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 ocurring 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)	k	2k	3k	4k	5k	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

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

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) umber 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) $\Sigma P(x_i) = 1$ (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:

$P(x, y) = \frac{1}{21}(x + y); x = 1, 2, 3$ 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 studnets (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 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 $P(x) = \frac{1}{n}; x = 1, 2, 3, \cdots, n$, 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 $P(x) = \frac{4-|5-x|}{k}; x = 2, 3, 4, \cdots 8$, 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 $V(X - Y)equalto?$**
(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 $P(x) = \frac{1}{20}; x = 1, 2, 3, \cdots, 20,$ 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 $P(X) = \frac{1}{10}; x = 1, 2, \cdots 10$, 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

53. **If $P(x) = \frac{4-|5-x|}{k}; x = 2, 3, 4, \cdots 8$, what is the value of $E(X)$?**

(a) 3 (b) 8 (c) 16 (d) 5

54. **If $P(x) = \frac{6-|7-x|}{k}; x = 2, 3, 4, \cdots 12$, what is the value of $E(X)$?**

(a) 6 (b) 9 (c) 13 (d) 36

55. **If $P(x) = \frac{3-|4-x|}{k}; x = 2, 3, 4, \cdots 6$, what is the value of k?**

(a) 6 (b) 9 (c) 10 (d) 40

56. **If the variance of X is 3, what is the variance of V(3)?**

(a) 1 (b) 2 (c) 3 (d) 0

57. **If $V(X) = 5$,, what is $V(X + 5)$?**

(a) 0 (b) 5 (c) 10 (d) 25

58. **If $V(X) = 5$,, what is $V(2X + 5)$?**

(a) 20 (b) 5 (c) 10 (d) 25

4 Binomial Distribution

59. **How many parameters are there in a binomial distribution?**

(a) 1 (b) 2 (c) 3 (d) 4

60. **In a Binomial distribution, how are mean and variance related?**

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

61. **When does Binomial distribution tend to Poisson distribution?**

(a) $n \to \infty$ and $p \to \infty$ (b) $n \to 0$ and $p \to 0$ (c) $n \to \infty$ and $p \to 0$ (d) $n \to 0$ and $p \to \infty$

Answer the next two questions based on the following information.

X is a binomial variate with expectation 4 and standard deviation $\sqrt{3}$.

62. **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) $10, \frac{1}{4}$

63. **What is $P(X \neq 0)$?**

(a) 0 (b) 0.01 (c) 0.99 (d) 1

5 Poisson Distribution

64. **What is the mean of Poisson distribution**

(a) $\frac{1}{\sqrt{m}}$ (b) m (c) $\frac{1}{m}$ (d) $1 + \frac{1}{m}$

65. **The parameter of a Poisson variate is 2. What is its variance?**

(a) 0 (b) 4 (c) $\sqrt{2}$ (d) 2

66. **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

67. **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

68. **Crude Birth Rate (CBR) is:**

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

69. **Which one is a measure of reproduction?**

i) CBR
ii) CDR
iii) NRR

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

70. **The number of people living per unit area is called–**

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

71. **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) $GFR = \frac{G_i}{F15-49} \times 1000$

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) $\Sigma P(x_i) = 1$
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) $V(X+Y) = V(X) + V(Y) + 2Cov(X,$
51. (b) i
52. (c) 4
53. (d) 5
54. (d) 36
55. (b) 9
56. (d) 0
57. (b) 5
58. (a) 20
59. (b) 2
60. (a) $Mean > Variance$
61. (a) $n \to \infty$ and $p \to \infty$
62. (a) 16, $\frac{1}{4}$
63. (c) 0.99
64. (a) $\frac{1}{\sqrt{m}}$
65. (d) 2
66. (b) 3.46
67. (c) $a^{\frac{1}{2}}$
68. (b) $\frac{B}{P} \times 1000$
69. (c) iii
70. (b) Population Density
71. (b) $GFR = \frac{B}{F_{15-49}} \times 1000$