

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



IV SEMESTER B.TECH (INDUSTRIAL & PRODUCTION ENGINEERING) END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: ENGINEERING MATHEMATICS IV (MAT 2209) REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates

✤ Answer ALL the questions. All questions carry equal marks

1A.	Fit a second degree parabola to the following data:			
	x: 0 1 2 3 4	3		
	y: 1 1.8 1.3 2.5 6.3			
1B.	From 6 positive and eight negative numbers four are chosen at random			
	and are multiplied. What is the probability that the product is negative?	J		
1C.	Find the correlation coefficient and the regression lines of y on x and x			
	on y for the following data.			
	x: 1 2 3 4 5	4		
	y: 2 5 3 8 7			
2A.	Let X_1 , X_2 and X_3 be uncorrelated random variables having the same	e		
	standard deviation. Find the correlation coefficient between $X_1 + X_2$	3		
20	and $X_2 + X_3$.			
2B.	If the random variable 'K' is uniformly distributed over [0,5], what is the much ability that the master of the equation $4x^2 + 4xK + K + 2 = 0$ are	3		
	probability that the roots of the equation $4x + 4xK + K + 2 = 0$ are	•		
2C.	Suppose that a two dimensional continuous random variable has			
	ioint ndf			
	$\begin{cases} kx(x-y) & 0 \le x \le 2 \\ -x \le y \le x \end{cases}$			
	$f(x,y) = \begin{cases} kx(x-y), & 0 < x < 2, & x < y < x \\ 0 & 1 & 1 \end{cases}$	4		
	0 elsewhere			
	a) Evaluate the constant k b) Find the marginal pdf of Y			
2.4				
3A.	A bag contains three coins, one of which is two headed and the other two			
	coins are normal and unbiased. One coin is chosen at random and	3		
	what is the probability that this is a two headed coin?			
	what is the probability that this is a two headed colling			

	Reg. No.	
प्रज्ञानं ब्रह Manipa	Manipal Institute of Technology, Manipal (A Constituent Institute of Manipal University)	WLEDGE IS 9 4 1 WINDE 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1
3B.	6 coins are tossed. Find probability of getting (i) atleast one head (ii) atmost 3 heads (iii) exactly three heads	3
3C.	Let S ² be the sample variance of a random sample of size 25 from the distribution which has N(3,100). Evaluate $P(\bar{X} < 6, 55.2 < S^2 < 145.6)$	4
4A.	Find the mean and variance of Gamma Distribution.	3
4B.	Let (X_1, X_2) be random sample from a distribution with the pdf $f(x) = e^{-x}$, $0 \le x < \infty$. Show that $Z = X_1/X_2$ has F distribution.	3
4C.	In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation.	4
5A.	Show that for the random variable X having normal distribution with mean μ and variance σ^2 , $E(X-\mu)^{2n} = 1.3.5(2n-1)\sigma^{2n}$.	3
5B.	Let X have uniform distribution over the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$. Find the pdf of Y where Y = tanX.	3
5C.	Compute an approximate probability that mean of a random sample of size	
	15 from a distribution having pdf $f(x) = \begin{cases} 3x^2, & 0 < x < 1 \\ 0, & \text{elsewhere} \end{cases}$	4
	is between $\frac{3}{5} \& \frac{4}{5}$.	