Sylhet Cadet College

Model Test Examination - 2022

Class: HSC

Subject: Statistics 2nd Paper (MCQ)

Time: 20 minutes **Subject Code: 130** **Full Marks: 25**

Answer any fifteen (15) questions. Each question is worth one (1) mark.

1. Which formula is correct?
   (a) $P(\bar{A} \cap B) = P(B) - P(A \cup B)$ (b) $P(\bar{A} \cap B) = P(B) - P(A \cap B)$
   (c) $P(\bar{A} \cup B) = P(B) - P(A \cup B)$ (d) $P(\bar{A} \cap B) = P(A) - P(A \cap B)$

2. $P(A \cup B) = P(A) + P(B)$ is true for
   (a) independent events (b) dependent events
   (c) mutually exclusive events (d) complementary events

3. If a coin is tossed n times, how many outcomes are generated?
   (a) n (b) n^2 (c) 2^n (d) $2n$

4. If $P(A) = \frac{1}{8}, P(A|B) = \frac{1}{4}$, and $P(B|A) = \frac{1}{6}, P(A \cap B) =?$
   (a) $\frac{1}{48}$ (b) $\frac{1}{24}$ (c) $\frac{1}{32}$ (d) 1

5. A card is drawn at random from a well-shuffled deck of 52 cards. What is the probability that the drawn card is not a Queen?
   (a) $\frac{1}{52}$ (b) $\frac{4}{52}$ (c) $\frac{1}{13}$ (d) $\frac{12}{13}$

6. If X denotes number of successes in a coin toss, how many possible possible values of X are there?
   (a) 0 (b) 1 (c) 2 (d) 3

7. Expectation for a discrete variable x is defined as:
   (a) $\int_{-\infty}^{\infty} x_i f(x_i) dx$ (b) $\sum_{i=-\infty}^{0} x_i p(x_i)$ (c) $\sum_{i=-\infty}^{\infty} x_i p(x_i)$ (d) $\sum_{i=-\infty}^{\infty} x_i p(x_i^2)$

8. $P(A \cap \bar{B}) =?$
   (a) $P(A) - P(A \cap B)$ (b) $P(B) - P(A \cap B)$ (c) $P(A) - P(A \cup B)$ (d) $P(B) - P(A \cup B)$

   Answer the questions 9-10 according to the following information.

   $P(x, y) = \frac{x+2y}{16}$; x = 0, 1 & y = 0, 1, 2, 3

9. $P(X) =?$
   (a) $\frac{x+2y}{3}$ (b) $\frac{2x+y}{3}$ (c) $\frac{2x+3y}{3}$ (d) $\frac{x+3}{4}$

10. $P(X|Y = 0) =?$
    (a) $\frac{x+2y}{4y+1}$ (b) 1 (c) x (d) 0

11. If $Y = aX + b, E(Y) =?$
    (a) $aE(X) + b$ (b) $a^2E(X)$ (c) $E(X)$ (d) $a + bE(X)$

12. Expectation is equal to-
    (a) Variance (b) Square of variance (c) Arithmetic mean (d) Standard deviation

13. If $E(X) = 2$ and $E(X^2) = 8$, what is the standard deviation?
    (a) 0 (b) 2 (c) 4 (d) 8

14. $f(x) = 5x^4; 0 \leq x \leq 1, E(X) =?$

(a) 0.0204 (b) 0.833 (c) 0.9204 (d) 1

15. The mean of the binomial distribution is

(a) np (b) nq (c) npq (d) $\sqrt{npq}$

16. What is true of binomial distribution?

(a) $np = 0$ (b) $np < 0$ (c) $np > 0$ (d) $np \neq 0$

17. If a coin is tossed once, it is called

i Bernoulli trial
ii Uniform trial
iii Poisson process

Which one is correct

(a) i & ii (b) i & iii (c) i (d) i, ii, & iii

18. If the mean of a Poisson distribution is 4, what is its variance?

(a) 2 (b) 3 (c) 4 (d) 16

19. If a Poisson distribution is defined as $P(x) = \frac{e^{-4}4^x}{x!}$, what is the value of $P(X \leq 1)$

(a) 0.09 (b) 0.02 (c) 0.07 (d) 0.24

20. What is true of Poisson distribution?

(a) $Mean > Variance$ (b) $Mean < Variance$ (c) $Mean = Variance^2$ (d) $Mean = Variance$

21. The Poisson distribution -

i is a discrete distribution
ii gives a probability mass function
iii gives a probability density function

Which one is true?

(a) i & ii (b) i & iii (c) i, ii, & iii (d) ii & iii

22. If a neutral coin is tossed 5 times, what is the probability that there would be at least 2 heads?

(a) 0.81 (b) 0.5 (c) 0.31 (d) 0.16

23. When is a Binomial distribution symmetric?

(a) $p < q$ (b) $p > q$ (c) $p = q^2$ (d) $p = q$

24. Which formula represents the exponential growth?

(a) $P_n = P_o e^{rn}$ (b) $P_n = P_o(1 + r)^n$ (c) $P_n = P_o n e^r$ (d) $P_o = P_n e^{rn}$

25. GFR =

(a) $\frac{B}{F_{15-49}} \times 1000$ (b) $\frac{B}{P} \times 1000$ (c) $\frac{D}{P} \times 1000$ (d) $\frac{B}{A} \times 1000$