

## **BRAINWARE UNIVERSITY**

## Term End Examination 2021 - 22 Programme – Bachelor of Computer Applications Course Name – Discrete Structures Course Code - GEBS201 (Semester II)

Time allotted: 1 Hrs.15 Min. Full Marks: 60 [The figure in the margin indicates full marks.] Group-A (Multiple Choice Type Question) 1 x 60=60 Choose the correct alternative from the following: (1) Let p: It is cold and q: It is raining, then the symbolic form of the statement 'It is cold or it is not raining' is a)  $P \vee q$ d)  $p \vee \neg q$ c)  $\neg p \land q$ (2) Let p be a proposition 'He is intelligent' and q be a proposition 'He is tall'. The the sy mbolic form of the statement 'He is intelligent and tall' is a)  $P \vee q$ b)  $\neg p \land q$ c)  $P \wedge q$ d) none of these. (3) For the statement p and  $q \neg (p \lor q)$  is a)  $\neg p \wedge \neg q$ b)  $\neg p \vee \neg q$ c)  $p \vee q$ d) none of these. (4)  $p \lor (p \land q) =$ a) p b) q c)  $P \wedge q$ d) none of these (5)  $p \rightarrow q \equiv$ 

a)

b)

	$\neg q \lor \neg p$		$\neg p \land q$
c)	$\neg p \lor q$	d)	$p \lor q$
	If the truth value of $p$ and $q$ are $F$ and $F$ respectively then is	the	etruth value of $\neg p \rightarrow \neg q$
a)	T	b)	F
c)	both T and F	d)	None of these
(7)	If $p \leftrightarrow q \equiv (p \rightarrow q) \land r$ then r is		
a)	p  o q	b)	$\neg p$
c)	$q \rightarrow p$	d)	$\neg q$
(8)	$\neg \left(p \lor q\right) \lor \left(p \land \neg q\right) \equiv$		
a)	$\neg p$	b)	P
c)	$\neg q$	d)	None of these .
(9)	The proposition $p \wedge (q \wedge \neg q)$ is a		
a)	contradiction	b)	Tautology
c)	an argument	d)	none of these .
(10)	Contrapositive of $'\neg p \rightarrow q'$ is		
a)	$p \rightarrow q$	b)	$\neg q \rightarrow \neg p$
c)	$\neg q \rightarrow p$	d)	$q \rightarrow \neg p$
	Let p: 'It is sunny afternoon 'and q: 'It is hot today'. T proposition $\neg p \land \neg q$ can be written as	hen	the following
a)	It is not sunny afternoon and it is not hot today .	-	It is false that It is not sunny afternoon or it is not hot today.
c)	It is false that It is sunny afternoon or it is ho t today.	d)	None of these .
(12)	The negation of the statement 'No one wants to be	uy 1	my house' is
a)	All want to buy my house		Some one wants to buy my house
	Every one wants to buy my house	d)	None of these .
(13)	'Any proposition'∨ 'a tautology'		
	The proposition		tautology
	contradiction	d)	none of these
(14)	If ${}^{2n}C_3$ : ${}^{n}C_2 = 44:3$ then the value of <i>n</i> is		
a)		b)	
	2	d)	
` ′	The number of three digit number that can be form		_
	24 4	b)	none of these
c)	7	u)	none of these

(16) In now many ways / different beads can be arrang	ged to form a necklace?	
a) 250	b) 300	
c) 360	d) 350	
(17) The generating function for the sequence <1,-1,1,-1,> is		
a) $(1-x)^{-1}$	b) $(1+x)^{-1}$	
c) $(1+2x)^{-\frac{1}{2}}$	d) $(1-2x)^{-\frac{1}{2}}$	
(18) If $a_n = a_{n-1} + 9$ , $n \ge 1$ and $a_0 = 5$ then $a_n =$		
a) $9 + 5n$	b) 5+9n	
c) 9n	d) 5 <i>n</i>	
(19) The sequence represented by the function $\frac{1}{1-5x}$ is		
a) $\{3^n\}$	<ul> <li>b) {5<sup>n</sup>}</li> <li>d) {4<sup>n</sup>}</li> </ul>	
c) $\{5^n + 1\}$	d) $\{4^n\}$	
(20) If ${}^{n}C_{1}$ , ${}^{n}C_{2}$ and ${}^{n}C_{3}$ are in A.P., the value of $n$ is		
a) 6	b) 7	
c) 8	d) 4	
(21) If A and B are sets and $A \cup B = A \cap B$ , then		
a) $A = \Phi$	b) $\mathbf{B} = \mathbf{\Phi}$	
c) $A = B$	d) none of these	
(22) Let R be a non-empty relation on a collection of s $B = \emptyset$ , then	ets defined by ARB if and only if A $\cap$	
a) R is reflexive and transitive.	b) R is symmetric and not transitive.	
c) R is an equivalence relation.	d) R is not reflexive and not symmetric.	
(23) Order of the power set of a set of order n is		
a) n	b) 2n	
c) n <sup>2</sup>	d) 2 <sup>n</sup>	
(24) Which of the following two sets are equal?		
a) $A = \{1, 2\}$ and $B = \{1\}$	b) $A = \{1, 2\}$ and $B = \{1\}$	
c) $A = \{1, 2, 3\}$ and $B = \{2, 1, 3\}$	d) $A = \{1, 2, 4\}$ and $B = \{1, 2, 3\}$	
(25) A function from A to B is called onto function if its range is		
a) B	b) A	
c) Neither A nor B	d) Both A and B	
(26) The smallest set A such that A $\cup$ {1, 2} = {1, 2, 3	, 5, 9} is	

ioned	{1, 2, 5, 9}	b)	a) {2,3,5}	
	None of the mention	d)	c) {3, 5, 9}	
	and	$A = \left\{ x \mid x \in \mathbb{N}, x \ge 4 \right\}_{a}$	(27) Let N be the set of all natural num $B = \{x \mid x \in N, x < 5\}  \text{Then}  A \cap$	(27)
	(4)	b)	a) {4,5}	a)
	(9)	d)	c) {0}	c)
		(a,kb) =	(28) If k is appositive integer, then go	(28)
	$k \gcd(a, b)$	b)	a) $k \gcd(ka, b)$	a)
	none	d)	c) $kgcd(a,kb)$	c)
ed	ir in relation is called	s of each ordered pair	(29) Set consisting of all first elem	(29)
L	domain of relation	b)	a) subset	a)
set	complement of a se	d)	c) range of relation	c)
alled	l pair in relation is call	ents of each ordered 1	(30) Set consisting of all second ele	(30)
	range of relation	b)	a) domain of relation	a)
et	complement of a set	d)	c) subset	c)
	(31) What is the base case for the inequality $7^n > n^3$ , where $n = 3$ ?			
	42 < 132	b)	a) 652 > 189	a)
	42 ≤ 431	d)	c) 343 > 27	c)
		-1)=	(32) If $f(x-2) = 2x^2 + 3x - 5$ then	(32)
	) 1	b)	a) 0	a)
	2	d)	c) -1	c)
ibers	the set of all real numbe	$f(x) = x^2$ , where R is t	(33) The function $f: R \to R$ defined to Then $f$ is	(33)
	) injective	b)	a) surjective	a)
	None of these	d)	c) bijective	c)
		) =	(34) If $\phi(x-2) = 2x^2 + 3x - 5$ then	(34)
	$2x^2 - 11x + 9$	b)	a) $2x^2 + 11x + 9$	a)
	none	d)	c) $x^2 + 11x + 9$	c)
		gers. Then	(35) Let a and b any two positive in	(35)
	$\gcd(a,b)lcm(a,b)$ =	b)	a) $gcd(a,b) = lcm(a,b)$	a)
) = ab	gca(a,o)icm(a,o):			
	$\gcd(a,b)lcm(a,b) = \\$ $\gcd(a,b)lcm(a,b) = \\$	d)	c) $gcd(a,b)lcm(a,b) = 1$	c)
			c) $gcd(a,b)lcm(a,b) = 1$ (36) If $32 \equiv a \pmod{7}$ . Then the value	
	god(a b)lam(a b).			a)

	c) 12	d) 13
	(37) If $gcd(a,b) = c$ , then $\frac{a}{c}$ and $\frac{b}{c}$ are	
	a) both prime	b) both composite
	c) relatively prime to each other (38) The gcd(81,135) is	d) None of these
	a) 3 c) 27 (39) The lcm(81,135) is	b) 9 d) 81
	<ul><li>a) 10935</li><li>c) 3645</li><li>(40) The set of all real numbers under usual addition</li></ul>	b) 2187 d) 405 formed a group. Then the inverse of 2.36
	is: a) 2.36 c) 2.4 (41) The inverse of the element — i in the multiplicative gro	b) -2.36 d) -2.4 up $\{-1,1,-i,i\}$ , where $i^2 = -1$
	a) $i$ c) 1  (42) The identity element in the multiplicative group $\{-1\}$	b) $-i$ d) -1 1 - i i} where $i^2 = -1$
	<ul> <li>a) i</li> <li>c) 1</li> <li>(43) A monoid (M,+) is called a group if</li> </ul>	b) -i d) -1
	<ul> <li>a) a+b=b+a=e</li> <li>c) a+b=b+a∀a,b∈ M</li> </ul>	b) $a+(b+c) = (a+b)+c$ d) $a+b \in M, \forall a,b \in M$
	<ul> <li>(44) A group of three element is:</li> <li>a) Always non-abelian</li> <li>c) Sometimes abelian</li> </ul>	b) Always abelian d) Always non-cyclic
	<ul> <li>(45) Let (G,.) be a group and a has the inverse b then ab</li> <li>a) e</li> <li>c) a</li> </ul>	<ul> <li>b) α²</li> <li>d) b²</li> </ul>
(46) The number of elements in the group $(Z_3,+)$ is		
	a) 1 c) 4	b) 3 d) 6

(4/) The inverse of the element [1] in the additive—group Z	3
a) [1]	b) [2]
c) [0]	d) None of these
(48) If $\circ$ denotes permutation multiplication, then the value of	of (12) o (14)
a) (4 1 2)	b) (1 4 2)
c) (4 2)	d) (4 1)
(49) Let $a$ be an element in a group with order 5. Then the variation	alue of $a^{2020}$
a) a	b) a <sup>2</sup>
c) a <sup>4</sup>	d) e
(50) Let $a$ be an element in a group with order 10. Then the	order of the element $a^7$
<ul><li>a) 10</li><li>c) 1</li><li>(51) Which of the following is not an abelian group:</li></ul>	<ul><li>b) 70</li><li>d) Cannot be determined from the given data</li></ul>
a) (Q,+)	b) (Z,+)
c) (Z <sub>3</sub> ,+)	d) S <sub>5</sub>
(52) A subgroup H of a group G is normal if for all $x \in G$ and	$d h \in H$
a) $xhx^{-1} \in H$	b) $xhx^{-1} \in G$
c) $xh^{-1} \in H$	d) $x^{-1}h \in H$
(53) In a Boolean algebra B, if $a+b=b$ then $a.b=?$	
a) a	b) b
c) a'	d) Cannot determined from the given data
(54) In a Boolean algebra B, $(a+b)'=?$	
a) a'+ b'	b) (a.b)'
c) a'.b'	d) 1
(55) In a Boolean algebra B, $0'=?$	
a) I	b) 0
c) I'	d) 0"
(56) Arithmetical minus (-) is a binary operation on	
a) set of all integers	b) set of positive integers
c) set of negative integers	d) none
(57) A groupoid $(G, \circ)$ is a semi-group if for all a,b,c in $G$	

a)  $a \circ b = b \circ a$ 

b)  $a \circ a = a$ 

c)  $(a \circ b) \circ c = (b \circ c) \circ a$ 

d)  $a \circ (b \circ c) = (a \circ b) \circ c$ 

(58) Which one of the following groupoid is semi-group

a) (Z,+)

b) (Z,-)

c) (R,÷)

d) None

(59) In the group  $Z_4 = \{[0],[1],[2],[3]\}$  under addition [3]+[2]=

a) [5]

b) [0]

c) [1]

d) [2]

(60) An edge whose two end vertices coincide is called

a) ring

b) adjacent edge

c) loop

d) none