Unit – IX

PROBABILITY THEORY

Section – A

One marks questions

1. Define an outcome. (U)
2. What is a random experiment? (K)
3. Define a Sample space. (U)
4. Write the sample space, when two coins are tossed once (K)
5. Write the sample space, when a die thrown once. (K)
6. What is an event? (K)
7. What is union of events? (K)
8. What is intersection of events? (K)
9. Give the classical (mathematical) definition of probability. (U)
10. Give the statistical (empirical) definition of probability. (U)
11. Give the axiomatic definition of probability. (U)
12. What is the probability of null event? (K)
13. What is the probability of sample space? (K)
14. Define conditional probability. (U)
15. If P(A) =1/4 ,what is P(A')? (S)

Section – B

Two marks questions

16. What is a random experiment? Give an example. (K)
17. Define null event. Give an example. (U)

18. Define simple event. Give an example. (U)
19. Define compound event. Give an example. (U)
20. Define favorable outcomes with an example. (U)
21. Define exhaustive outcomes with an example. (U)
22. Define equally likely events with an example. (U)
23. Define mutually exclusive events with an example. (U)
24. What is complement of an event? Give an example.
25. Show that $0 \le P(A) \le 1$ (K)
26. If A' is the complementary event of A, then show that $P(A) + P(A') = 1$. (S)
27. Define independent events with an example. (U)
28. Define dependent events with an example. (U)
29. A coin is tossed once. Find the probability of getting a head. (S)
30. A coin is tossed once. Find the probability of getting head or tail. (S)
31. A die is thrown once. What is the probability of getting an odd number? (S)
32. When two coins are tossed, find the probability of getting 2 heads. (S)
33. A card is drawn from a pack of cards. what is the probability that it is a king or a Queen card? (S)
34. A card is drawn from a pack of cards .what is the probability that it is a red or black card? (S)
35. If P(A) = 1/13, P(B) =1/4 and $P(A \cap B) = 1/52$ then, find the value of $P(A \cup B)$. (A)
36. If $P(A) = 1/2$, $P(B) = 1/3$ and $P(A \cap B) = 1/6$ then , find $P(A \cup B)$. (A)
37. If $P(A \cap B) = 1/3$ and $P(B) = 2/3$ then , find $P(A|B)$. (A)
38. If $P(A) = 2/3$ and $P(B|A) = 2/5$ then , find $P(A \cap B)$. (A)
39. If A and B are two independent events and $P(A) = 0.6$, $P(B) = 0.5$ then, find $P(A \cup B)$. (A)

Section – C/E

Five marks questions

40. State and prove addition theorem of probability for any two events. (K)
41. State and prove addition theorem of probability for two mutually exclusive events. (K)
42. State and prove multiplication theorem of probability for two dependent events. (K)
43. State and prove multiplication theorem of probability for two independent events. (K)
44. A card is drawn randomly from a pack of 52 playing cards. Find the probability that it is : (i) a King or a Spade (ii) a Spade or a Red. (iii) a spade king. (U)
45. A box contains cards numbered from 1 to 20. A card is drawn randomly from it. Find the probability of getting a card with: (i) an odd number (ii) a multiple of 4 (iii) a perfect square. (S)
46. When three coins are tossed at a time. Find the probability of getting : (i) only heads (ii) at least two heads (S)
47. From a group of 6 boys and 4 girls, two are selected at randomly. What is the Probability that: (a) both are boys (b) both are girls (c) one is boy and other is a girl. (S)
48. A box contains 5 red and 4 green balls. Two balls are drawn at random from this box. Find the probability that they are: (a) 0f Different colours (b) of same colour. (S)
49. A box contains 6 white, 4 black and 5 green balls. Three balls are drawn at random from this box. Find the probability that they are: (a) two white and one black (b) one white and two are green. (S)
50. A box contains 5 red, 4 green and 3 blue marbles. Three marbles are drawn at random from this box. Find the probability that they are of: (i) different colours (ii) the same colour. (S)
51. A bag contains 5 tickets numbered from 1 to 5. Two tickets are drawn at random. What is the probability that the sum of obtained numbers is: (i) odd (ii) even? (U)

52. For a university cricket team 2 players are to be selected from a college having 5 batsmen, 3 bowlers and 2 wicket-keepers. Find the probability of selecting- (i) a batsman and a wicket-keeper (ii) bowlers only. (U)
53. A firm wants to select three candidates among 3 graduates, 5 undergraduates and 8 matriculates. What is the probability of selecting: (a) one graduate and two matriculates, (b) two undergraduates and one matriculate? (S)
54. In a hostel 60% of students drink tea, 50% of students drink coffee and 20% of students drink both tea and coffee. Find the probability that a randomly selected student drinks either tea or coffee. (A)
55. The probability that a contractor will get a plumbing contract is 1/2 and the probability that he will not get an electrical contract is 2/3. If the probability of getting at least one of these contracts is 2/3. What is the probability that he will get both? (A)
56. Probability that A solves a problem is 2/3 and that B solves it is 3/5. If a randomly selected problem is given Find the Probability that: a) both of them solve, b) none of them solves.(S)
57. A, B and C hit a target with probabilities 0.6, 0.5 and 0.4 respectively. If they hit at the target independently, find the probability that: (i) none of them hit the target (ii) the target is hit. (A)
58. A box contains 40 nails and 20 screws. $1/4^{th}$ of nails and 20% of the screws are rusted. If one item is selected at random, what is the probability that it is a rusted nail or a screw? (S)
59. A purse contains 4 silver and 2 gold coins. Another purse contains 3 silver and 4 gold coins. If a coin is selected at random from one of the two purses, what is the probability that it is a silver coin? (S)
60. Contents of the bags are are as follows - I bag: 3 red and 2 green balls, II bag: 4 red and 3 green balls, III bag: 2 red and 2 green balls. One bag is selected at random and then a ball is drawn from it. Find the probability that it is red in colour. (S)
61. Two fair dice are rolled. Find the probability that : (i) both the dice show same numbers, (ii) the sum of numbers is 7 or 11, (iii) the sum is divisible by 3 (iv) product of numbers obtained is 36. (S)
62. What is the probability that there will be 53 Mondays in a randomly selected i) Non-Leap year ii) Leap year? (S)
63. A bag contains 3 white and 5 black marbles. Two marbles are drawn one after another. (i) What is the probability that both are white marbles under with replacement? (ii) both are black marbles under without replacement. (S)

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