

Integ. Msc App Geo Semester-4 Examination

Agl 210

Mathematics-IV

Time : 2-30 Hours]

April-2024

[Max. Marks : 70

QUESTION-1 Write the following.

I. A card is drawn from an ordinary deck of 52 playing cards. Find the probability that (i) Card is a red card (ii) Card is a diamond (iii) Card is 10	7
II. A fair coin is tossed three times. What is the probability that at least one head appears?	7

OR

I. Six white balls and four black balls which are indistinguishable apart from color are placed in a bag. If six balls are taken from the bag, find the probability of their being three white and three black.	7
II. An employer wishes to hire three people from a group of 15 applicants 8 men and 7 women all of whom are equally qualified to fill the position. If he selects three at random. What is the probability that? (i) All three will be men (ii) At least one will be women	7

QUESTION-2 Write the following.

I. Given that E and F are events such that $P(E) = 0.6$, $P(F) = 0.3$ and $P(E \cap F) = 0.2$, find $P(E F)$ and $P(F E)$.	7
II. If $P(A) = 0.8$, $P(B) = 0.5$ and $P(B A) = 0.4$, find (i) $P(A \cap B)$ (ii) $P(A B)$ (iii) $P(A \cup B)$	7

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OR

I. Assume that each born child is equally likely to be a boy or a girl. If a family has two children, what is the conditional probability that both are girls given that (i) the youngest is a girl, (ii) at least one is a girl?	7
II. A box of oranges is inspected by examining three randomly selected oranges drawn without replacement. If all the three oranges are good, the box is approved for sale, otherwise, it is rejected. Find the probability that a box containing 15 oranges out of which 12 are good and 3 are bad ones will be approved for sale.	7

QUESTION-3 Write the following.

I. Box A contain 5 green and 7 red balls. Box B contain 3 green, 3 red and 6 yellow balls. A box is selected at random and a ball is drawn at random from it. What is the probability that the ball drawing is green.	7
II. In a hostel, 60% of the students read Hindi newspaper, 40% read English newspaper and 20% read both Hindi and English newspapers. A student is selected at random. (a) Find the probability that she reads neither Hindi nor English newspapers. (b) If she reads Hindi newspaper, find the probability that she reads English newspaper. (c) If she reads English newspaper, find the probability that she reads Hindi newspaper.	7

OR

I. A factory has two machines A and B. Past record shows that machine A produced 60% of the items of output and machine B produced 40% of the items. Further, 2% of the items produced by machine A and 1% produced by machine B were defective. All the items are put into one stockpile and then one item is chosen at random from this and is found to be defective. What is the probability that was produced by machine B?	7
II. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 Truck drivers. The probability of accidents are 0.01, 0.03 and 0.15 respectively. One of the insured persons meets with an accident. What is the probability that he is a scooter driver?	7

QUESTION-4 Write the following.

I. A laboratory blood test is 99% effective in detecting a certain disease when it is in fact, present. However, the test also yields a false positive result for 0.5% of the healthy person tested (that is, if a healthy person is tested, then, with a probability 0.005, the test will imply he has the disease). If 0.1 percent of the population actually has the disease, what is the probability that a person has the disease given that his test result is positive?	7
II. A bag contains 4 red and 4 black balls, and another bag contains 2 red and 6 black balls. One of the two bags is selected at random, and a ball is drawn from the bag which is found to be red. Find the probability that the ball is drawn from the first bag.	7

OR

I. A fair coin is tossed, and a fair die is thrown. Write down sample spaces for (a) the toss of the coin; (b) the throw of the die; (c) the combination of these experiments. Let A be the event that a head is tossed, and B be the event that an odd number is thrown. Directly from the sample space, calculate $P(A \cap B)$ and $P(A \cup B)$.	7
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II. A box contains 15 items 4 of which are defective and 11 are good. Two items are selected what is the probability that the first is good and second is defective.	7
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QUESTION-5 Attempt any seven out of twelve. (14 MARKS)

(1) What will be the probability of getting odd numbers if a dice is thrown? a) $1/2$ b) 2 c) $4/2$ d) $5/2$	2
(2) What is the probability of getting an even number when a dice is thrown? a) $1/6$ b) $1/2$ c) $1/3$ d) $1/4$	2
(3) The probability of getting two tails when two coins are tossed is - a) $1/6$ b) $1/2$ c) $1/3$ d) $1/4$	2

<p>(4) What is the probability of getting the sum as a prime number if two dice are thrown?</p> <p>a) $5/24$ b) $5/12$ c) $5/30$ d) $1/4$</p>	2
<p>(5) If two dice are thrown together, what is the probability of getting an even number on one dice and an odd number on the other dice?</p> <p>a) $1/4$ b) $3/5$ c) $3/4$ d) $1/2$</p>	2
<p>(6) In a box, there are 8 orange, 7 white, and 6 blue balls. If a ball is picked up randomly, what is the probability that it is neither orange nor blue?</p> <p>a) $1/3$ b) $1/21$ c) $2/21$ d) $5/21$</p>	2
<p>(7) A card is drawn from a pack of 52 cards. What is the probability of getting a king of a black suit?</p> <p>a) $1/26$ b) $1/52$ c) $3/26$ d) $7/52$</p>	2
<p>(8) Suppose a number x is chosen from the numbers -2, -1, 0, 1, 2. What will be the probability of $x^2 > 0$?</p> <p>a) $1/5$ b) $2/3$ c) $3/5$ d) $4/5$</p>	2
<p>(9) If a number is selected at random from the first 50 natural numbers, what will be the probability that the selected number is a multiple of 3 and 4?</p> <p>a) $7/50$ b) $4/25$ c) $2/25$ d) None of the above</p>	2

<p>(10) In 30 balls, a batsman hits the boundaries 6 times. What will be the probability that he did not hit the boundaries?</p> <p>a) $1/5$ b) $4/5$ c) $3/5$ d) None of the above</p>	2
<p>(11) If a number is selected at random from the first 100 natural numbers, what will be the probability that the selected number is a perfect cube?</p> <p>a) $1/25$ b) $2/25$ c) $3/25$ d) $4/25$</p>	2
<p>(12) Two people X and Y apply for a job in a company. The probability of the selection of X is $2/5$, and Y is $4/7$. What is the probability that both of them get selected ?</p> <p>a) $1/6$ b) $27/35$ c) $8/35$ d) $3/35$</p>	2

