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Department of Electronics and Communication Engineering

MA 8451 – Probability and Random Processes

Unit I - MCQ Bank

1. Probability lies between:

A. -1 and +1

B. 0 and 1

C. 0 and n

D. 0 and ∞

Answer: (B)

2. A set of all possible outcomes of an experiment is called:

A. Combination

B. Sample point

C. Sample space

D. Compound event

Answer: (C)

3. The events having no experimental outcomes in common is called:

A. Equally likely events

B. Exhaustive events

C. Mutually exclusive events

D. Independent events

Answer: (C)

4. When each outcome of a sample space is as likely to occur as any other, the outcomes are called:

A. Exhaustive

B. Mutually exclusive

C. Equally likely

D. Not mutually exclusive

Answer: (C)

5. Which statement is false?

A. The classical definition applies when there are n equally likely outcomes to an experiment

B. The empirical definition occurs when number of times an event happen is divided by the number of observations.

C.A subjective probability is based on whatever information is available

D. The general rule of addition is used when the events are mutually exclusive

Answer: (D)

6. Two fair dice are rolled. The probability of throwing an odd sum is:

A. 1

B. 1/2

C. 1/6

D. 1/36

Answer: (B)

7 If P (A/B) = 0.50 and P (A∩ B) =0.40 then PA. =

A. 0.40

B. 1/2

C. 0.80

D. 1

Answer: (C)

8. _____ is a function that assigns a real number to every element $s \in S$, where S is the sample space corresponding to a random experiment E.

A. Random Variable

B. Discrete Random Variable

C. Continuous Random Variable

Answer: (A)

9. If E(X) = 2 and E(Z) = 4, then E(Z − X) =?

A. 2

B. 6

C. 0

D. Insufficient data

Answer: (A)

10. If Σ P(x) = k^2 − 8 then, the value of k is?
A. 0

B. 1

C. 3

D. Insufficient data

Answer: (C)

11. If the probability that a bomb dropped from a place will strike the target is 60% and if 10 bombs are dropped, find mean and variance?

A. 0.6, 0.24
B. 6, 2.4

C. 0.4, 0.16

D. 4, 1.6

Answer: (B)

12. What is the mean and variance for standard normal distribution?

A. Mean is 0 and variance is 1

B. Mean is 1 and variance is 0

C. Mean is 0 and variance is ∞

D. Mean is ∞ and variance is 0

Answer: (A)

13. Find λ in Poisson's distribution if the probabilities of getting a head in biased coin toss as 34 and 6 coins are tossed.

A. 3.5

B. 4.5

C. 5.5

D. 6.6

Answer: (B)

14. Find the expectation of a random variable X if f(x) = ke^{-x} for x>0 and 0 otherwise.
A. 0

B. 1

C. 2

D. 3

Answer: (B)

15. Find the Moment Generating Function of f(x) = x for 0<x<1 and 2-x for 1<x<2 and 0 otherwise.

A. $(\frac{e^t-1}{t})^2$

B. $(\frac{e^{-t}-1}{t})^2$

C. $(\frac{e^{2t}-1}{t})^2$

D. $(\frac{e^t-1}{t})$

Answer: (A)

16. E(X) = npq is for which distribution?
A. Bernoulli's

B. Binomial

C. Poisson's

D. Normal

Answer: (B)

17. If 'X' is a random variable, taking values 'x', probability of success and failure being 'p' and 'q' respectively and 'n' trials being conducted, then what is the probability that 'X' takes values 'x'? Use Binomial Distribution

A. $P(X = x) = {}^nC_x \, p^x \, q^x$

B. $P(X = x) = {}^nC_x \, p^x \, q^{(n-x)}$

C. $P(X = x) = {}^xC_n \, q^x \, p^{(n-x)}$
D. $P(x = x) = {}^xC_n \, p^n \, q^x$

Answer: (B)

18. Normal Distribution is symmetric is about _____
A. Variance

B. Mean

C. Standard deviation

D. Covariance

Answer: (B)

19. The mean of exponential distribution is given as _____

A. $1/\lambda$

B. λ

C. λ^2

D. $1/\lambda^2$

Answer: (A)

20. A mobile conversation follows a exponential distribution $f(x) = (1/3)e^{-x/3}$. What is the probability that the conversation takes more than 5 minutes?

A. $e^{-5/3}$

B. e^{-15}

C. $5e^{-15}$

D. $e^{-5}/3$

Answer: (A)

21. Consider a random variable with exponential distribution with $\lambda=1$. Compute the probability for $P(X>3)$.

A. e^{-3}

B. e^{-1}

C. e^{-2}

D. e^{-4}

Answer: (A)

22. In a Binomial Distribution, if $p = q$, then $P(X = x)$ is given by?

A. $^nC_x (0.5)^n$

B. $^nC_n (0.5)^n$

C. $^nC_x \, p^{(n-x)}$

D. $^nC_n \, p^{(n-x)}$

Answer: (A)

23. For a Poisson Distribution, if mean(m) = 1, then P(1) is?
A. 1/e

B. e

C. e/2

D. Indeterminate

Answer: (A)

24. Find the mean of a random variable X if f(x) = x − $\frac{5}{2}$ for 0<x<1 and 2x for 1<x<2 and 0 otherwise.

A. 3.5

B. 3.75

C. 2.5

D. 2.75

Answer: (B)

25. Find λ in Poisson's distribution if the probabilities of getting a head in biased coin toss as 34 and 6 coins are tossed.
A. 3.5

B. 4.5

C. 5.5

D. 6.6

Answer: (B)