

**END SEMESTER EXAMINATION, OCT./NOV.- 2021-22**

**COURSE NAME: Discrete Mathematics and Structures COURSE CODE: 201CSL202**

**Day and Date: .....day, .../.../2022**

Seat No :

**Time: ----- to -----**

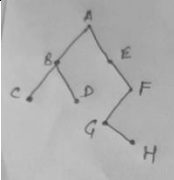
**Max. Marks- 50**

**OBJECTIVE**

**Instructions:**

- 1) Students must write **correct answer option** in given right hand side column.
- 2) **Do not** make  $\checkmark$  (Tick) or any other symbol for selecting correct answer.
- 2) All questions are **compulsory**.
- 3) Each question carries **2 marks**.

		Correct Option
Q. 1)	Which Symbolic Form for the given statement is correct "If either Jerry takes calculus or Ken takes Sociology , then Larry will take English."	<input type="checkbox"/>
	A) $(J \wedge K) \wedge L$	B) $(J \wedge K) \rightarrow L$
	C) $(J \vee K) \rightarrow L$	D) $(J \vee K) \vee L$
Q. 2)	Truth table for the given formula is " $(\neg(\neg P \wedge Q)) \vee (Q \wedge P)$ .	<input type="checkbox"/>
	A) T T F T	B) T F F F
	C) T F T F	D) T T T T
Q.3)	Which of the following is in Principle Disjunctive Normal Form ?	<input type="checkbox"/>
	A) $(P \wedge Q) \vee (\neg P \wedge Q) \vee (Q \wedge R)$	B) $(P \wedge Q \wedge R) \vee (\neg P \wedge Q \wedge \neg R) \vee (\neg P \wedge Q \wedge R)$
	C) $(P \vee Q \vee R) \wedge (\neg P \vee Q \vee \neg R) \wedge (\neg P \vee Q \vee R)$	D) $(P \vee Q \vee R) \vee (\neg P \vee Q \vee \neg R) \vee (\neg P \vee Q \vee R)$
Q. 4)	What is the Cartesian product of $A = \{1, 2\}$ and $B = \{a, b\}$ ?	<input type="checkbox"/>
	A) $\{(1, a), (1, b), (2, a), (b, b)\}$	B) $\{(1, 1), (2, 2), (a, a), (b, b)\}$
	C) $\{(1, a), (2, a), (1, b), (2, b)\}$	D) $\{(1, 1), (a, a), (2, a), (1, b)\}$
Q. 5)	The binary relation $\{(1,1), (2,1), (2,2), (2,3), (2,4), (3,1), (3,2)\}$ on the set $\{1, 2, 3\}$ is _____	<input type="checkbox"/>
	A) reflexive, symmetric and transitive	B) irreflexive, symmetric and transitive
	C) irreflexive and antisymmetric	D) neither reflexive, nor irreflexive but transitive
Q. 6)	A function or mapping (Defined as $f:X \rightarrow Y$ ) is a relationship from elements of one set X to elements of another set Y, then X is called?	<input type="checkbox"/>
	A) Codomain	B) Domain
	C) pre-image	D) image of function
Q. 7)	Let $(A, \otimes) = (\{1, 2, 3, 4, 5, 6\}, \otimes)$ is a group. It has two sub groups X and Y. $X = \{1, 3, 6\}$ , $Y = \{2, 3, 5\}$ . What is the order of union of subgroups?	<input type="checkbox"/>
	A) 5	B) 6
	C) 7	D) 12
Q. 8)	A monoid is called a group if _____	<input type="checkbox"/>
	A) $(a * a) = a = (a + c)$	B) $(a * c) = (a + c)$
	C) $(a + c) = a$	D) $(a * c) = (c * a) = e$
Q. 9)	Let $\langle S, * \rangle$ and $\langle T, * \rangle$ be any two semi groups. A mapping $g : S \rightarrow T$ is called semigroup homomorphism if	<input type="checkbox"/>
	A) $g(a * b) * c = a \Delta (b * c)$	B) $g(a * b) = g(a') \Delta g(b')$

	C) $g(a * b) = g(a') * g(b')$	D) $g(a * b) = g(a) \Delta g(b)$	
Q. 10)	Let $\langle M, *, e_M \rangle$ and $\langle T, \Delta, e_T \rangle$ be any two monoids. A mapping $G: M \rightarrow T$ such that for any two elements $a, b \in M$ $g(a * b) = g(a) \Delta g(b)$ and $g(e_M) = e_T$ is called		<input type="checkbox"/>
	A) Group Isomorphism	B) Monoid Homomorphism	
	C) Monoid Isomorphism	D) Sub Monoid Homomorphism	
Q. 11)	Let a set $S = \{2, 4, 8, 16, 32\}$ and $\leq$ be the partial order defined by $S \leq R$ if $a$ divides $b$ . Number of edges in the Hasse diagram is		<input type="checkbox"/>
	A) 5	B) 6	
	C) 4	D) 3	
Q.12)	Simplify the expression using K-maps: $F(A,B,C) = \pi(0,2,4,5,7)$ .		<input type="checkbox"/>
	A) $(x+z')(y+z)(x+y)$	B) $(x+y'+z)(x+z')$	
	C) $(y+z)(x+z)(x'+z')$	D) $(y'+z')(x'+y)(z+y')$	
Q. 13)	Which of the following boolean identity is correct?		<input type="checkbox"/>
	A) $(a * b) \oplus (a * b') = a$	B) $(a * b) \oplus (a * b') = a * b$	
	C) $a \oplus (a * b') = b$	D) $(a * b) \oplus (a * b') = a'$	
Q. 14)	Simplified Boolean Expressions which is equivalent to $m_0 + m_1 + m_2 + m_3$ is , where the variables are $x_1, x_2, x_3$ and $x_4$		<input type="checkbox"/>
	A) $x_1' * x_2$	B) $x_1' * x_4'$	
	C) $x_2' * x_3'$	D) $x_1' * x_2'$	
Q. 15)	Product of sums canonical form of $(x_1 * x_2') + x_3$ is		<input type="checkbox"/>
	A) $(x_1 + x_2' + x_3') * (x_1 + x_2' + x_3) * (x_1' + x_2' + x_3')$	B) $(x_1 + x_2 + x_3) * (x_1 + x_2' + x_3) * (x_1' + x_2' + x_3)$	
	C) $(x_1 * x_2 * x_3) + (x_1 * x_2' * x_3) + (x_1' * x_2' * x_3)$	D) $(x_1' + x_2' + x_3') * (x_1 + x_2' + x_3) * (x_1' + x_2' + x_3)$	
Q. 16)	The number of edges appearing in the sequence of the path is called		<input type="checkbox"/>
	A) Edges of Graph	B) Path Length	
	C) Graph Cycle	D) Total number of Vertex	
Q. 17)	 <p>The preorder traversal of above tree is</p>		<input type="checkbox"/>
	A) CBDAEFGH	B) ABDCEFGH	
	C) ABCDEFGH	D) ABDCEFHG	
Q. 18)	Activities A, B, and C are the immediate predecessors for Y activity. If the earliest finishing time for the three activities are 12, 15, and 10, then what will be the earliest starting time for Y?		<input type="checkbox"/>
	A) 15	B) 12	
	C) 10	D) Cannot be determined	
Q. 19)	A connected graph G is a Euler Graph if and only if all vertices of G are of		<input type="checkbox"/>
	A) Odd Degree	B) Even Degree	
	C) Same Degree	D) Different Degree	
Q. 20)	The problem of finding a path in a graph that visits every vertex exactly once is called?		<input type="checkbox"/>
	A) Hamiltonian path problem	B) Hamiltonian cycle problem	
	C) Subset sum problem	D) Turnpike reconstruction problem	
Q.21)	Find the number of ways of arranging the letters of the words DANGER, so that no vowel occupies odd place		<input type="checkbox"/>
	A) 36	B) 48	
	C) 96	D) 144	
Q. 22)	In how many ways can we select 6 people out of 10, of which a particular person is not included?		<input type="checkbox"/>
	A) $^{10}C_5$	B) $^9C_5$	

	C) ${}^9C_6$	D) ${}^9C_4$	
Q. 23)	A 4 digit PIN is selected. What is the probability that there are no repeated digits?		
	A) 0.504	B) 0.9	<input type="checkbox"/>
	C) 0.87	D) 0.12	
Q. 24)	When we perform an experiment, then the set S of all possible outcomes is called the?		
	A) Random Experiment	B) Sample Space	<input type="checkbox"/>
	C) Event	D) Tossing Space	
Q. 25)	If E and F are two events associated with sample space such that $P(E)=0.6$ , $P(F)=0.3$ and $P(E \cap F) =0.2$ , then $P(E   F)$ is		
	A) 1/3	B) 2/3	<input type="checkbox"/>
	C) 3/4	D) 1/4	