Dt. _____

Pg. _____

Q11. $p_1 = \frac{1}{3}$, $p_2 = \frac{2}{5}$, $p_3 = \frac{2}{3}$

$q_1 = 1 - \frac{1}{3}$ $\quad q_2 = 1 - \frac{2}{5}$ $\quad q_3 = 1 - \frac{2}{3}$

$q_1 = \frac{2}{3}$ $\quad q_2 = \frac{3}{5}$ $\quad q_3 = \frac{1}{3}$

prob. at least one success $= 1 - q_1 q_2 q_3$

$= 1 - \frac{2}{3} \times \frac{3}{5} \times \frac{1}{3}$

$= \frac{13}{15}$

Q12. (i)

4 W
3 R
2 B

four balls are drawn without replacement then (pro. (all are white)

$= \frac{{}^4C_4}{{}^9C_4} = \frac{1}{126}$

(ii) balls are drawn with replacement then

$P(\text{all white}) = \frac{4}{9} \times \frac{4}{9} \times \frac{4}{9} \times \frac{4}{9} = \left(\frac{4}{9}\right)^4$

Dt. _____

Pg. _____

Q13. (i) without replacement P(no ball is white)

$$= \frac{^5C_4}{^9C_4} = \frac{5}{126}$$

(ii) with replacement P(no ball is white)

$$= \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9}$$

Q14. (ii)

2R
3B

Three ball are drawn at random

$$\text{Req. prob} = P(2R \& 1B) + P(1R\ 2B)$$

$$= \frac{^2C_2 \times {}^3C_1}{^5C_3} + \frac{^2C_1 \times {}^3C_2}{^5C_3} = \frac{3+6}{10} = \frac{9}{10}$$

Q15.

5W
7R
4B

four ball drawn one by one with replacement

$$P(\text{No white}) = \frac{11}{16} \times \frac{11}{16} \times \frac{11}{16} \times \frac{11}{16} = \left(\frac{11}{16}\right)^4$$

Dt.
Pg.

16.

1W
5R
4B

Three ball are drawn one by one without replacement

Req. Prob. = P(WRR)

$$= \frac{1}{10} \times \frac{{}^5C_2}{{}^9C_2} = \frac{10}{10} \times \frac{1}{36}$$

$$= \frac{1}{36}$$

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18. (iii)

4R
7B

Two ball are drawn with replacement

P(one red one black)

$$= P(RB) + P(BR)$$

$$= \frac{4}{11} \times \frac{7}{11} + \frac{7}{11} \times \frac{4}{11}$$

$$= \frac{56}{121}$$

Q19. | 3W |
| 3R |
| 3B |

Three ball are drawn without replacement

P(atleast one Red ball) $= \frac{{}^3C_1 \times {}^6C_2 + {}^3C_2 \times {}^6C_1 + {}^3C_3}{{}^9C_3}$

$= \frac{45 + 18 + 1}{84} = \frac{64}{84_{21}} = \frac{16}{21}$

Q21. $P(G) = \frac{30}{100}$ $\quad P(\bar{G}) = \frac{70}{100}$

In three days prob. of getting green signal in two consecutive day

$= P(GG\bar{G}) + P(\bar{G}GG)$

$= \frac{30}{100} \times \frac{30}{100} \times \frac{70}{100} + \frac{70}{100} \times \frac{30}{100} \times \frac{30}{100}$

$= \frac{126}{1000}$

$= \frac{63}{500}$

Dt.

Pg.

22. (iii)

3W
7R
15B

I

10W
6R
9B

II

one ball is drawn from each bag

$P(\text{same color}) = P(WW) + P(RR) + P(BB)$

$= \frac{3}{25} \times \frac{10}{25} + \frac{7}{25} \times \frac{6}{25} + \frac{15}{25} \times \frac{9}{25}$

$= \frac{30 + 42 + 135}{625} = \frac{207}{625}$

24.

3 Boy
3 girls

members in a group = 4

Req. prob $= P(3B\ 1G) + P(3G\ 1B)$

$= \frac{{}^3C_3 \times {}^3C_1}{{}^6C_4} + \frac{{}^3C_3 \times {}^3C_1}{{}^6C_4}$

$= \frac{6}{15} = \frac{2}{5}$

Dt. _____

Pg. _____

25. four cards are drawn from pack of 52 cards

(i) P(all are same suit) $= 4 \times \frac{^{13}C_4}{^{52}C_4} = \frac{44}{4165}$

(ii) P(all are of same no.) $= \frac{13 \times {}^4C_4}{^{52}C_4} = \frac{1}{20825}$

(iii) Three cards are drawn

P(one king, one queen, one jack) $= \frac{{}^4C_1 \times {}^4C_1 \times {}^4C_1}{^{52}C_3}$

$= \frac{64}{22100} = \frac{16}{5525}$

Q26.

5W 4B	7W 9B

One ball is drawn from I bag & two from other bag

P(one w two Black) $= P[w(BB)] + P[B(WB)]$

$= \frac{5}{9} \times \frac{^9C_2}{^{16}C_2} + \frac{4}{9} \times \frac{^7C_1 \times {}^9C_1}{^{16}C_2}$

$= \frac{180}{1080} + \frac{252}{1080} \Rightarrow \frac{2}{5}$

Dt.
Pg.

Q27. Two dice are rolled

i) P(both dice have diff. no) $= \frac{6}{6} \times \frac{5}{6} = \frac{5}{6}$

ii) P(Total is atleast 4) $= 1 - P(\text{Sum is less than } 4)$

Sum is less than $4 = \{(1,1)\ (1,2)(2,1)\}$

Required prob. $= 1 - \frac{3}{12}$

$= \frac{11}{12}$

iii) P(product is odd) $= \frac{3}{6} \times \frac{3}{6} = \frac{9}{36} = \frac{1}{4}$

Q28. Three dice are rolled

(i) P(same on three dice)

$= \frac{6}{6} \times \frac{1}{6} \times \frac{1}{6}$

$= \frac{1}{36}$

Dt.
Pg.

(iii) E = Total is 5

$$= \{(1,1,3)\ (1,3,1)\ (3,1,1)\ (1,2,2)\ (2,1,2)\ (2,2,1)\}$$

$$P(E) = \frac{6}{216} = \frac{1}{36}$$

(iii) E = Total is atmost 5

$$= \{(1,1,1)\ (1,1,2)\ (1,2,1)\ (2,1,1)\ (1,1,3)\ (1,3,1)\ (3,1,1)\ (1,2,2)\ (2,1,2)\ (2,2,1)\}$$

$$P(E) = \frac{10}{216} = \frac{5}{108}$$

(iv) P(at least 5)

$$= 1 - P(\text{at most } 5) + P(5)$$

$$= 1 - \frac{5}{108} + \frac{1}{36}$$

$$= \frac{108 - 5 + 3}{108}$$

$$= \frac{106}{108}\ \frac{53}{54}$$

$$= \frac{53}{54}$$

Dt.

Pg.

Q30. Horse A

$P(A) = \frac{1}{5}$

$P(\bar{A}) = \frac{4}{5}$

Horse B

$P(B) = \frac{2}{3}$

$P(\bar{B}) = \frac{1}{3}$

(i) P(both are selected) $= P(A) \cdot P(B) = \frac{1}{5} \times \frac{2}{3} = \frac{2}{15}$

P(only one will selected) $= P(A) \cdot P(\bar{B}) + P(B) \cdot P(\bar{A})$

$= \frac{1}{5} \times \frac{1}{3} + \frac{4}{5} \times \frac{2}{3} = \frac{9}{15}$

$= \frac{3}{5}$

P(none of them will select) $= P(\bar{A}) \cdot P(\bar{B}) = \frac{4}{5} \times \frac{1}{3}$

$= \frac{4}{15}$

P(at least one of them will select) $= 1 - P(\text{none of them})$

$= 1 - \frac{4}{15} = \frac{11}{15}$

Dt. _____

Pg. _____

Q32. (iii) $P(A) = \frac{1}{2}$ $P(B) = \frac{1}{3}$

$P(\bar{A}) = 1 - \frac{1}{2}$ $P(\bar{B}) = 1 - \frac{1}{3}$

$= \frac{1}{2}$ $= \frac{2}{3}$

$P(C) = \frac{1}{4}$ $P(\bar{C}) = \frac{3}{4}$

P(only one will solve) = $P(A) \cdot P(\bar{B}) \cdot P(\bar{C}) + P(B) \cdot P(\bar{A}) \cdot P(\bar{C}) + P(C) \cdot P(\bar{A}) \cdot P(\bar{B})$

$= \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} + \frac{1}{3} \times \frac{1}{2} \times \frac{3}{4} + \frac{1}{4} \times \frac{1}{2} \times \frac{2}{3}$

$= \frac{6+3+2}{24} = \frac{11}{24}$

P(exactly two will solve) = $P(A) \cdot P(B) \cdot P(\bar{C}) + P(B) \cdot P(C) \cdot P(\bar{A}) + P(C) \cdot P(A) \cdot P(B)$

$= \frac{1}{2} \times \frac{1}{3} \times \frac{3}{4} + \frac{1}{3} \times \frac{1}{4} \times \frac{1}{2} + \frac{1}{4} \times \frac{1}{2} \times \frac{2}{3}$

$= \frac{6}{24} = \frac{1}{4}$

Dt.
Pg.

(iii) P(at least two will solve)

= P(exactly two solve) + P(All solve)

$= \frac{1}{4} + P(A) \cdot P(B) \cdot P(C) = \frac{1}{4} + \frac{1}{2} \times \frac{1}{3} \times \frac{1}{4}$

$= \frac{7}{24}$

Q34. p_1 = prob. of I component fail = 0.14
p_2 = " " II component " = 0.10
p_3 = " " III component " = 0.05

machine will work if all the three component work

P(machine will not work) = $1 - (1-p_1)(1-p_2)(1-p_3)$
$= 1 - (1-0.14)(1-0.10)(1-0.05)$
$= 1 - 0.86 \times 0.90 \times 0.95$
$= 0.2647$

Q35. P(A) = prob. A speaks truth = $\frac{60}{100}$

P(B) = prob. B speaks truth = $\frac{40}{100}$

P(contradict each other) = $P(A) \cdot P(\bar{B}) + P(B) \cdot P(\bar{A})$

Dt. _____

Pg. _____

$$= \frac{60}{100}\left(1-\frac{40}{100}\right) + \frac{40}{100}\left(1-\frac{60}{100}\right)$$

$$= \frac{3600}{10000} + \frac{1600}{10000} = \frac{52}{100} = 52\%$$

$P(\text{Agree to each other}) = P(A)\cdot P(B) + P(\bar{A})\cdot P(\bar{B})$

$$= \frac{60}{100} \times \frac{40}{100} + \frac{60}{100} \times \frac{40}{100}$$

$$= \frac{4800}{10000} = 48\%$$

Q36. Ticket = {1, 2, 3, ... 10}

Two tickets are drawn with replacement

P(one is multiple of 4 & one is multiple of 5)

$$= \frac{2}{10} \times \frac{2}{10} + \frac{2}{10} \times \frac{2}{10}$$

$$= \frac{8}{100} = \frac{2}{25}$$

without replacement then req. prob

$$= \frac{{}^2C_1 \times {}^2C_1}{{}^{10}C_2}$$

$$= \frac{4}{45}$$

Dt.
Pg.

Q38. | 3B / 5W |

four balls are drawn without replacement

Req. prob = P(WBWB) + P(BWBW)

$$= \frac{5}{8}\times\frac{3}{7}\times\frac{4}{6}\times\frac{2}{5} + \frac{3}{8}\times\frac{5}{7}\times\frac{2}{6}\times\frac{4}{5}$$

$$= \frac{240}{8\times7\times5\times6} = \frac{1}{7}$$

four balls are drawn with replacement

Req. prob. = P(WBWB) + P(BWBW)

$$= \frac{5}{8}\times\frac{3}{8}\times\frac{5}{8}\times\frac{3}{8} + \frac{3}{8}\times\frac{5}{8}\times\frac{3}{8}\times\frac{5}{8}$$

$$= \frac{450}{8\times8\times8\times8} = \frac{225}{2048}$$

Dt. _____

Pg. _____

Q39.

1 White
2 Black

one ball is drawn and keep it out if it white & put it back if it is black

(i) P(first draw is a white ball) $= \frac{2}{3}$

(ii) P(second draw is white)

$= P(B\,W) + P(W\,W)$

$= \frac{1}{3} \times \frac{2}{3} + \frac{2}{3} \times \frac{1}{2}$

$= \frac{4+6}{18} = \frac{10}{18} = \frac{5}{9}$

(iii) P(Third draw is white)

$P(BBW) + P(WBW) + P(BWW)$

$= \frac{1}{3} \times \frac{1}{3} \times \frac{2}{3} + \frac{2}{3} \times \frac{1}{2} \times \frac{1}{2} + \frac{1}{3} \times \frac{2}{3} \times \frac{1}{2}$

$= \frac{2}{27} + \frac{1}{6} + \frac{1}{9}$

$= \frac{4+9+6}{54} = \frac{19}{54}$

Dt.
Pg.

Qu. | 2B
4W
3R |

All the balls are drawn one by one by keeping aside

$$P(2B\ 4W\ 3R) = \frac{2}{9} \times \frac{1}{8} \times \frac{4}{7} \times \frac{3}{6} \times \frac{2}{5} \times \frac{1}{4} \times \frac{3}{3} \times \frac{2}{2} \times \frac{1}{1}$$

$$= \frac{1}{9 \times 4 \times 7 \times 5}$$

$$= \frac{1}{1260}$$