

Discrete Structure
Sample Final Exam
Fall 2015

Instructions:

- a. Answer all of the questions.
- b. You have two hours to answer these questions
- c. This is a closed note/book/neighbor exam.
- d. Please turn off your cell phone, laptop, and all other electronic devices.

Name:

Question No.	points	Question No.	points	Question No.	points
1		13		25	
2		14		26	
3		15		27	
4		16		28	
5		17		29	
6		18		30	
7		19		31	
8		20		32	
9		21		33	
10		22		34	
11		23		35	
12		24		Total	

Questions:

1. Which of the following statement is the negation of the statement “2 is even or –3 is negative”?
 - a. 2 is even & -3 is negative.
 - b. 2 is odd & -3 is not negative.
 - c. 2 is odd or –3 is not negative.
 - d. 2 is even or –3 is not negative.

2. The statement $(p \wedge q) \rightarrow (p \vee q)$ is a
 - a. Contingency.
 - b. Absurdity.
 - c. Tautology.
 - d. None of the above.

3. In how many ways can a president and vice president be chosen from a set of 30 candidates?
 - a. 820
 - b. 880
 - c. 870
 - d. 850

4. The relation $\{ (1,2), (1,3), (3,1), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4) \}$ is
 - a. Reflexive.
 - b. Transitive.
 - c. Asymmetric.
 - d. Symmetric.

5. A tree with n vertices has _____ edges
 - a. n
 - b. n-2
 - c. n-1
 - d. n+1

6. In propositional logic which one of the following is equivalent to $p \rightarrow q$
 - a. $\bar{p} \vee q$
 - b. $\bar{p} \vee \bar{q}$
 - c. $\bar{p} \rightarrow q$
 - d. $p \rightarrow \bar{q}$

7. Which of the following statement is true:
- Every graph is not its own sub graph.
 - The terminal vertex of a graph are of degree two.
 - A tree with n vertices has n edges.
 - A single vertex in graph G is a sub graph of G .
8. The number of distinct relations on a set of 3 elements is:
- 8
 - 9
 - 18
 - 512
9. Which of the following set is null set?
- $\{0\}$
 - $\{\}$
 - $\{\emptyset\}$
10. Suppose v is an isolated vertex in a graph, then the degree of v is:
- 0
 - 1
 - 2
 - 3
11. Let p be “He is tall” and let q “He is handsome”. Then the statement “It is false that he is short or handsome” is:
- $p \wedge q$
 - $\sim(\sim p \vee q)$
 - $p \vee \sim q$
 - $\sim p \wedge q$
12. Find the number of relations from $A = \{\text{cat, dog, rat}\}$ to $B = \{\text{male, female}\}$
- 64
 - 6
 - 32
 - 15
13. The recurrence definition of the sequence $\{a_n\}$, $n=1,2,3,4,\dots$ if $a_n=2n+1$
- $a_{n+1}=2a_n$
 - $a_{n+1}=2a_n+1$
 - $a_{n+1}=2a_n+2$
 - $a_{n+1}=a_n+2$

14. The relation $\{ (1,1), (2,2), (3,3), (4,4) \}$ is
- Reflexive.
 - Transitive.
 - Asymmetric.
 - Symmetric.
 - All of the above
15. Which of the following proposition is a tautology?
- $(p \vee q) \rightarrow p$
 - $p \vee (q \rightarrow p)$
 - $p \vee (p \rightarrow q)$
 - $p \rightarrow (p \rightarrow q)$
16. A graph with one vertex and no edges is:
- Multigraph
 - Diagraph
 - Isolated graph
 - Trivial graph
17. How many different words can be formed out of the letters of the word VARANASI?
- 64
 - 120
 - 40320
 - 720
18. Which of the following statement is the negation of the statement “4 is even or -5 is negative”?
- 4 is odd and -5 is not negative
 - 4 is even or -5 is not negative
 - 4 is odd or -5 is not negative
 - 4 is even and -5 is not negative
19. Which one is the contrapositive of $q \rightarrow p$?
- $p \rightarrow q$
 - $\neg p \rightarrow \neg q$
 - $\neg q \rightarrow \neg p$
 - None of these
20. Is it possible in a group of 13 people for each to shake hands with exactly 7 others?
- T
 - F

21. Is it possible to have a simple graph with 10 edges where each vertex has degree 4?
a. T
b. F

22. What is the total degree of K_9 ?
a. 72
b. 81
c. 9
d. 18

23. What is the degree of each vertex in the complete bipartite graph $K_{4,5}$?
a. $\{(5,5,5,5),(4,4,4,4,4)\}$
b. 20
c. 4,5
d. 5^4

24. Is a graph with 12 vertices and 12 edges a tree?
a. T
b. F

25. Tree is a cyclic and has ----- edges
a. $n-1$
b. $n+1$
c. n
d. n^2

