Statistics MCQ Question Bank

Second Paper

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1 Introduction to Probability

1. **An act repeated under some specific conditions is called –**
   (a) Event (b) Experiment (c) Sample (d) Sample space
2. $P(0)$ **implies –**
   (a) A certain event (b) An uncertain event (c) An impossible event (d) A probable event
3. **Events having some common elements are called –**
   (a) Complementary events (b) Mutually exclusive events
   (c) Exhaustive events (d) Non-Mutually exclusive events events
4. **The minimum value of probability is**
   (a) $-\alpha$ (b) 1 (c) 0 (d) -1

1.1 Permutation-Combination

5. **Three objects can be placed in 2 positions in – ways.**
   (a) 3 (b) 4 (c) 6 (d) 8
6. **In how many ways can a team of 2 be formed from 4 people?**
   (a) 4 (b) 6 (c) 8 (d) 12
7. ${}^{n}p_{r} =$
   (a) $\frac{n!}{(n-r)!}$ (b) $\frac{n!}{(n+r)!}$ (c) $\frac{n!}{r!}$ (d) $\frac{n!}{(r-n)!}$
8. ${}^{n}C_{r} =$
   (a) $\frac{n!}{(n-1)!(n+r)!}$ (b) $\frac{r!}{n!(n-r)!}$ (c) $\frac{n!(n-1)!}{r!}$ (d) $\frac{n!}{(r-n)!}$
9. **Each element of sample space is called–**
   (a) Trial (b) Experiment (c) Variable (d) Sample Point
10. **Two events not ocurring together are called–**
    (a) dependent Events (b) Independent Events
    (c) Mutually Exclusive Events (d) Marginal Events
11. **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.
12. **What is the probability that the card is a King?**
    (a) 0.0192 (b) 0.25 (c) 0.5 (d) 0.0769
13. **P(The card is not from Diamonds)–**
    (a) $\frac{1}{2}$ (b) 0 (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

14. **P(The card is red or Clubs)**

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

15. **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) $\frac{3}{6}$

16. **Tossing a coin twice generates how many outcomes?**

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

17. **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

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

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

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

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

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

20. **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) $\frac{11}{12}$

21. **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

22. **How many conditions does a probability density function have?**

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

23. **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

24. **What is the value of k?**

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

25. **What is the type of variable X?**

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

26. **What is $F(\infty)$ for a distribution function $F(x)$?**
(a) $-\infty$ (b) -1 (c) 0 (d) 1

27. **What is $F(-\infty)$ for a distribution function $F(x)$?**
(a) $-\infty$ (b) -1 (c) 0 (d) 1

28. **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

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

29. **What is the value of k?**
(a) 10 (b) 11 (c) 14 (d) 15

30. $P(x)$ **is a –**
(a) Joint probability distribution (b) Cumulative probability distribution
(c) Probability mass function (d) Probability Density function

31. **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

32. **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

33. **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) $\int_x P(X)dx \leq 1$

34. $f(x) = 2x; 0 < X < 3$**; 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 $y = 1, 2$

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

36. **P(y)=?**
(a) $\frac{y+2}{7}$ (b) $\frac{y+3}{7}$ (c) $\frac{3y+2}{7}$ (d) $\frac{y+2}{9}$

37. **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

38. **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) $0 \leq P(X_i, Y_j) \leq 1$

39. **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)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

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

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

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

(a) $\frac{5}{6}$ (b) 0

(c) 1 (d) Can't be found from this information

3 Mathematical Expectation

42. **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

43. **What is the minimum value of variance a random variable?**

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

44. **If $y = ax + b$, what is the value of $V(y)$?**

(a) $aV(X)$ (b) $a^2V(X)$ (c) $V(X)$ (d) a^2

45. **If $y = ax + b$, what is the value of $E(y)$?**

(a) $aE(X) + b$ (b) $a^2E(X)$ (c) $E(X)$ (d) b

46. **What is the value of $V(5)$?**

(a) 0 (b) 25 (c) 5 (d) 1

47. **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) $n + 1$

48. **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

49. **Expected value of a constant a is –**

(a) 1 (b) Variance (c) a (d) a+1

50. **The variance of a constant m is –**

(a) 0 (b) 1 (c) m (d) m^2

51. **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) $V(X)+V(Y)+2Cov(X,Y)$

52. **What is the value of V(2X+5)?**

(a) $4V(X)-5$ (b) 20 (c) $4V(X)$ (d) 0

53. **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

54. **Expectation measures –**

(a) Dispersion (b) Skewness (c) Kurtosis (d) Central tendency

55. **If** $E(X)=-0.5$**, then** $E(1-2X)=$**?**

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

56. **If** $P(X)=\frac{1}{10}; x=1,2,\cdots 10$**, then** $E(X)=$**?**

(a) 10 (b) 5.5 (c) 0 (d) 11

57. **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) $V(X+Y)=V(X)-V(Y)+2Cov(X,Y)$

58. **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

59. **If** $E(X)=2, E(X^2)=8, V(X)=--$

(a) 0 (b) 2 (c) 4 (d) 8

60. **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

61. **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

62. **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

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

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

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

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

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

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

4 Binomial Distribution

66. **How many parameters are there in a binomial distribution?**
(a) 1 (b) 2 (c) 3 (d) 4

67. **In a Binomial distribution, how are mean and variance related?**
(a) $Mean > Variance$ (b) $Mean < Variance$
(c) $Mean = Variance$ (d) $Mean = 2 \times Variance$

68. **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 $\sqrt{3}$.

69. **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) $10, \frac{1}{4}$

70. **What is** $P(X \neq 0)$?
(a) 0 (b) 0.01 (c) 0.99 (d) 1

5 Poisson Distribution

71. **What is the mean of Poisson distribution**
(a) $\frac{1}{\sqrt{m}}$ (b) m (c) $\frac{1}{m}$ (d) $1 + \frac{1}{m}$

72. **The parameter of a Poisson variate is 2. What is its variance?**
(a) 0 (b) 4 (c) $\sqrt{2}$ (d) 2

73. **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

74. **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

75. **Crude Birth Rate (CBR) is:**
(a) $\frac{B}{P} \times 100$ (b) $\frac{B}{P} \times 1000$ (c) $\frac{P}{B} \times 100$ (d) $\frac{F}{P} \times 100$

76. **Which one is a measure of reproduction?**
i) CBR
ii) CDR
iii) NRR
(a) i (b) ii (c) iii (d) i and ii

77. **The number of people living per unit area is called–**
(a) Population Index (b) Population Density
(c) Human Development Index (d) Dependency Ratio

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