 1 2. 2 3. 0 4. 1.5	(1)	CO2
	c.	Let G={1,-1,i,-i} is a multiplicative group. Find the order of every element. 1. 1,1,2,2 2. 1,2,1,4 3. 2,1,4,1 4. 1,2,4,4	(1)	CO2
	d.	A house has 4 doors and 10 windows. In how many ways can a burglar rob the house entering through window and exiting through door. 1. 35 2. 33 3. 45 4. 40	(1)	CO2
2.	All questions are compulsory		(2×2=4)	
	a.	Show that $11^n - 4^n$ is divisible by 7 using mathematical induction.	(2)	CO2
	b.	Draw the composition table for multiplication on the element in the set $A=\{1,w,w^2\}$ where w is the cube root of unity. Show that it satisfy the properties of group.	(2)	CO2

		SECTION – B	**[10Marks]**	
3.		**Answer any twoof the following-**	**(2×5=10)**	
	a.	Present the statement of Lagranges theorem and provide its proving also.	**(5)**	CO2
	b.	Define the cyclic group. How many generators are there of the cyclic group G of order 8?	**(5)**	CO2
	c.	What is permutation group? Define it properly and show that product of permutation group is not commutative.	**(5)**	CO2
		SECTION – C	**[12Marks]**	
4		Answer any one of the following-	**(1×6=6)**	
	a.	Prove the following theorem: 1. The identity element of subgroup is same as that of group. 2. The inverse of any element in subgroup is same as inverse of element in group.	**(6)**	CO2
	b.	If H is a subgroup of index 2 in G, then H is a normal subgroup of G.	**(6)**	
5.		Answer any one of the following-	**(1×6=6)**	
	a.	Give the definition of following algebraic structure 1. Groupoid 2. Semigroup 3. Monoid 4. Group 5. Free semi group 6. SubGroup	**(6)**	CO2
	b.	Show that the following $A=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$, $B=\begin{bmatrix}-1 & 0\\ 0 & 1\end{bmatrix}$, $C=\begin{bmatrix}1 & 0\\ 0 & -1\end{bmatrix}$, $D=\begin{bmatrix}-1 & 0\\ 0 & -1\end{bmatrix}$ forms a multiplicative group.	**(6)**	CO2