Mahatma Gandhi Mission's College of Engineering & Technology

Kamothe , Navi Mumbai

Class: S.E. COMPS/I.T Subject: AM IV

Tutorial No. : 1 (Matrix Theory):

Qn .No	Questions	Module	C.O	Level
1	If $A = \begin{bmatrix} 1 & 0 \\ 2 & 4 \end{bmatrix}$ then find the eigen values of $4A^{-1} + 3A + 2I$	3.1	CO 3	3
2	Find the eigen values and eigen vectors of the following matrix $\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$	3.1	CO 3	4
3	Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find $\mathbf{A^{-1}}$	3.2	CO 3	4
4	Show that the given matrices are diagonalisable. Find diagonal matrix and transforming matrix (1) $\begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$	3.3	CO 3	4
5	Find the symmetric matrix of order 3 having eigen values 3 ,6 , 9 with corresponding eigen vectors X 1 = [1 2 2]', X 2 = [-2 2 -1]', X3	3.1	CO 3	3
6	If $A = \begin{bmatrix} 2 & 3 \\ -3 & -4 \end{bmatrix}$ show that $A^{100} = \begin{bmatrix} -299 & -300 \\ 300 & 301 \end{bmatrix}$	3.4	CO 3	4
7	If $A = \begin{bmatrix} -1 & 4 \\ 2 & 1 \end{bmatrix}$ prove that 3 tan A = A tan 3	3 .4	CO 3	4
8	IF $A = \begin{bmatrix} \pi & \pi/4 \\ 0 & \pi/2 \end{bmatrix}$ find Cos A	3.4	CO 3	4
9	If $A = \begin{bmatrix} 2 & 0 & 0 \\ 5 & -1 & 0 \\ 2 & 3 & 3 \end{bmatrix}$ find the eigen values of $A2 + 6A^{-1} - 3I$	3.1	CO 3	3

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Class: S.E. EXTC/Electrical Subject: A M IV

Tutorial No. : 2 (Probability)

Qn. No.	Questions	Module	C.O	Level
1	A discrete random variable X has the probability density function as given .Find the mean and variance X: -2, -1, 0, 1, 2, 3 P(X=x): 0.2, k, 0.1, 2k, 0.1, 2k	3	3	4
2	A continuous random variable X is distributed over the interval [0, 1] with p.d.f $ax^2 + bx$, where a and b are constants. If the arithmetic mean of X is 0.5 , find the value of a and b	3	3	4
3	A continuous random variable has probability density function f(x) = kx $e^{\frac{-x}{3}}$, x > 0.Find k and the mean	3	3	4
4	Let X be a continuous random variable with probability distribution F(x) = $\frac{x}{6} + k$, $0 \le x \le 3$ and f(x) = 0 , elsewhere Evaluate k and find P($1 \le x \le 2$)	3	3	4
5	If the random variable X takes the values 1, 2, 3, 4 such that 2 P(X=1)= 3 P(X=2)= P(X=3)=5 P(X=4), find the probability distribution and cumulative distribution of X	3	3	4
6	Find the MGF of a random variable whose probability density function is P(X=x) = $(\frac{1}{2})^x$,x = 1 ,2 ,3, ….. Hence find the mean and variance	3	3	4
7	A perfect coin is tossed twice. If X denotes the number of heads that appear, find the moment generating function of X. Also find the mean and variance.	3	3	4
8	Given that X has the probability distribution p(x) = $\frac{1}{8} 3C_x$, x = 0, 1, 2, 3. Find the moment generating function and hence find the mean and variance	3	3	4
9	The density function of a R.V X is f(x) = a (x- 1) ^{2} , 0<x<2; = 0, otherwise Find the constant 'a' , E(X), Var(X), and MGF of X	3	3	4
10	Show that the expected number of failures preceding the first success in a series of Bernoullian trials with a constant probability of success p is $\frac{1-p}{p}$	3	3	4

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Tutorial No. : 3 (Probability Distributions)

Qn. No.	Questions	Module	C.O	Level
1	The incidence of an occupational disease in an industry is such that the workers have 20% chance of suffering from it. What is the probability that out of six workers chosen at random 4 or more will be suffering from the disease?	4	4	4
2	If the birth sex ratio is 49 girls to 51 boys, find the probability of there being 8 or more girls among 10 babies born on the same day in a maternity hospital.	4	4	4
3	Assuming that the number of cars passing a junction obeys a Poisson distribution, if the probability of no cars pass in 1 minute is 0.20,what is the probability that more than one car pass in 2 minutes ?	4	4	4
4	The average percentage of marks of candidates in an university examination is 42 with a S D of 10. The minimum for a pass is 50%. If 1000 candidates appear for an examination, how many can be expected to pass it assuming normality of the distribution of marks? If it is required that double that number should pass, what should be the minimum percentage of marks?	4	4	4
5	Obtain the moment generating function of binomial distribution with n = 7, p = 0.6. Find the mean. Find also the first three moments about the mean of the distribution	4	4	3
6	A manufacture of pins knows that 2% of his products are defective. If he sells pins in boxes of 100 and guarantees that not more than 4 pins will be defective, then what is the probability that a box will fail to meet the guaranteed quality?	4	4	4
7	In a normal distribution of a large group of men 5% are under 60 and 40% are between 60 & 65. Find the mean height and standard deviation.	4	4	4
8	Find the mean and variance of Poisson distribution	4	4	2
9	It was found that the burning life of electric bulbs of a particular brand was normally distributed with the mean 1200 hrs and the SD of 90 hrs. Estimate the number of bulbs in a lot of 2500 bulbs having the burning life (1) more than 1300 hrs (2) between 1050 and 1400 hrs	4	4	4
10	The lowest wage of 1000 workmen is normally distributed around a mean of Rs 70 and standard deviation of Rs 5. Estimate the number of workers whose weekly wages will be (i) between 69 & 72 (ii) more than 75 (iii) less than 63. Also estimate the lowest wages of the 100 highest paid workers	4	4	4