

University of Mumbai
Examination 2020 under cluster 4 (Lead College: PCE, New Panvel)

Program: **Computer Engineering**

Curriculum Scheme: Rev2016

Examination: Second Year Semester: III

Course Code: CSC303 Course Name: Discrete Mathematics

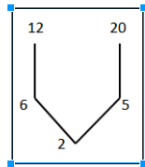
Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	A set containing only one element is called a _____
Option A:	Unique set
Option B:	Primary set
Option C:	Singleton set
Option D:	Universal set
Q2.	Warshall's Algorithm is used to find _____ closure
Option A:	Transitive
Option B:	Symmetric
Option C:	Asymmetric
Option D:	Reflexive
Q3.	If every element of set A is an element of set B, then A and B can be denoted by which of the following notation?
Option A:	$A = B$
Option B:	$A \rightarrow B$
Option C:	$A \subseteq B$
Option D:	$A \not\subseteq B$
Q4.	If H is subgroup of G, then which of the following is incorrect about H?
Option A:	The identity element e belongs to H
Option B:	If $a \in H$ then $a^{-1} \in H$
Option C:	The identity element e should not belong to H
Option D:	If a, b belong to H the $a*b$ also belongs to H
Q5.	_____ is a compound statement obtained by combining two simple statements by 'And'.
Option A:	disjunction
Option B:	conjunction
Option C:	Implication
Option D:	negation
Q6.	For a semi-group $(Z^+, +)$ the identity element is _____
Option A:	0
Option B:	1
Option C:	2
Option D:	-1

Q7.	Obtain the DNF of $(p \supset q) \wedge (\sim p \wedge q)$
Option A:	$p \supset q$
Option B:	$\sim p \wedge q$
Option C:	p
Option D:	q
Q8.	Solve using warshall's algorithm $R=\{(a,b),(b,a),(b,c)\}$ defined of A where $A=\{a,b,c\}$
Option A:	$\{(a,a),(c,c),(b,a),(b,b),(b,c)\}$
Option B:	$\{(a,a),(a,b),(a,c),(b,c)\}$
Option C:	$\{(a,a),(a,b),(a,c),(b,a),(b,b),(b,c),(c,a),(c,b)\}$
Option D:	$\{(a,a),(a,b),(a,c),(b,a),(b,b),(b,c)\}$
Q9.	If a card is chosen at random from a pack of 52 playing cards. What is the probability of getting a king or a heart?
Option A:	1/13
Option B:	4/13
Option C:	1/4
Option D:	3/52
Q10.	Consider a parity check matrix. Find the (2,5) group code function $eH : B_2 \rightarrow B_5$
	$\begin{pmatrix} 011 \\ 011 \\ 100 \\ 010 \\ 001 \end{pmatrix}$
Option A:	$e(00)=00000$ $e(01)=01010$ $e(10)=10011$ $e(11)=11000$
Option B:	$e(00)=00001$ $e(01)=01010$ $e(10)=10011$ $e(11)=11001$
Option C:	$e(00)=00000$ $e(01)=01111$ $e(10)=10010$ $e(11)=11000$
Option D:	$e(00)=00000$ $e(01)=01011$ $e(10)=10011$ $e(11)=11111$
Q11.	Identify the symbolization of the following proposition when the universe of discourse is real numbers there are real numbers x and y such that $x - y = 1$.
Option A:	$(\forall x) (\exists y) (x - y = 1)$
Option B:	$(\exists x) (\forall y) (x - y = 1)$
Option C:	$(\exists x) (\exists y) (x - y = 1)$
Option D:	$(\forall x) (\forall y) (x - y = 1)$
Q12.	Let $f(x)=x+2$, $g(x)=x-2$, & $h(x)=3x$, for $x \in R$, where R is a set of real numbers. Find $g \circ f$
Option A:	x
Option B:	$6x-2$
Option C:	$x+1$
Option D:	$x-3$
Q13.	Let $A = \{1, 2, 3, 4, 5, 6\}$ is a finite abelian group under multiplication modulo 7. Identify the inverse of elements 2 and 3.
Option A:	Inverse of 2 is 4 and inverse of 3 is 5

Option B:	Inverse of 2 is 5 and inverse of 3 is 4
Option C:	Inverse of 2 is 6 and inverse of 3 is 1
Option D:	Inverse of 2 is 1 and inverse of 3 is 6
Q14.	How many friends must you have to guarantee that at least five of them will have birthdays in the same month?
Option A:	49
Option B:	48
Option C:	60
Option D:	61
Q15.	Identify the maximal and minimal elements in the given Hasse diagram of a poset. 
Option A:	Maximal: 20 and Minimal: 2
Option B:	Maximal: 12, 20 and Minimal: 2
Option C:	Maximal: 6, 12 and Minimal: 2, 5
Option D:	Maximal: 5, 20 and Minimal: 2, 6
Q16.	There can be _____ possible sub graphs of any graph.
Option A:	exactly one
Option B:	many
Option C:	zero
Option D:	at most one
Q17.	If A and B are true statements and X is a false statement, find the truth value of: $\sim X \wedge (\sim A \vee \sim B)$
Option A:	T
Option B:	F
Option C:	T and F
Option D:	T or F
Q18.	Consider a function $f:A \rightarrow B$ is bijective ..which of the following is INCORRECT?
Option A:	$f^{-1} : B \rightarrow A$ exist
Option B:	$f^{-1} : B \rightarrow A$ unique
Option C:	f^{-1} is bijective
Option D:	f^{-1} is only injective
Q19.	If the origin and terminus of a walk are same, the walk is known as... ?
Option A:	Path
Option B:	Closed
Option C:	Open
Option D:	Bound
Q20.	The conjunctive normal form(CNF) of $\sim [(p \vee \sim q) \wedge \sim r]$ is

Option A:	$(r \vee \sim p) \wedge (r \vee q)$
Option B:	$(\sim r \vee p) \wedge (\sim r \vee q)$
Option C:	$(r \wedge \sim p) \vee (r \wedge q)$
Option D:	$(r \vee p) \wedge (r \vee \sim q)$
Q21.	A binary operation on * is said to be associative if
Option A:	$a*(b*c)=c*(d*e)$
Option B:	$a*(b*c)=ab*ac$
Option C:	$a*(b*c)=(a*b)*c$
Option D:	$b*c=c*b$
Q22.	Given any non empty set A and a binary operation *, if there is an element $e \in A$, such that for every $a \in A$, $a*e=e*a=a$, then e is called _____
Option A:	an inverse element
Option B:	unique element
Option C:	an identity element
Option D:	an empty element
Q23.	A set of real numbers G is a group under * defined by $a*b=a+b-2$. The identity element is _____
Option A:	1
Option B:	2
Option C:	3
Option D:	4
Q24.	In a group of 300 persons, 160 drink tea and 170 drink coffee, 80 of them drink both, How many persons do not drink either?
Option A:	50
Option B:	40
Option C:	60
Option D:	45
Q25.	Construct the truth table to determine whether the statement $[p \wedge (q \vee r)] \supset [p \wedge q] \vee (p \wedge r)$ is _____.
Option A:	Tautologous
Option B:	Contradictory
Option C:	Contingent
Option D:	Inverse