Hall Ticket Number:

Code No. : 13652 S N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (I.T.) III-Semester Supplementary Examinations, August-2023

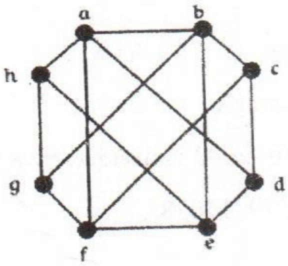
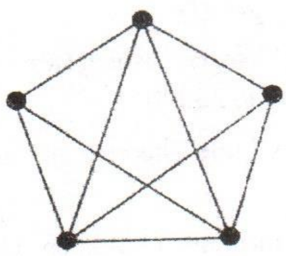
Discrete Mathematics

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Which of the following are Propositions? What are the truth values of those that are Propositions? a) The moon is made of green cheese b) 4+X=5	2	1	1	1,2,12
2.	What is an Exhaustive proof? Give an Example.	2	1	1	1,2,12
3.	What is the Quotient and Remainder when -2002 is divided by 87?	2	2	2	1,2,12
4.	Use Euclidean algorithm to find GCD (1529, 14038).	2	2	2	1,2,12
5.	State the Vandermonde's Identity?	2	1	3	1,2,12
6.	How many strings of three decimal digits begin with an odd digit?	2	2	3	1,2,12
7.	List the ordered pairs in the relation R from A={ 0,1,2,3,4} to B={ 0,1,2,3} , where (a, b) ∈ R if and only if $a + b = 4$.	2	2	4	1,2,12
8.	Represent the relation R={ (1,1) , (1,2), (1,3), (2,2), (2,3), (3,3) } on {1,2,3} with a matrix.	2	2	4	1,2,12
9.	How many edges does a graph have if its degree sequence is 4, 3, 3, 2, 2?	2	2	5	1,2,12
10.	Explain briefly Strongly connected graph and Weakly connected graph with an example?	2	1	5	1,2,12
	Part-B (5 × 8 = 40 Marks)				
11. a)	Prove that if n is an integer and 3n+2 is even, then n is even using a)Proof by Contradiction b) Proof by Contraposition	4	3	1	1,2,12
b)	Show that $\neg\forall x\,(P(x) \rightarrow Q(x))$ and $\exists x\,(P(x) \wedge \neg Q(x))$ are logically equivalent.	4	3	1	1,2,12
12. a)	i) Find the total number of positive divisors of the number $n = 14553$. ii) Find the number of positive integers which are less than $n = 25200$ that are relatively prime to 25200.	4	4	2	1,2,12
b)	Show that $2^{340} \equiv 1 \pmod{11}$ by Fermat's Little Theorem and noting that $2^{340} = (2^{10})^{34}$.	4	3	2	1,2,12
13. a)	Suppose that a department contains 10 men and 15 women. How many ways are there to form a committee with six members if it must have more women than men?	4	3	3	1,2,12
b)	State Pigeon hole principle and Prove that if 30 dictionaries in a library contain a total of 61327 pages then at least one of the dictionaries must have at least 2045pages using Pigeon hole principle.	4	1	3	1,2,12

			M	L	CO	PO
14.	a)	Draw the Hasse diagram for the "greater than or equal to" relation on {0, 1, 2, 3, 4, 5}.	4	2	4	1,2,12
	b)	Find the relation R = { (a , b) | a and b are the same age} on the set of all people are equivalence relation ? Determine the properties of an Equivalence relation that the others lack.	4	2	4	1,2,12
15.	a)	Explain the terms Euler path, Euler Circuit, Eulers formula, and Eulerian multi-graph with an example?	4	1	5	1,2,12
	b)	Determine whether the given graph is Planar. If so, draw it so that no edges cross. 	4	3	5	1,2,12
16.	a)	Express each of these statements using predicates, quantifiers, logical connectives and mathematical operators where the domain consists of all integers. a) The difference of two negative integers is not necessarily negative. b) The absolute value of the sum of two integers does not exceed the sum of the absolute values of these integers.	4	2	1	1,2,12
	b)	Solve the Congruence $2x \equiv 7 \pmod{17}$.	4	3	2	1,2,12
17.		Answer any *two* of the following:				
	a)	Consider the Non Homogeneous linear recurrence relation $a_n = 2a_{n-1} + 2^n$. Show that $a_n = n\,2^n$ is a solution of this recurrence relation.	4	3	3	1,2,12
	b)	Let A= {1,2,3,4,6,8,12} , define a relation 'R' on A such that $x\,R\,y$ *iff x divides b*. then (i)Prove that (A,R) is a Poset (ii) Draw the Hasse diagram (iii) Find the Maximal, Minimal, Greatest & Least elements if any.	4	3	4	1,2,12
	c)	Find the Chromatic number of the given graph. 	4	4	5	1,2,12

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%

*****