

ASSIGNMENT-2

EE24BTECH11043 - Murra Rajesh Kumar Reddy

- 1) A is targeting B , B and C are targeting to A . Probability of hitting the target by A, B and C are $\frac{2}{3}, \frac{1}{2}$ and $\frac{1}{3}$ respectively. If A is hit then find the probability that B hits the target and C does not. (2003 – 2 Marks)
- 2) A and B are two independent events. C is event in which exactly one of A or B occurs. Prove that $\Pr(C) \geq \Pr(A \cup B) \Pr(\overline{A} \cap \overline{B})$ (2004-2 Marks)
- 3) A box contains 12 red and 6 white balls. Balls are drawn from the box one at a time without replacement. If in 6 draws there are at least 4 white balls, find the probability that exactly one white drawn in the next two draws. (binomial coefficients can be left as such) (2004-4 Marks)
- 4) A person goes to office either by car, scooter, bus or train the probability of which being $\frac{1}{7}, \frac{3}{7}, \frac{3}{7}, \frac{2}{7}$, and $\frac{1}{7}$ respectively. Probability that he reaches office late, if he takes car, scooter, bus or train is $\frac{2}{9}, \frac{1}{9}, \frac{4}{9}$ and $\frac{1}{9}$ respectively. Given that he reached office in time, then what is the probability that he travelled by a car. (2005-2 Marks)

G COMPREHENSION BASED QUESTIONS

PASSAGE-1

There are n urns, each of these contain $n+1$ balls. The i^{th} urn contains i white balls and $(n+1-i)$ red balls. Let u_i be the event of selecting i^{th} urn, $i = 1, 2, 3, \dots, n$ and w the event of getting a white ball.

- 1) If $\Pr(u_i) \propto i$, where $i = 1, 2, 3, \dots, n$, then $\lim_{n \rightarrow \infty} \Pr(w) =$ (2006-5M,-2)
 - a) 1
 - b) $\frac{2}{3}$
 - c) $\frac{3}{4}$
 - d) $\frac{1}{4}$
- 2) If $\Pr(u_i) = c$, (a constant) then $\Pr\left(\frac{u_n}{w}\right) =$ (2006-5M,-2)
 - a) $\frac{2}{n+1}$
 - b) $\frac{1}{n+1}$
 - c) $\frac{n}{n+1}$
 - d) $\frac{1}{2}$
- 3) Let $\Pr(u_i) = \frac{1}{n}$, if n is even and E denotes the event of choosing even numbered urn, then the value of $\Pr\left(\frac{w}{E}\right)$ is (2006-5M,-2)
 - a) $\frac{n+2}{2n+1}$
 - b) $\frac{n+2}{2(n+1)}$
 - c) $\frac{n}{n+1}$
 - d) $\frac{1}{n+1}$

PASSAGE-2

A fair die is tossed repeatedly until a six is obtained. Let X denote the number of tosses required. (2009)

- 4) The probability that $X = 3$ equals
 - a) $\frac{25}{216}$
 - b) $\frac{25}{36}$
 - c) $\frac{5}{36}$
 - d) $\frac{125}{216}$
- 5) The probability that $X \geq 3$ equals
 - a) $\frac{125}{216}$
 - b) $\frac{25}{216}$
 - c) $\frac{5}{36}$
 - d) $\frac{25}{36}$
- 6) The conditional probability that $X \geq 6$ given $X > 3$ equals

a) $\frac{125}{216}$

b) $\frac{25}{216}$

c) $\frac{5}{36}$

d) $\frac{25}{36}$

PASSAGE-3

Let U_1 and U_2 be two urns such that U_1 contains 3 white and 2 red balls, and U_2 contains only 1 white ball. A fair coin is tossed. If head appears then 1 ball is drawn at random from U_1 and put into U_2 . However, if tail appears then 2 balls are drawn at random from U_1 and put into U_2 . Now 1 ball is drawn at random from U_2 . (2011)

7) The probability of the drawn ball from U_2 being white is

a) $\frac{13}{30}$

b) $\frac{23}{30}$

c) $\frac{19}{30}$

d) $\frac{11}{30}$

8) Given that the drawn ball from U_2 is white, the probability that head appeared on the coin is

a) $\frac{17}{23}$

b) $\frac{11}{23}$

c) $\frac{15}{23}$

d) $\frac{12}{23}$