Make- UP Examination
April / May - 2018

Max. Marks: 100
Class: SE (Comp and IT)
Course Code: BS41
Name of the Course: Applied Mathematics-II
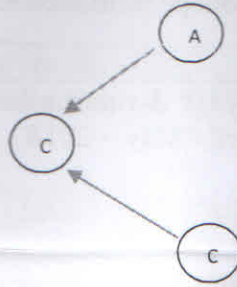
Duration: 3 Hours
Semester: IV
Branch: Comp and IT

Instructions:
(1) All questions are compulsory
(2) Assume suitable data if necessary

Q No.		Max Marks	CO
Q.1	a) Show that $A = \begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}$ is a derogatory matrix.	06	CO1
	b) Find the Singular value Decomposition of $\begin{bmatrix} 2 & 3 \\ 0 & 2 \end{bmatrix}$	06	CO1
	c) Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 10 & -2 & -5 \\ -2 & 2 & 3 \\ -5 & 3 & 5 \end{bmatrix}$	08	CO1
	OR		
	c i) Find the Page Rank matrix for the following diagram (with 03 iterations). Give highest rank to highest page rank value. Initial Page Rank= $\begin{bmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{bmatrix}$	05	CO1

	ii) Can you solve the below diagram to calculate page rank with matrix method. If not, why? (Solve and prove)	03	CO1

Q.2	a) Calculate Karl Pearson's coefficient of correlation from the following data:-	06	CO2

X : 65 66 67 67 68 69 70 72
Y : 67 68 65 68 72 72 69 71

b) Computes Spearman's rank correlation coefficient from the following data:

X :	60	62	64	66	68	70	72	74
Y :	92	83	101	110	128	119	137	146

06   CO2

c) Find the equation of line of Regression of y on x for the following data:-

08   CO2

x	1	3	4	6	8	9	11	14
y	1	2	4	4	5	7	8	9

Estimate the value of y when x = 10

OR

c) Find the correlation coefficient between x and y when the lines of regressions are $2x - 9y + 6 = 0$, $x - 2y + 1 = 0$

08   CO2

Q.3	a) Find the Expectation of i) the sum ii) the product of the number of points on the throw of n dice.	06	CO3
	b) Find the Covariance and the correlation coefficient of two random variables X and Y if $E(X) = 2$, $E(y) = 3$, $E(XY) = 10$, $E(X^2) = 9$, $E(Y^2) = 16$	06	CO3

	c) The probability density of two Random variables X & Y is given by $$f(x,y) = \frac{2}{5}(2x+3y), \quad 0<x<1, \ 0<y<1$$ $$0 \qquad , \quad \text{otherwise}$$ Find i) $P(x < \frac{1}{2}, \ y > \frac{1}{2})$ ii) $P(y < \frac{3}{4})$ iii) Marginal density function of x.	08	CO3

OR

	c) The probability density of two Random variables X & Y is given by $$f(x,y) = \frac{xy}{96}, \quad 0<x<4, \quad 1<y<5$$ $$0 \quad , \quad \text{otherwise}$$ Find $E(X)$, $E(Y)$, $E(XY)$ and $E(2X+3Y)$	08	CO3
Q.4	a) Find out the fallacy if any in the following statement : If X is a Poisson variate such that $$P(X=2) = 9\ P(X=4) + 90\ P(X=6)$$ Then mean of X = 1.	06	CO4
	b) The marks obtained by students in a college are normally distributed with mean 65 and variance 25. If 3 students are selected at random from this college. What is the probability that at least one of them would have scored more than 75 marks ?	06	CO4
	c) In 10 independent throws of a defective die, the probability that an even number will appear five times is twice the probability that an even number will appear four times. Find the probability that an even number will not appear at all in 10 independent throws of a die.	08	CO4

OR

	c) i) If X is binomial distributed with $E(X) = 2$, $Var(X) = \frac{4}{3}$ Find the probability distribution of X.	04	CO4

	ii) If on an average, one ship in every 10 is wrecked, find the probability that out of five ships expected to arrive, four at least will arrive safely.	04	CO4
Q.5	a) The following table gives the number of accidents in a city during a week . Find whether the accidents are uniformly distributed over a week.	06	CO5

Day	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Total
Number of accidents	13	15	9	11	12	10	14	84

(Using Chi- square test) .Table value of Chi square for 6 d. f. at 5% LOS is 12.59 .

	b) A random sample of 50 items gives the mean 6. 2 and standard Deviation 10. 24 . Can it be regarded as drawn from a normal population with mean 5.4 at 5 % level of significance? (Table value is 1.96)	06	CO5
	c) The means of two random samples of size 9 and 7 are 196.42 and 198. 82 respectively. The sum of the squares of the deviations from the means are 26.94 and 18. 73 respectively. Can the samples be considered to have been drawn from the same population? Table value for 14 d. f. at 5% LOS is 2.145 .	08	CO5

OR

	c) The average of marks scored by 32 boys is 72 with standard deviation 8 while that of 36 girls is 70 with standard deviation 6. Test at 1 % level of significance whether the boys perform better than the girls. Table value at 1 % LOS is 2.58	08	CO5

………All the Best…………