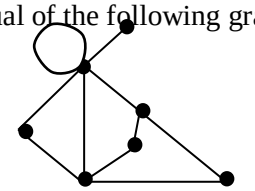
JIS COLLEGE OF ENGINEERING
NAAC 'A' Accredited Autonomous Institution
Affiliated by MAKAUT

DEPARTMENT OF MATHEMATICS

COURSE CODE: PGCS 101

COURSE NAME: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCES

ASSIGNMENT – 1 **Total Points: 30**

QUESTION NO.			QUESTION	POINTS	CO
1.	(a)		Show that a function which is $\|x\|$ in $(-1,1)$ and zero elsewhere is a possible p.d.f and find the corresponding distribution function	3	CO1
	(b)		If X is normally distributed with mean 3 and s.d. 2, find c such that $P(X > c) = 2P(X < c)$. Given $\int_{-\infty}^{.43} \phi(t)dt = \frac{1}{3}$	3	CO2
2	(a)		For a bi-variate continuous distributions the density function is $f(x,y) = 3x^2 - 8xy + 6y^2, 0 < x < 1, 0 < y < 1.$		
		(i)	Find the conditional expectation of X given $Y = y$	3	CO3
		(ii)	Hence write down the regression curve	2	CO1
	(b)		Raindrops fall at random on a square R with vertices $(1,0), (0,1), (-1,0), (0,-1)$. If (x,y) is the point struck by at random and X, Y assume the value x and y respectively having joint distribution given by the p.d.f $f(x,y) = \frac{1}{2}$ if $(x,y) \in R$ = 0 , otherwise Find the marginal $p.d.f$ of X and Y. Are X and Y independent?	5	CO4
3	(a)		Remove a vertex of Kuratowski's First Graph and show it becomes a planar graph	3	CO2
	(b)		Draw the dual of the following graph 	3	CO2

4	(a)		Suppose that during rainy season, on a tropical island, the length of shower has an exponential distribution with average length of shower $\frac{1}{2}$ minutes. If a shower has already lasted for 2 minutes, what is the probability that it will last for at least 1 more minute?	3	CO3
	(b)		The wages of workers in a factory is normally distributed with mean Rs.400 and standard deviation Rs.100. Several samples of four are drawn and it is observed that 80 such samples have sample mean less than Rs.350. How many samples were drawn? Then find the number of samples for which the average wage would be greater than Rs.450	5	CO4