

MCCQ

PART A (DSE 3(i) : Probability theory and Statistics - UPC: 32357607)

- 1. Let $F(x)$ be the cdf of random variable X , then
 - (i) $F(x)$ is a nondecreasing function of x , (ii) $\lim_{b \rightarrow \infty} F(b) = 0$, (iii) $\lim_{b \rightarrow -\infty} F(b) = 1$ (iv) all of the above.
- 2. Suppose that the number of typographical error on a single page of a book has Poisson distribution with parameter $\lambda = 1$. Then the probability that there is at least one error on a page is
 - (i) e^{-1} (ii) $1/(1-e)$ (iii) $1 - e^{-1}$ (iv) 1
- 3. If X is uniformly distributed over $(0, 10)$, then $P(X > 7) =$
 - (i) $1/10$ (ii) $3/10$ (iii) $1/5$ (iv) $1/2$
- 4. Suppose X has the following mass function: $p(0) = 1/5$, $p(1) = 1/2$ and $p(2) = 3/10$. Then $E(X^2) =$
 - (i) 1.9 (ii) 1.7 (iii) 1.3 (iv) 1.1
- 5. Let $X_n, n=1, 2, \dots, 10$ be independent random variables, each being uniformly distributed over $(0, 1)$. Using CLT, $P\{\sum_{n=1}^{10} X_n > 7\} =$
 - (i) $\Phi(0.2)$ (ii) $1 - \Phi(2.2)$ (iii) $1 - \Phi(0.2)$ (iv) $\Phi(2.2)$

6. The classes of the following markov chain are:

$$\begin{pmatrix} 1/2 & 1/2 & 0 & 0 \\ 1/2 & 1/2 & 0 & 0 \\ 1/4 & 1/4 & 1/4 & 1/4 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

- (i) $\{0\}, \{1, 2\}, \{3\}$ (ii) $\{0\}, \{1, 2, 3\}$ (iii) $\{0, 1\}, \{2\}, \{3\}$ (iv) $\{0, 1\}, \{2, 3\}$

7. If the random variables X and Y have the joint pdf

$$f(x, y) = 4xy(1-y), 0 < x < 1, 0 < y < 1,$$

= zero elsewhere.

Then $P(0 < X < 1/3, 0 < Y < 1/3) =$

- (i) $1/81$ (ii) $5/81$ (iii) $5/27$ (iv) $4/81$

8. Let X and Y have the joint pdf

$$f(x, y) = 3y \text{ if } 0 < y < x < 1 \\ = 0 \text{ elsewhere.}$$

Then, the conditional pdf of Y , given $X = x$ is

- (i) $2y/x$ (ii) $2y^2/x$ (iii) $y/2x^2$ (iv) $2y/x^2$, where $0 < x < 1$.

9. The mode of the distribution of X with pdf

$$f(x) = \left(\frac{x}{2}\right)^2 e^{-x}, 0 < x < \infty, \\ = 0 \text{ elsewhere, is}$$

- (i) 1 (ii) 2 (iii) $\frac{1}{2}$ (iv) 0

10. The median of the distribution of X with pdf

$$f(x) = 3x^2, 0 < x < 1, \text{ zero elsewhere, is}$$

- (i) $\frac{1}{\sqrt{2}}$ (ii) $\frac{1}{\sqrt[3]{2}}$ (iii) $\sqrt{2}$ (iv) $\sqrt[3]{2}$

SUSHIL KUMAR AZAD

MCA

PART A (DSE 3(i) : Probability theory and Statistics - UPC: 32357607)

1. Let $P_x(x) = \frac{x}{15}$, $x = 1, 2, 3, 4, 5$; zero elsewhere, be the pmf of X. then $P\left(\frac{1}{2} \leq X \leq \frac{5}{2}\right) =$

- (i) 1/15 (ii) 4/15 (iii) 1/5 (iv) 1

2. Suppose that the number of typographical error on a single page of a book has Poisson distribution with parameter $\lambda = 1$. Then the probability that there is at least one error on a page is

- (i) e^{-1} (ii) $1/(1-e)$ (iii) $1 - e^{-1}$ (iv) 1

3. If X is uniformly distributed over (0,10), then $P(X > 7) =$

- (i) 1/10 (ii) 3/10 (iii) 1/5 (iv) 1/2

4. Suppose X has the following mass function: $p(0) = 1/5$, $p(1) = 1/2$ and $p(2) = 3/10$. Then $E(X^2) =$

- (i) 1.9 (ii) 1.7 (iii) 1.3 (iv) 1.1

5. Let X_n , $n=1, 2, \dots, 10$ be independent random variables, each being uniformly distributed over (0, 1). Using CLT, $P\left\{\sum_{n=1}^{10} X_n > 7\right\} =$

- (i) $\Phi(0.2)$ (ii) $1 - \Phi(2.2)$ (iii) $1 - \Phi(0.2)$ (iv) $\Phi(2.2)$

6. Consider a gambler who, at each play of the game, either wins \$1 with probability, p or loses \$1 with probability (1 - p). Suppose the gambler quits playing when he goes broke or he attains a fortune of \$N. The classes of this Markov chain are

- (i) $\{0\} \{1\}, \{2\}, \dots, \{N\}$ (ii) $\{0, 1, 2, \dots, N-1\} \{N\}$ (iii) $\{0\} \{1, 2, \dots, N-1\}, \{N\}$ (iv) $\{0\} \{1, 2, \dots, N\}$

7. If the random variables X and Y have the joint pdf $f(x, y) = 4x(1-y)$, $0 < x < 1, 0 < y < 1$,

= zero elsewhere.

Then $P(0 < X < 1/3, 0 < Y < 1/3) =$

- (i) 1/81 (ii) 5/81 (iii) 5/27 (iv) 4/81

8. Let X and Y have the joint pdf

$f(x, y) = 3y$ if $0 < y < x < 1$
= 0 elsewhere.

Then, the conditional pdf of Y, given $X = x$ is

- (i) $2y/x$ (ii) $2y^2/x$ (iii) $y/2x^2$ (iv) $2y/x^2$, where $0 < x < 1$.

9. The median of the distribution having pdf $f(x) = |x|/2$, $-1 < x < 1$ and zero elsewhere

- (i) 1/4 (ii) 0 (iii) $\sqrt{2}$ (iv) None of the above

SUSHIL KUMAR A-2AD