THINK ACADEMY
MATH CLASSES By O.P. GUPTA
Class XII - Mathematics (041)
Topics - Probability

Alpha Test Series-13
(For Academic session 2023-24)

Max. Marks - 30
Time - 60 Minutes

Followings are of 2 Marks each (Q01-05).

Q01. Two cards are drawn successively with replacement from a well shuffled pack of 52 cards. Find the probability distribution of the number of kings.

Q02. Two integers are selected at random from the integers one to eleven. If their sum is even, what is the probability that both the numbers are even?

Q03. Show that $\bar{E}$ and $\bar{F}$ are independent events, if it is known that E and F are independent events.

Q04. If $P(A)=\frac{2}{5}$, $P(B)=\frac{1}{3}$, $P(A\cap B)=\frac{1}{5}$, then find $P(\bar{A}\,|\,\bar{B})$.

Q05. The ratio of the number of boys to the number of girls in class XII of a school is 1:2. It is known that the probabilities of a girl and a boy getting a first division are 0.25 and 0.28 respectively. Find the probability that student chosen at random will get first division. $[2\times5=10$

Followings are of 3 Marks each (Q06-07).

Q06. Let A can hit a target 4 times in 5 shots, B can hit 3 times in 4 shots and C can hit 2 times in 3 shots. Find the probability that

(a) B, C will hit and A will lose
(b) Any two of A, B and C will hit
(c) None of them will hit.

Q07. Two cards from a pack of 52 playing cards are lost. From the remaining cards of the pack, one card is drawn and is found to be heart. Find the probability of the lost cards were both hearts.

OR

A random variable X has the following probability distribution :

X	0	1	2	3	4	5	6	7
P(X)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Determine the followings :

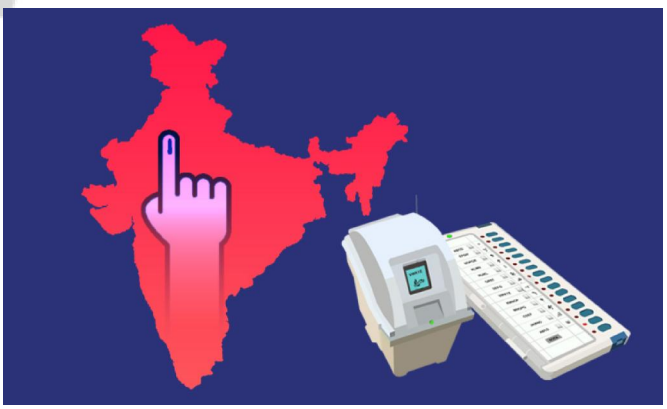
(a) k (b) $P(X<3)$ (c) $P(X>6)$. $[3\times2=6$

Following is of 4 Marks (Q08).

Q08. **CASE STUDY :** In a recent state election in India, there are three major political parties: Party A, Party B, and Party C. Exit polls indicate that 40% of voters support Party A, 30% support Party B, and 30% support Party C.

It is also known that the exit polls have a history of accuracy as follows.

- When the exit poll predicts Party A as the winner, it is correct 80% of the time.
- When the exit poll predicts Party B as the winner, it is correct 70% of the time.
- When the exit poll predicts Party C as the winner, it is correct 60% of the time.



Based on the above information, answer the following :

(i) Let E be the event that the exit poll predicts Party A as the winner. Find $P(E)$.

(ii) If the exit poll predicts Party A as the winner, what is the probability that Party A will indeed win the election? $[2\times2=4$

Followings are of 5 Marks each (Q09-10).

Q09. By examining the chest X-ray, the probability that T.B. is detected when a person is actually suffering is 0.99. The probability that the doctor diagnosis incorrectly that a person has T.B. on the basis of X-ray is 0.001. In a certain city, 1 in 1000 suffers from T.B. A person is selected at random and is diagnosed to have T.B. What is the probability that he actually has T.B.?

Q10. If a machine is set up properly, it produces 90% good items. If it is not set up properly, it produces only 40% good items. Past experience reveals that 80% of the set ups are correctly done. If after a certain set up, the machine produces 2 acceptable items, find the probability that machine was not set up properly. [5×2=10

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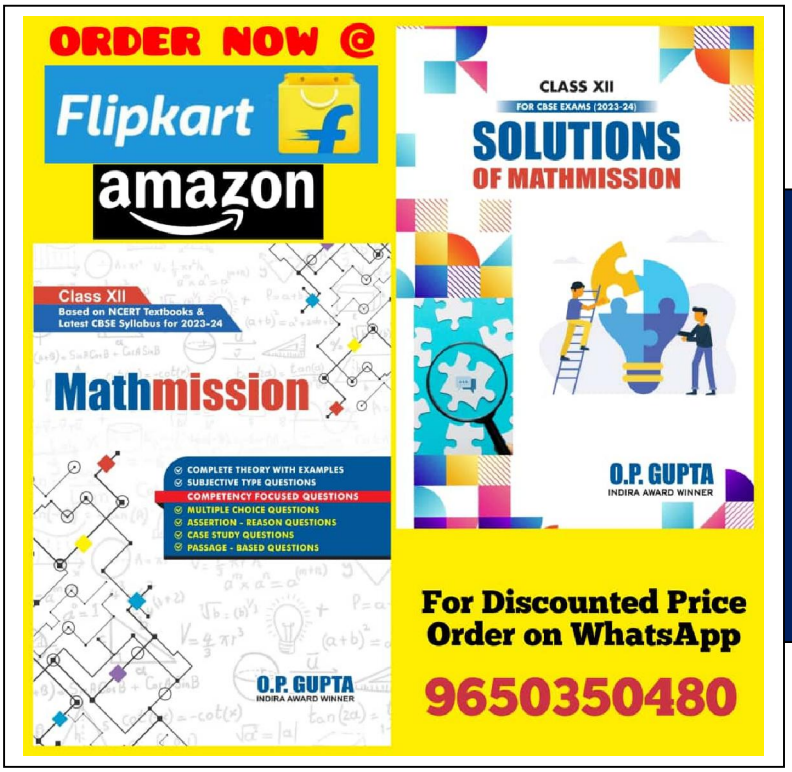

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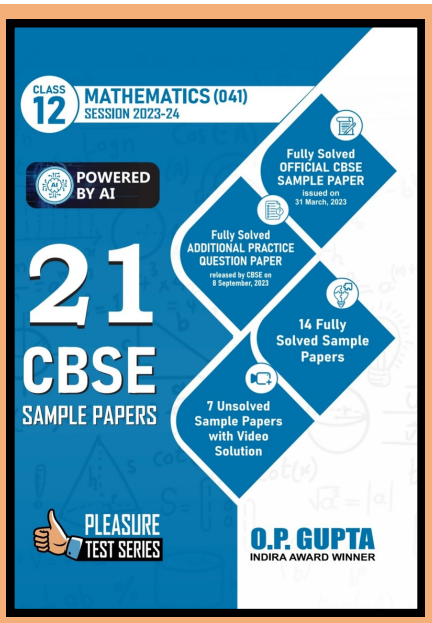

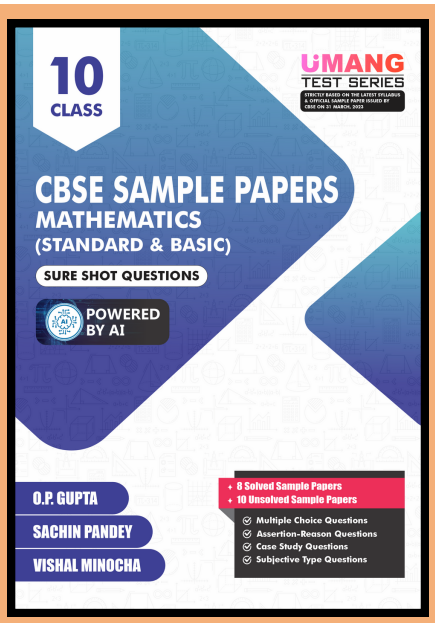

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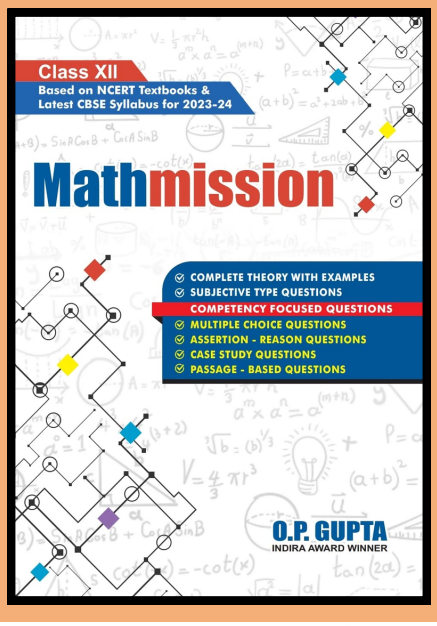

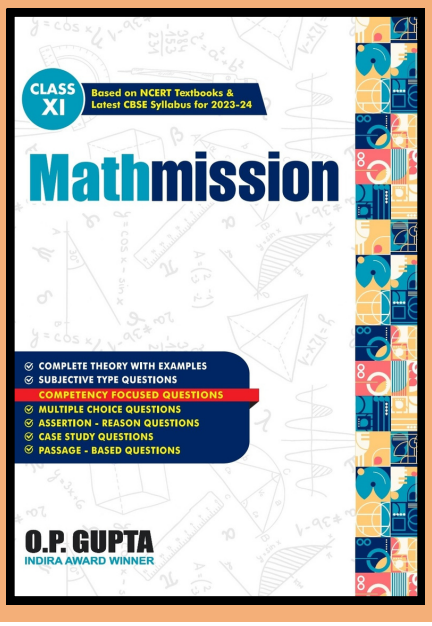

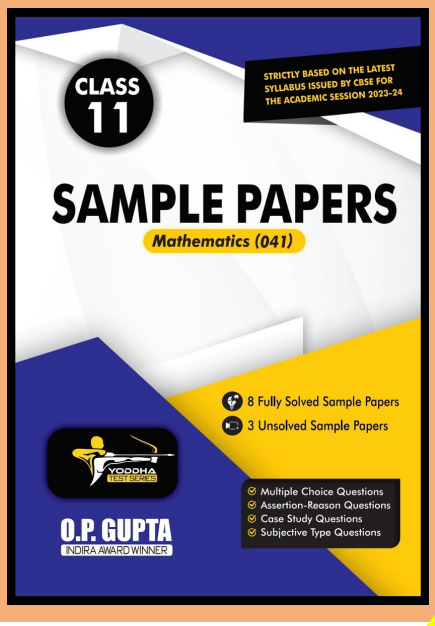

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