

Statistics MCQ Question Bank

Second Paper

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1 Introduction to Probability

1. The minimum value of probability is

- (a) $-\alpha$ (b) 1 (c) 0 (d) -1

2. Each element of sample space is called–

- (a) Trial (b) Experiment (c) Variable (d) Sample Point

3. Two events not occurring together are called–

- (a) dependent Events (b) Independent Events
(c) Mutually Exclusive Events (d) Marginal Events

4. If A and B are independent, which formula is correct?

- (a) $P(A \cap B) = P(A) \cdot P(B)$ (b) $P(A \cap B) = P(\bar{A}) \cdot P(B)$
(c) $P(A \cap B) = P(A) \cdot P(\bar{B})$ (d) $P(A \cap \bar{B}) = P(A) \cdot P(B)$

Answer the next three questions based on the following information.

A card is drawn from of pack of playing cards.

5. What is the probability that the card is a King?

- (a) 0.0192 (b) 0.25 (c) 0.5 (d) 0.0769

6. P(The card is not from Diamonds)–

- (a) $\frac{1}{2}$ (b) 0 (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

7. P(The card is red or Clubs)

- (a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$

8. If a neutral die is thrown, the probability of having a digit greater than 6 is

- (a) $\frac{1}{6}$ (b) $\frac{0}{6}$ (c) $\frac{2}{3}$ (d) $\frac{3}{6}$

9. Tossing a coin twice generates how many outcomes?

- (a) 4 (b) 16 (c) 8 (d) 2

10. The probability of two disjoint sets happening together is:

- (a) 0.5 (b) 0 (c) 1 (d) $0 \leq x < 1$

Answer the next three questions using the following information

$$P(A) = \frac{1}{3}, P(B) = \frac{1}{2} \& P(A \cup B) = \frac{7}{12}$$

11. $P(A \cap B) = ?$

- (a) $\frac{5}{12}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{15}{16}$

12. $P(A \cap \bar{B}) = ?$

- (a) $\frac{1}{4}$ (b) $\frac{3}{4}$ (c) $\frac{5}{6}$ (d) $\frac{1}{12}$

13. What is the probability that B occurs or A does not occur?

- (a) $\frac{3}{4}$ (b) $\frac{7}{12}$ (c) $\frac{5}{12}$ (d) $\frac{11}{12}$

14. An un contains 10 red and 5 black balls. Two balls are drawn; what is the probability of getting two red balls?

- (a) $\frac{3}{7}$ (b) $\frac{4}{7}$ (c) $\frac{20}{21}$ (d) $\frac{2}{21}$

2 Random Variables

15. How many conditions does a probability density function have?

- (a) 2 (b) 3 (c) 4 (d) 5

16. The conditions of a probability distribution are—

i. $\sum P(X) = 1$

ii. $\sum P(X) = 0$

iii. $0 \leq P(X) \leq 1$

- (a) i and ii (b) i and iii (c) ii and iii (d) i, ii and iii

Answer the next two questions using the following information

| | | | | | | |
|------|---------------|----------------|----------------|----------------|----------------|----------------|
| x | 1 | 2 | 3 | 4 | 5 | 6 |
| P(x) | $\frac{1}{k}$ | $\frac{2}{2k}$ | $\frac{3}{3k}$ | $\frac{4}{4k}$ | $\frac{5}{5k}$ | $\frac{6}{6k}$ |

17. What is the value of k?

- (a) $\frac{7}{21}$ (b) $\frac{5}{21}$ (c) $\frac{1}{21}$ (d) 1

18. What is the type of variable X?

- (a) Discrete (b) Discrete random (c) Continuous (d) Continuous random

19. What is $F(\infty)$ for a distribution function $F(x)$?

- (a) $-\infty$ (b) -1 (c) 0 (d) 1

20. What is $F(-\infty)$ for a distribution function $F(x)$?

- (a) $-\infty$ (b) -1 (c) 0 (d) 1

21. How many types of random variables are there?

- (a) 2 (b) 3 (c) 4 (d) 5

Answer the next two questions using the following information

$$P(x) = \frac{x+1}{k}; x = 1, 2, 3, 4$$

22. What is the value of k?

- (a) 10 (b) 11 (c) 14 (d) 15

23. $P(x)$ is a —

- (a) Joint probability distribution (b) Cumulative probability distribution
(c) Probability mass function (d) Probability Density function

24. The example of a discrete random variable is—

i. Binomial variate

ii. Poisson variate

iii. Normal variate

Which one is correct?

- (a) i and ii (b) i and iii (c) ii and iii (d) i, ii and iii

25. Which of the following is not a discrete random variable?

- (a) number of students (b) Weight
(c) Number of heads in coin toss (d) Population

26. Which one is a property of a probability distribution?

- (a) $P(x_i) = 0$ (b) $P(x_i \neq 1)$ (c) $\sum P(x_i) = 1$ (d) $\int_x P(X)dx \leq 1$

27. $f(x) = 2x; 0 < X < 3$; What is $F(3)$?

- (a) 3 (b) 0 (c) 1 (d) 0

Answer the next two questions based on the following information:

$$P(x, y) = \frac{1}{21}(x + y); x = 1, 2, 3 \text{ and } y = 1, 2$$

28. $P(x) = ?$

- (a) $P(x) = \frac{2x+3}{21}$ (b) $P(x) = \frac{x+3}{27}$ (c) $P(x) = \frac{4x+3}{21}$ (d) $P(x) = \frac{2x+5}{21}$

29. $P(y) = ?$

- (a) $\frac{y+2}{7}$ (b) $\frac{y+3}{7}$ (c) $\frac{3y+2}{7}$ (d) $\frac{y+2}{9}$

30. Which one is not a discrete random variable?

- (a) Number of students (b) Weight
(c) Number of heads in five coin tosses (d) Released version number of a software

31. Which one is a property of joint probability distribution?

- (a) $P(X_i, Y_j) < 1$ (b) $P(X_i, Y_j) = 0$ (c) $P(X_i, Y_j) < 0$ (d) $0 \leq P(X_i, Y_j) \leq 1$

32. If $f(x) = kx^3; -1 \leq x \leq 1$, then k is

- i) positive
ii) negative
iii) lies from -1 to 1
(a) i (b) ii (c) iii (d) i and ii

Answer the next two questions based on the following information.

| | | | | | | |
|------|---------------|---------------|---------------|---------------|---------------|---------------|
| x | 4 | 5 | 6 | 3 | 2 | 1 |
| P(X) | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ |

33. The value of $P(3 < X < 5)$ is:

- (a) $\frac{1}{2}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) 0

34. $P(x \neq 2)$ is :

- (a) $\frac{5}{6}$ (b) 0
(c) 1 (d) Can't be found from this information

3 Mathematical Expectation

35. What is the expected value of the squared deviation of the value of the random variable from their mean?
 (a) Arithmetic Mean (b) Expectation (c) Variance (d) Co-variance
36. What is the minimum value of variance a random variable?
 (a) $-\infty$ (b) 1 (c) 0 (d) -1
37. If $y = ax + b$, what is the value of $V(y)$?
 (a) $aV(X)$ (b) $a^2V(X)$ (c) $V(X)$ (d) a^2
38. If $y = ax + b$, what is the value of $E(y)$?
 (a) $aE(X) + b$ (b) $a^2E(X)$ (c) $E(X)$ (d) b
39. What is the value of $V(5)$?
 (a) 0 (b) 25 (c) 5 (d) 1
40. If $P(x) = \frac{1}{n}; x = 1, 2, 3, \dots, n$, what is the value of $E(X)$?
 (a) $\frac{n}{2}$ (b) $\frac{n-1}{2}$ (c) $\frac{n+1}{2}$ (d) $n + 1$
41. If $P(x) = \frac{4-|5-x|}{k}; x = 2, 3, 4, \dots, 8$, what is the value of k ?
 (a) 5 (b) 8 (c) 16 (d) 24
42. Expected value of a constant a is –
 (a) 1 (b) Variance (c) a (d) $a+1$
43. The variance of a constant m is –
 (a) 0 (b) 1 (c) m (d) m^2
44. What is $V(X - Y)$ equal to?
 (a) $V(X) + V(Y)$ (b) $V(X) + V(Y) - 2Cov(X, Y)$
 (c) $V(X) - V(Y)$ (d) $V(X) + V(Y) + 2Cov(X, Y)$
45. What is the value of $V(2X+5)$?
 (a) $4V(X) - 5$ (b) 20 (c) $4V(X)$ (d) 0
46. If $P(x) = \frac{1}{20}; x = 1, 2, 3, \dots, 20$, what is the standard deviation?
 (a) 1 (b) 5.77 (c) 7.75 (d) 12.57
47. Expectation measures –
 (a) Dispersion (b) Skewness (c) Kurtosis (d) Central tendency
48. If $E(X) = -0.5$, then $E(1 - 2X) =$?
 (a) 0 (b) -1 (c) 2 (d) 1
49. If $P(X) = \frac{1}{10}; x = 1, 2, \dots, 10$, then $E(X) =$?
 (a) 10 (b) 5.5 (c) 0 (d) 11
50. Which formula of variance is correct?
 (a) $V(X + Y) = V(X) + V(Y) - 2Cov(X, Y)$ (b) $V(X + Y) = V(X) + V(Y) + 2Cov(X, Y)$
 (c) $V(X + Y) = V(X) + V(Y) - 2Cov(X, Y)$ (d) $V(X + Y) = V(X) - V(Y) + 2Cov(X, Y)$

51. **X is a constant; what is the value of $V(\frac{X}{2})$?**
 i) 0
 ii) $\frac{1}{2}$
 iii) $\frac{1}{4}$
 (a) ii (b) i (c) iii (d) i and iii
52. **If $E(X) = 2, E(X^2) = 8, V(X) = --$**
 (a) 0 (b) 2 (c) 4 (d) 8

4 Binomial Distribution

53. **How many parameters are there in a binomial distribution?**
 (a) 1 (b) 2 (c) 3 (d) 4
54. **In a Binomial distribution, how are mean and variance related?**
 (a) *Mean > Variance* (b) *Mean < Variance*
 (c) *Mean = Variance* (d) *Mean = 2 × Variance*
55. **When does Binomial distribution tend to Poisson distribution?**
 (a) $n \rightarrow \infty$ and $p \rightarrow \infty$ (b) $n \rightarrow 0$ and $p \rightarrow 0$ (c) $n \rightarrow \infty$ and $p \rightarrow 0$ (d) $n \rightarrow 0$ and $p \rightarrow \infty$
- Answer the next two questions based on the following information.**
 X is a binomial variate with expectation 4 and standard deviation $\sqrt{3}$.
56. **What are the values of the parameters (mean and probability)?**
 (a) 16, $\frac{1}{4}$ (b) 16, $\frac{3}{4}$ (c) 15, $\frac{1}{4}$ (d) 10, $\frac{1}{4}$
57. **What is $P(X \neq 0)$?**
 (a) 0 (b) 0.01 (c) 0.99 (d) 1

5 Poisson Distribution

58. **What is the mean of Poisson distribution**
 (a) $\frac{1}{\sqrt{m}}$ (b) m (c) $\frac{1}{m}$ (d) $1 + \frac{1}{m}$
59. **The parameter of a Poisson variate is 2. What is its variance?**
 (a) 0 (b) 4 (c) $\sqrt{2}$ (d) 2
60. **X is a Poisson variate. $P(2) = P(4)$. What is the value of the parameter?**
 (a) 12 (b) 3.46 (c) 3.6 (d) 4
61. **Mean of a Poisson variate is a. What is its standard deviation?**
 (a) 0 (b) a (c) $a^{\frac{1}{2}}$ (d) a^2

6 Vital Statistics

62. Crude Birth Rate (CBR) is:

- (a) $\frac{B}{P} \times 100$ (b) $\frac{B}{P} \times 1000$ (c) $\frac{P}{B} \times 100$ (d) $\frac{F}{P} \times 100$

63. Which one is a measure of reproduction?

- i) CBR
ii) CDR
iii) NRR

- (a) i (b) ii (c) iii (d) i and ii

64. The number of people living per unit area is called—

- (a) Population Index (b) Population Density
(c) Human Development Index (d) Dependency Ratio

65. Which formula of GFR is accurate?

- (a) $GFR = \frac{B}{P} \times 1000$ (b) $GFR = \frac{B}{F_{15-49}} \times 1000$
(c) $GFR = \frac{B_i}{F_i} \times 1000$ (d) $GFR = \frac{G_i}{F_{15-49}} \times 1000$

Answer Key:

1. (c) 0
2. (d) Sample Point
3. (c) Mutually Exclusive Events
4. (a) $P(A \cap B) = P(A) \cdot P(B)$
5. (d) 0.0769
6. (c) $\frac{3}{4}$
7. (d) $\frac{3}{4}$
8. (b) $\frac{0}{6}$
9. (a) 4
10. (b) 0
11. (c) $\frac{1}{4}$
12. (a) $\frac{1}{4}$
13. (d) $\frac{11}{12}$
14. (a) $\frac{3}{7}$
15. (b) 3
16. (b) i and iii
17. (a) $\frac{7}{21}$
18. (b) Discrete random
19. (d) 1
20. (c) 0
21. (a) 2
22. (c) 14
23. (c) Probability mass function
24. (a) i and ii
25. (b) Weight
26. (c) $\sum P(x_i) = 1$
27. (c) 1
28. (a) $P(x) = \frac{2x+3}{21}$
29. (c) $\frac{3y+2}{7}$
30. (d) Released version number of a software
31. (d) $0 \leq P(X_i, Y_j) \leq 1$
32. (a) i
33. (b) $\frac{1}{6}$
34. (a) $\frac{5}{6}$
35. (c) Variance
36. (c) 0
37. (b) $a^2V(X)$
38. (a) $aE(X) + b$
39. (a) 0
40. (c) $\frac{n+1}{2}$
41. (c) 16
42. (c) a
43. (a) 0
44. (c) $V(X) - V(Y)$
45. (c) $4V(X)$
46. (a) 1
47. (d) Central tendency
48. (c) 2
49. (b) 5.5
50. (b) $V(X + Y) = V(X) + V(Y) + 2Cov(X, Y)$
51. (b) i
52. (c) 4
53. (b) 2
54. (a) $Mean > Variance$
55. (a) $n \rightarrow \infty$ and $p \rightarrow \infty$
56. (a) 16, $\frac{1}{4}$
57. (c) 0.99
58. (a) $\frac{1}{\sqrt{m}}$
59. (d) 2
60. (b) 3.46
61. (c) $a^{\frac{1}{2}}$
62. (b) $\frac{B}{P} \times 1000$
63. (c) iii
64. (b) Population Density
65. (b) $GFR = \frac{B}{F_{15-49}} \times 1000$