INTEGRATED

Class: ~~VIII~~ IX, MATHEMATICS

7. PROBABILITY

TEACHING TASK (JEE MAINS)

01. $S = \{HH, HT, TH, TT\} \rightarrow n(S) = 4$

$E = \{HT, TH\} \rightarrow n(E) = 2$

$\therefore P(E) = \frac{2}{4} = \frac{1}{2}$ Ans: B

02 $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$

$E = \{5, 6\} \rightarrow n(E) = 2$

$P(E) = \frac{2}{6} = \frac{1}{3}$ or Ans: B

03 $S = \{52 \text{ cards}\} \rightarrow n(S) = 52$

$E = \{\text{Red xing}\} \rightarrow n(E) = 2$

$\therefore P(E) = \frac{2}{52} = \frac{1}{26}$ Ans: B

04 $\frac{P(A)}{1-P(A)} = \frac{4}{3} \Rightarrow 3P(A) = 4 - 4P(A)$

$\Rightarrow P(A) = \frac{4}{7}$ Ans: A

05 $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$

$E = \{2, 3, 5\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{6} = \frac{1}{2}$ Ans: A

06 $P(A) = 0.6 = \frac{6}{10} = \frac{3}{5}$

odd in favour $= \frac{P(A)}{1-P(A)} = \frac{\frac{3}{5}}{1-\frac{3}{5}} = \frac{3}{2}$

Ans: A

07 $S = \{1, 2, 3, \ldots 99, 100\} \rightarrow n(S) = 100$. (2)

$E = \{5, 10, 15, \ldots 100\} \rightarrow n(E) = 20$

$\therefore P(E) = \frac{20}{100} = \frac{1}{5}$ Ans: C

08 $P(A) = \frac{3}{8}$

odds in favour of $= \frac{P(A)}{1-P(A)} = \frac{\left(\frac{3}{8}\right)}{1-\frac{3}{8}} = \frac{3}{5}$

Ans: A

09 $S = \{1, 2, 3 \ldots$ 52 cards $52\} = P(S) = 52$

$E = \{$neither an King nor a queen$\} = 44$

$P(E) = \frac{44}{52} = \frac{11}{13}$ Ans. A

10 $P(\bar{E}) \geq 0.7$ $\Rightarrow 1 - 0.7 > P(E)$

$1 - P(E) > 0.7$ $\Rightarrow P(E) < 0.3$ Ans: A

11. A) Conceptual ✓

B) Conceptual ✓

C) Conceptual ✓

Ans: A, B, C

12 d)

No. of yellow sectors = 4

" blue " = 5

" Red " = 3

Total = 12

A) $P(\text{Yellow}) = \frac{4}{12} = \frac{1}{3}$ ✓

B) $P(\text{Red}) = \frac{3}{12} = \frac{1}{4}$ ✓

C) $P(\text{Blue}) = \frac{5}{12}$ ✓

Ans: A, B, C

13. Statement I:

We have $p(1)+p(2)+p(3)+p(4)=1$

$\Rightarrow x+2x+3x+4x=1$

$\Rightarrow x=\frac{1}{10}$ (True)

Statement II: Conceptual (True)

Ans. A

14. Statement I:

$S=\{HH, HT, TH, TT\} \rightarrow n(S)=4$

$E=\{HT, TH, TT\} \rightarrow n(E)=3$

$\therefore p(E)=\frac{3}{4}$ (True)

Statement II: Conceptual (True)

Ans. A

15 Assertion: $S=\{H, T\} \rightarrow n(S)=2$

$E=\{H\} \rightarrow n(E)=1$

$\therefore p(E)=\frac{1}{2}$ (True)

Reason: Conceptual (True)

Ans. A

16 Assertion: $S=\{HH, HT, TH, TT\} \rightarrow n(S)=4$

$E=\{HH, HT, TH\} \rightarrow n(E)=3$

$\therefore p(E)=\frac{3}{4}$ (True)

Reason: Conceptual (True)

Ans: A

17. $p(\text{size } 39)=\frac{39}{200}$

Ans: B

18 $p(\text{Size less than } 40)=15+25+39=79$

$\therefore p(<40)=\frac{79}{200}$

Ans: D

19. $S = \{HH, HT, TH, TT\} \rightarrow n(S) = 4$ (4)

$E = \{HT, TH, TT\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{4}$ Ans: C

20. $P(\bar{E}) = 1 - P(E) = 1 - \frac{3}{4} = \frac{1}{4}$

$E \rightarrow$ getting atleast one tail

$\bar{E} \rightarrow$ getting no tail Ans: B

21 No. of favourable outcomes for red balls = 6

Ans: 6

22 PROBABILITY

$P(\text{vowel}) = \frac{4}{11} = \frac{x}{y}$

$\therefore xy = 4 \times 11 = 44$ Ans: 44

23 a) $P(\text{King}) = \frac{4}{52} = \frac{1}{13}$

$\therefore$ odds infavour of King $= \frac{P(\text{King})}{1 - P(\text{King})} = \frac{\frac{1}{13}}{1 - \frac{1}{13}}$

$= \frac{1}{12}$ (P)

b) $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$

$E = \{3\} \rightarrow n(E) = 1$

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

$\therefore$ odds in favour of $= \frac{P(E)}{1 - P(E)} = \frac{\frac{1}{6}}{1 - \frac{1}{6}} = \frac{1}{5}$ (Q)

c) $P(R) = \frac{3}{10}$

odds in favour $= \frac{\frac{3}{10}}{1 - \frac{3}{10}} = \frac{3}{7}$ (R)

D) $P(H) = \frac{2}{4} = \frac{1}{2}$ $\therefore P(\text{odd infa}) = \frac{\frac{1}{2}}{1 - \frac{1}{2}} = 1:1$

24 a) $P(\text{King}) = \frac{4}{52} = \frac{1}{13}$ (q) (5)

b) $P(\text{Red Card}) = \frac{26}{52} = \frac{1}{2}$ (p)

c) $S = \{S, T, A, T, I, S, T, I, C, S\} \rightarrow n(S) = 10$

$E = \{A, I, I\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{10}$ (r)

d) $P(E) = \frac{1}{10}$ (s)

Ans: ~~p,q~~
Ans: q, p, r, s

LEARNERS TASK (CUUIS)

01.	Conceptual	Ans: C
02	Conceptual	Ans: C
03	$P(\text{Red ball}) = \frac{3}{8}$	Ans: A
04	Conceptual	Ans: A
05	Conceptual	Ans D
06	Conceptual	Ans: B
07	2^3	Ans: B
08	Conceptual	Ans: A
09	Conceptual	Ans: B
10.	Conceptual	Ans: D

JEE MAINS LEVEL

01	$P(T) = \frac{1}{2}$	Ans: B
02		

02 $S = \{1, 2, 3, \ldots 20\} \rightarrow n(S) = 20$

$E = \{4, 8, 12, \ldots 20\} \rightarrow n(E) = 5$

$\therefore P(E) = \frac{5}{20} = \frac{1}{4}$ Ans: A

03 $P(\text{Red ball}) = \frac{3}{8}$ Ans: A

04 $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$

$E = \{1, 4, 6\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{6} = \frac{1}{2}$ Ans: B

05 Conceptual Ans: A

06 $S = \{BB, BG, GB, GG\}$ B → Boy, G → Girl

One of the child is Boy, now we have to eliminate GG.

Now, one new sample space is

$S = \{BB, BG, GB\} \rightarrow n(S) = 3$

$E = \{BB\} \rightarrow n(E) = 1$

$\therefore P(E) = \frac{1}{3}$ Ans: B

07 $P(\text{not } E) = 1 - P(E) = 1 - 0.4 = 0.6$ Ans A

08 $P(\text{Red card}) = \frac{26}{52} = \frac{1}{2}$ Ans B

09. $\frac{P(A)}{1 - P(A)} = \frac{1}{4} \Rightarrow 4P(A) = 1 - P(A)$

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

$\therefore P(\text{not happening of } A) = 1 - P(A) = 1 - \frac{1}{5}$

$= \frac{4}{5}$ Ans A

10. $S = \{S, T, A, T, I, S, T, I, C, S\} \rightarrow n(S) = 10$

$E = \{S, S, S\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{10}$

Ans: A

11. A) $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$

$E = \{2, 4, 6\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{6} = \frac{1}{2}$ ✓

B) $E = \{5, 6\} \rightarrow n(E) = 2$

$P(E) = \frac{2}{6} = \frac{1}{3}$ ✓

C) $P(3) = \frac{1}{6}$

$\therefore$ odds infavour of $= \frac{P(3)}{1 - P(3)} = \frac{\frac{1}{6}}{1 - \frac{1}{6}} = \frac{1}{5}$ ✓

D) $E = \{2, 3, 5\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{6} = \frac{1}{2}$ ✓

Ans: A, B, C, D

12. $P(\text{No rain}) = 1 - P(\text{rain})$

$= 1 - 0.75 = 0.25 = \frac{25}{100} = \frac{1}{4}$

Ans: B, C

13. S.I $P(\text{Bad eggs}) = 0.028$

$\Rightarrow \frac{\text{Bad eggs}}{500} = 0.028$

$\Rightarrow$ Bad eggs $= 0.028 \times 500 = 14$

$\therefore$ Good eggs $= 500 - 14 = 486$ (True)

Ans: C

14. Statement I: $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$ (8)

$E = \{5, 6\} \rightarrow n(E) = 2$

$\therefore P(E) = \frac{2}{6} = \frac{1}{3}$ (True)

Statement II:

Odds against $= \frac{1 - P(E)}{P(E)} = \frac{1 - \frac{1}{3}}{\frac{1}{3}} = \frac{2}{1} = 2:1$

(True)

Ans. A

15 Assertion: $S = \{HH, HT, TH, TT\} \rightarrow n(S) = 4$

$E = \{TT\} \rightarrow n(E) = 1$

$\therefore P(E) = \frac{1}{4}$ (True)

Reason: Conceptual (True)

Ans. A

16 Assertion: $P(\text{Red card}) = \frac{26}{52} = \frac{1}{2}$ (True)

Reason: Conceptual (True)

Ans. A

17. $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$

$E = \{2, 4, 6\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{6} = \frac{1}{2}$

Ans. B

18 $S = \{1, 2, 3, 4, 5, 6\} \rightarrow n(S) = 6$

$F = \{5, 6\} \rightarrow n(F) = 2$

$P(F) = \frac{2}{6} = \frac{1}{3}$

Odds against $F = \frac{1 - P(F)}{P(F)} = \frac{1 - \frac{1}{3}}{\frac{1}{3}} = \frac{2}{3}$

19. $S = \{51, 52, \ldots 100\} \rightarrow n(S) = 50$

$E = \{$ Not prime numbers $\}$

$\bar{E} = \{$ prime numbers $\} = \{53, 59, 61, 67, 71, 73, 79, 83, 89, 97\} \rightarrow n(E) = 10$

$\therefore P(\bar{E}) = \frac{10}{50} = \frac{1}{5}$

Ans. D

$\therefore P(E) = 1 - \frac{1}{5} = \frac{4}{5}$

20 $S = \{M, O, B, I, L, E\} \rightarrow n(S) = 6$

$E = \{O, I, E\} \rightarrow n(E) = 3$

$\therefore P(E) = \frac{3}{6} = \frac{1}{2}$

Ans. D

21. Total No. of tosses = 1000

No. of Heads = 625

$\therefore$ No. of Tails = $1000 - 625 = 375$

$\therefore P(\text{Tail}) = \frac{375}{1000} = \frac{3}{8} = \frac{a}{b}$

$\Rightarrow a + b = 3 + 8 = 11$

Ans: 11

22 $S = \{HH, HT, TH, TT\}$

$E = \{$ at least one Head $\}$

$E = \{HH, HT, TH\}$

$\therefore n(E) = 3$

Ans. 3

(10)

23 a) $S = \{M, A, T, H, E, M, A, T, I, C, S\}$, $n(S) = 11$

$E = \{A, E, A, I\}$, $n(E) = 4$

$\therefore P(E) = \frac{4}{11}$ (p)

b) $P(E) = \frac{3}{9} = \frac{1}{3}$ (q) $E = \{3, 6, 9\}$

c) $P(E) = \frac{2}{4} = \frac{1}{2}$ (r)

D) Impossible Event $\Rightarrow$ $P(I) = 0$ (s)

Ans: p, q, r, s

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24 a) Conceptual (p)

b) Conceptual (q)

c) Conceptual (r)

d) Conceptual (s)

Ans: p, q, r, s

$\Rightarrow$ THE END $\in$