PRN No.	

PAPER CODE	U213 - 233CRE

December 2023 (REEXAM)

SY B.TECH (SEMESTER - I)

COURSE NAME:Discrete Mathematics

Branch: Computer Engineering

COURSE CODE: ES21203CS

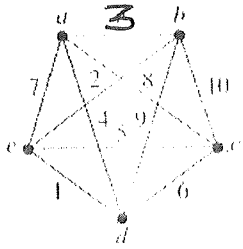
(PATTERN 2020)

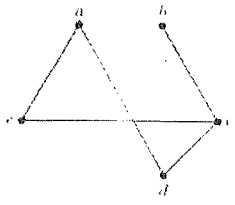
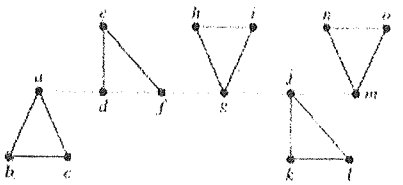
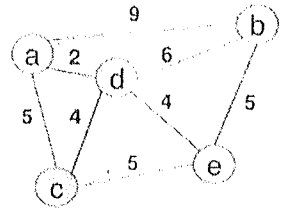
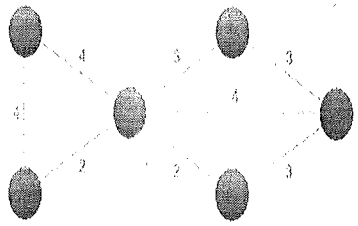
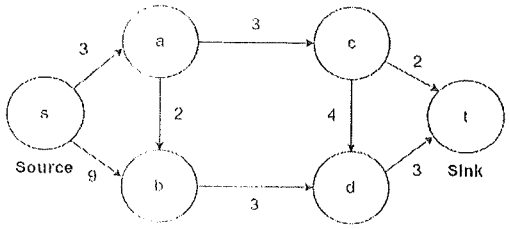
Time: [2 Hrs]

[Max. Marks: 60]

Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **All questions are compulsory. Solve any two sub questions each from each Question 1 ,2, 3,4,5,and 6 respectively**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Calculate and check that $p \rightarrow q$ and $\sim q \rightarrow \sim p$ are logically equivalent or not?	[5]	1	Apply
	b) Construct a direct proof of the theorem "If n is an odd integer, then n^2 is odd."	[5]	1	Apply
	c) Compute the premises "If you send me an e-mail message, then I will finish writing the program," "If you do not send me an e-mail message, then I will go to sleep early," and "If I go to sleep early, then I will wake up feeling refreshed" lead to the conclusion "If I do not finish writing the program, then I will wake up feeling refreshed."	[5]	1	Apply
Q2	a) Determine whether the function $f(x) = x^2$ from the set of integers to the set of integers is one-to-one or not?	[5]	2	Apply
	b)Calculate i) R^2 ii) R^3. If R be the relation on the set {1, 2, 3, 4, 5} containing the ordered pairs (1, 3), (2, 4), (3, 1), (3, 5), (4, 3), (5, 1),(5, 2), and (5, 4).	[5]	2	Apply
	c) Calculate whether is R an equivalence relation or not? if R is the relation on the set of strings of English letters such that aRb if and only if $l(a) = l(b)$, where $l(x)$ is the length of the string x.	[5]	2	Apply
Q3.	a) Demonstrate that K_n has a Hamilton circuit whenever $n \geq 3$.	[5]	3	Apply
	b)Solve the traveling salesperson problem for this graph by finding the total weight of all Hamilton circuits and determining a circuit with minimum total weight. 	[5]	3	Apply
	c)Compute the chromatic number of the given graph.	[5]	3	Apply

	graph.  i)  ii)			
Q.4	a)Compute MST using Prims algorithm  	[5]	4	Apply
	b) Compute MST using Kruskal's algorithm 	[5]	4	Apply
	c)Calculate Maximum flow of given network using ford Fulkerson algorithm  	[5]	4	Apply
Q.5	a) Compute how many words, with or without meaning, can be formed using all the letters of the word EQUATION, using each letter exactly once?	[5]	5	Apply
	b)Calculate how many ways are there to select a crew of 5 people to go on this mission (assuming that all crewmembers have the same job)?If A group of 35 people have been trained as astronauts to go on the first mission to Moon	[5]	5	Apply
	c) Compute i)how many possible outcomes are there in total? ii) contain exactly two heads If a coin is flipped 10 times where each flip comes up either heads or tails.	[5]	5	Apply
Q.6)	a) show that G is abelian group In a group (G, *), if $(a * b)^2 = a^2 * b^2$ "a,b ∈ G.	[5]	6	Apply
	b) Show that set of all non zero real numbers is a group with respect to multiplication	[5]	6	Apply
	c) Show that the set 'N'is a monoid with respect to addition.	[5]	6	Apply