SECTION – I
(SINGLE CORRECT CHOICE TYPE)

This section contains **4 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE is correct.**

Marking scheme +3 for correct answer , 0 if not attempted and -1 in all other cases.

37. The probability that a man makes a certain dangerous journey by car, motor cycle or on foot are 1/2,1/6 and 1/3 respectively. The probabilities to happen an accident when he uses these means of transport are 1/5, 2/5 and 1/10 respectively. Given that an accident happened, then the probability that the man was travelling by car, is

A) 3/2 B) 1/5 C) 1/2 D) 1/3

38. A bag contains 5 balls of unknown colours, two balls are drawn at random from the bag and are found to be red. The probability that the bag contains exactly 4 red balls is

A) $\frac{3}{5}$ B) $\frac{3}{10}$ C) $\frac{5}{13}$ D) $\frac{4}{13}$

39. A pair of distinct fair dice are rolled together till a sum of either 5 or 7 is obtained then probability that 5 comes before 7 is…

A) $\frac{1}{5}$ B) $\frac{2}{5}$ C) $\frac{3}{5}$ D) $\frac{4}{5}$

40. A signal which can be green or red with probability $\left(\frac{4}{5}\right)$ and $\left(\frac{1}{5}\right)$ respectively is received by the station A and Transmitted to station B. The probability each station receive signal correctly is $\left(\frac{3}{4}\right)$. If the signal received by B is green, then the probability original signal was green is

A) $\frac{3}{5}$ B) $\frac{6}{7}$ C) $\frac{20}{23}$ D) $\frac{9}{20}$

SECTION – II
(MULTIPLE CORRECT CHOICE TYPE)

This section contains **8 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE is/ are correct.**

Marking scheme +4 for correct answer , 0 if not attempted and -1 in all other cases.

41. Contents of the two urns is a given in this table. A fair die is tossed. If the face 1,2,4 or 5 comes, a marble is drawn from the urn A ,otherwise a marble is chosen from the urn B.

Urn	Red marbles	White marbles	Blue Marbles
A	5	3	8
B	3	5	0

Let E_1 : Denote the event that a red marble is chosen

E_2 : Denote the event that a white marble is chosen

E_3 : Denote the event that a blue marble is chosen

Then

A) Events E_1, E_2 and E_3 are equiprobable.

B) $P(E_1), P(E_2), P(E_3)$ are in A.P.

C) If the marble drawn is red, the probability that it came from the urn A is $\frac{1}{2}$

D) If the marble drawn is white, the probability that the face 5 appeared on the die is $\frac{3}{32}$

42. A player tosses a fair coin. He set one point for head and two points for tail. He plays till he get sum of points equal to n. If p_n be the probability that his score becomes n, then

A) $p_3 = \frac{1}{2}$

B) $p_n = \frac{1}{2}p_{n-1} + \frac{1}{4}p_{n-2}$

C) $p_n = \frac{1}{2}(p_{n-1} + p_{n-2})$

D) $p_4 = \frac{11}{16}$

43. One of 10 keys open the door. If we try the keys one after the other then

A) Probability that the door opened in the first attempt is $\frac{1}{10}$

B) Probability that the door opened in the second attempt is $\frac{1}{10}$

C) Probability that the door opened in 10^{th} attempt is $\frac{1}{10}$

D) Probability that the door opened in 5^{th} attempt is 1/3

44. Let X and Y be the two events such that $P\left(\frac{X}{Y}\right)=\frac{1}{2}, P\left(\frac{Y}{X}\right)=\frac{1}{3}$ AND $P(X\cap Y)=\frac{1}{6}$ .Which of the following is(are) correct?

A) $P(X\cup Y)=\frac{4}{6}$

B) X and Y are independent

C) X and Y are not independent

D) $P\left(X^c\cap Y\right)=\frac{1}{3}$

45. A machine needs at least 2 of its 3 parts to work correctly. The probability of part 1 failing is $\frac{1}{2}$, the probability of part 2 failing is 6/7 and the probability of part 3 failing is also 6/7. Each part failing is independent of any other part failing. Given that the machine failed, the chance the only part 3 doesn't fail is

A) Equal to $\frac{3}{7}$ B) Greater than $\frac{5}{7}$ C) Less than $\frac{4}{7}$ D) Equal to $\frac{6}{7}$

46. A bag initially contains one red and two blue balls. An experiment consisting of selecting a ball at random, noting its colour and replacing it together with an additional ball of the same colour. If three such trials are made, then (among those three trails)

A) Probability that atleast one blue ball is drawn is $\frac{9}{10}$

B) Probability that exactly one blue ball is drawn is $\frac{1}{5}$

C) Probability that all the drawn balls are red given that all the drawn balls are of same colour is $\frac{1}{5}$

D) Probability that atleast one red ball is drawn is $\frac{3}{5}$

47. From an urn containing M white and (N – M) black balls, r balls have been lost. Then probability of drawn a white ball is….(given N > M > r)

A) Before the loss is M/N

B) After the loss is M/N if r = 1

C) After the loss is M/N if r = 2

D) After the loss is M/N if r = 3

48. Consider two bags A and B where Bag A, contains 4 black and 3 green balls ,Bag B contains 3 black and 4 green balls ,A fair coin is tossed. If it is head, then two balls are drawn from bag A otherwise one ball is drawn each from bag A and bag B, then

A) Probability that both the balls drawn are black is equal to $\frac{13}{49}$

B) Probability that exactly one ball is black is equal to $\frac{53}{98}$

C) If it is know that both the balls drawn are of same colour, then the probability that they are green is equal to $\frac{17}{45}$

D) If it is know that both the balls drawn are of same colour, then the probability that they are black is equal to $\frac{19}{45}$

SECTION – III
(NUMERICAL VALUE ANSWER TYPE)

This section contains 6 questions. The answer to each question is a **Numerical values comprising of positive or negative decimal numbers (place value ranging from Thousands Place to Hundredths place).**
Eg: 1234.56, 123.45, -123.45, -1234.56, -0.12, 0.12 etc.
Marking scheme : +3 for correct answer, 0 in all other cases.

49. If nine students write an examination, if there are 9 teachers available, for the correction of their papers, and these papers randomly distributed to the teachers. If the probability that exactly two teachers will get nothing (no paper) is $K\frac{(8!)}{9^8}$ then sum of digits of K equals.

50. Let $S=\{1,2,3,4,5,6,7\}$. A subset A of S is selected, keeping back elements in S, again a subset B of S is selected. Let E_1 = event that $A\cup B=\{1,2,3,4,5\}$ $E_2=$ Event that $A\cap B=\{1,2\}$ if $P\left(\frac{E_2}{E_1}\right)=\frac{a}{b}(a,b\in N)$ (G.C.D(a,b)=1) then $\frac{1}{10}\left[\frac{b}{a}\right]$ equals to... ([.] is GIF]

51. Of the three independent events A, B and C ,the chance that only A occurs is e_1; the chance that only B occurs is e_2; the chance that only c occurs is e_3. The chance that none of them occurs is λ and λ satisfies $(e_1-2e_2)\lambda=e_1e_2$ and $(e_2-3e_3)\lambda=2e_2e_3$. All the given probabilities lie in (0, 1) then $\frac{P(\text{occurence of A})}{P(\text{occurence of C})}=$ ___

52. The contents of 3 bags w.r.t., green and red marbles is as given in the table shown. A child randomly select one of the bags, and draws a marble from it and retains it. If the marble is green, the child draws the second marble randomly from one of the two remaining bags. If the first marble drawn is red then the child draws one more marble from the same bag. The probability that the second drawn marble is green is expressed as $\frac{m}{n}$ (where m and n are coprime). Find the value of (m+n – 210) is…

Bag	G	R
A	3	1
B	2	2
C	1	3

53. Two cards are drawn from a well shuffled pack of 52 cards. The probability that one is a heart card and the other is a king is p, then the value of 104p is

54. A person speaks truth in ‘3’ out of 5 cases. He throws a die and shouted that it is ‘6’. The probability that it is actually ‘4’ is P, then the value of $[26P]$ is…. ([.] is GIF]