

PILLAI COLLEGE OF ENGINEERING, NEW PANVEL

(Autonomous) (Accredited 'A+' by NAAC)

END SEMESTER EXAMINATION

May 2023(SEM IV)

BRANCH: Computer Engineering/Information Technology

Subject:- Engineering Mathematics-IV		Time: 02.00 Hours					
Max. Marks: 60 Date:02 /0			/2023				
N.B 1. Q.1 is compulsory Subject Code CE20							
2. Attempt any two from the remaining three questions							
3. E	ach Question carry 20 marks.						
Q.1.	Attempt All		Marks				
	Find from the following values of the demand and the corr	esponding price					
	of a commodity, the degree of correlation between the demand and price						
a)	by computing Karl Pearson's coefficient of correlation.						
	Demand in guintals : 65.66.67.67.68.69.70.72						
	Price in Paise per k.g: 67, 68, 65, 68, 72, 72, 69, 71						
	Draw the Hasse diagram of the poset A={2.3.6.12.24.36.72	} under the					
b)	relation of divisibility. Is it a Lattice?						
	(i)A random variable X has the probability distribution						
	\mathbf{X} : -2 -1 0 1 2 3						
c)	$P(X): 0.1 \ k \ 0.2 \ 2k \ 0.3 \ k$						
	Find k and the mean and the variance of X						
	(ii) If hone of a cortain broad law ages on E days a weak on an average, find						
	(ii) in heris of a certain breed lay eggs on 5 days a week on an average; find						
	bans of this broad will expect to reasing at least 4 error						
	nens of this breed, will expect to receive at least 4 eggs						
	(i) Discuss whether the following graph have Eulerian path	Eulorian	3				
	(i)Discuss whether the following graph have Eulerian path,	Luienan	5				
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	9 <u> </u>						
	(ii) Show that the given graph is bipartite.						

QP CODE 225421

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Q.2.	Attempt All			
a)	A fertiliser mixing machine is set to give 12kg of nitrate for quintal bag of fertiliser.Ten 100 kg bags are examined ,the part of nitrate per bag are as follows: 11,14,13,12,13,12,13,14,11,12 Is there any reason to believe that the machine is defective? (Value of t for 9 degrees of freedom is 2.262)			
b)	If Z^+ is a set of positive integers and R is a relation such that aRb if 'a divides b' then prove that R is partial order relation. And find two elements which are not comparable.			
c)	 (i)Find a positive integer which leaves the remainder 2 if divided by 3, the remainder 3 if divided by 5, the remainder 2 if divided by 7. (ii)Using Euclidean algorithm, prove that (143,227) are relatively prime. 			
d)	The average selling price of houses in a city is Rs 50,000 with standard deviation of Rs.10,000. Assuming the distribution of selling price to be normal find (i)the percentage of houses that sell for more than Rs 55,000,(ii)the percentage of houses selling between Rs 45,000 and Rs.60,000. (Area between z=0 to z=1 is 0.3413 and between z=0 to z=0.5 is 0.1915)			
Q.3.	Attempt All			
a)	Two lines of regression are given by $5y - 8x + 17 = 0$ and $2y - 5x + 14 = 0$. If $\sigma_y^2 = 16$, find (i) the mean values of x and y (ii) σ_x^2 , (iii) the coefficient of correlation between x and y.			
b)	Using Fermat's theorem find the least positive remainder of 3^{201} modulo 11.	4		
c)	Find whether the following graphs are isomorphic? 1 2 G 4 4 3 4 3 4 3 4 3 4 3 4 3 3 4 3 3 4 3 3 3 4 3 3 3 3 3 3 3 3	6		

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d)	Using the Kuhn-Tucker conditions ,solve the following N.L.P.P $\begin{array}{l} Minimise\ z={x_1}^2-2x_1-x_2\\ Subject\ to\ 2x_1+3x_2\leq 6\\ 2x_1+x_2\leq 4\\ x_1,x_2\geq 0 \end{array}$					6
Q.4.	Attempt All					
a)	Using the method of Lagrange's multipliers ,solve the following N.L.P.P $\begin{array}{c} Optimise\ Z = 6{x_1}^2 + 5{x_2}^2\\ Subject\ to\ x_1 + 5x_2 = 7\\ x_1, x_2 \geq 0 \end{array}$				4	
b)	Construct an orthonormal basis of R ² using Gram-Schmidt process to S={(3,1),(2,2)}					
c)	(i)Find the minimum spanning tree by Kruskal's algorithm . 30 45 40 50 25					
	(ii)In an experiment on immunization of cattle from Tuberculosis the					
	following results were obtained					
		Attected	Not Affected	Total		3
	Non Inoculated	267	<u> </u>	294 012		J
	Total	1024	182	1206		
	Use $\chi^2 - test$ to c	letermine tl	ne efficacy of va	ccine in preve	enting tuber-	
	CUIOSIS. (Table of v^2 at 5%	level for 1 ($1 \circ f is 3.84$			
d)	(i)Find the straight line that best fits the following data. X 1 2 3 4 5					3
	y 14 27 40 55 68					
	(ii)Solve the recurrence relation $a_n = 8a_{n-1} - 21a_{n-2} + 18a_{n-3}$, $n \ge 3$, $a_0 = 0$, $a_1 = 2$, $a_2 = 13$.					