SRM Institute of Science and Technology
Department of Mathematics

Assignment-I

Subject: 18MAB204T-Probability and Queuing Theory

Part-B

1. One card is drawn from a pack of 52 cards. What is the probability that either a King or a Queen?

2. The probability distribution of X is

x	0	2	4	6
P(x)	1/6	1/3	1/8	3/8

Find the mean and variance of X

3. If X has the probability distribution

x	-1	0	1	2
P(x)	0.3	0.1	0.4	0.2

Find E(x),E(x^2), Var(x)

4. If $X$is continuous random variable whose pdf is given by $f(x) = kx(2-x)^2, 0 < x < 2$, Find the value of k & $P(X < 1)$

5. A r.v X has mean E(x)=12, and variance E(x^2)=9. Find P(6<x<18)

6. A r.v. 'x' has the probability function $f(x) = \frac{1}{2^x}, x = 1,2,3, \ldots$ Find MGF.

7. The MGF of a rv X is $\frac{2}{2-t}$, Find the S.D of X

8. Let X be the random variable with $E(X) = 1$, $E(X(X-1)) = 4$. Find i) $Var(2-3x)$ ii) $Var\left(\frac{x}{2}\right)$

9. If X and Y are independent random variables with mean 2,3 and variance 1,2 repectively. Find the mean and variance of the random variable $z = 2x - 5y$

10. A continuous random variable X that can assume any value between x=2 and x=5 has the density function given by $f(x) = k(1+x)$. Find $P(x < 4)$.

11. Let x be a continuous random variable with pdf $f(x) = \begin{cases} x/2; 1 < x < 5 \\ 0; Otherwise \end{cases}$

12. If X is uniformly distributed in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$, find the pdf of Y=tanX

Part-C

13. A random variable X has the following probability distribution

X	-2	-1	0	1	2	3
P(X)	0.1	k	0.2	2k	0.3	3k

Find i) k ii) $P(X < 2)$ iii) $P(-2 < X < 2)$ iv) CDF of X

14. A random variable X has the following proability distribution

X	0	1	2	3	4	5	6	7	8
P(X)	a	3a	5a	7a	9a	11a	13a	15a	17a

Find 'a' and $P(X < 3), P(X \geq 3), P(0 < X < 5)$, CDF

15. A random variable X has the following probability function

X	0	1	2	3	4	5	6	7
P(X)	0	k	2k	2k	3k	K^2	$2k^2$	$7k^2+k$

a) Find K b) Evaluate $P(X < 6), P(X \geq 6)$ c) If $P(X \leq C) > \frac{1}{2}$, Find the minimum value of C

d) Determine the distribution function of X

16. If the random variable X takes the values 1,2,3 and 4 such that 2P(X=1)=3P(X=2)=P(X=3)=5P(X=4), find the probability distribution and cumulative function of X

17. In a continuous distribution, the probability density is given by $f(x) = kx(2-x), 0 < x < 2$, Find K, mean, Variance and distribution function.

18. A random variable x has the pdf $f(x) = Kx^2e^{-x}; x \geq 0$. Find K, Mean, Variance and $E[3x^2 - 2x]$

19. Find the MGF of a random variable X whose pdf defined by $f(x) = \begin{cases} x, for\ 0 \leq x \leq 1 \\ 2-x, for\ 1 \leq x \leq 2 \\ 0 \quad , otherwise \end{cases}$. Hence find mean & variance of X

20. A continuous random variable X has pdf $f(x) = k(1-x), 0 < x < 1$. Find the r^{th} moment about the origin. Hence find the mean and variance.

21. If X denote the number in a throw of a die find $E(X), E(9x+2), Var(x)$

22. The CDF of a continuous random variable X is given by $F(x) = \begin{cases} 0, x < 0 \\ x^2, 0 < x < 1/2 \\ 1 - \frac{3}{25}(3-x)^2, \frac{1}{2} \leq x < 3 \\ 1, x \geq 3 \end{cases}$ Find the pdf of X and evaluate $P(|X| \leq 1)$ and $P\left(\frac{1}{3} < X < 4\right)$

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