Digital Assignment - I

Subject: Statistics for Engineers **Sub. Code: MAT2001**

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1. If $X$and Y have the joint p.d.f. $f(x,y) = \frac{1}{3}(x+y), 0 \le x \le 1, 0 \le y \le 2$, then find (i) $r(X,Y)$ (ii) the two lines of regression (iii) the two regression curves for the means.

2. If X, Y and Z are uncorrelated r.v's with zero means and S.D's 5, 13 and 9 respectively and if $U = X + Y$ and $V = Y + Z$, find the correlation coefficient between U and V.

3. The life length X of an electronic component follows an exponential distribution. There are two processes by which the component may be manufactured. The expected life length of the component is 100 h, if process I is used to manufacture while it is 150 h, if process II is used. The cost of the manufacturing a single component process one is Rs.10, while it is Rs.20 for process II. Moreover if the component lasts less than the guaranteed life of 200 h, a loss of Rs.50 is to be borne by the manufacturer. Which process is advantageous to the manufacturer?

4. If the density function of a continuous r.v X is $f(x) = ce^{-b(x-a)}, a \le x$ where a, b, c are constants. Show that $b = c = \frac{1}{\sigma}$ and $a = \mu - \sigma$ where $\mu = E(X)$ and $\sigma = Var(X)$.

5. A study of prices of rice at Chennai and Vellore gave the following data:

	Chennai	Vellore
Mean	19.5	17.75
S.D.	1.75	2.5

Also the coefficient of correlation between the two is 0.8. Estimate the most likely price of rice (i) at Chennai corresponding to the price of 18 at Vellore and (ii) at Vellore corresponding to the price of 17 at Chennai.