PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 25 : Probability

STEP-BY-STEP SOLUTIONS & MARKING SCHEME · Maximum Marks: 40

Results used

P(E) = (number of favourable outcomes) ÷ (total number of outcomes). $0 \le P(E) \le 1$; $P(E) + P(\text{not } E) = 1$.

Three coins: 8 outcomes. Two dice: 36 outcomes. Pack of cards: 52 cards (26 red, 26 black, 12 face cards, 13 of each suit).

Area of a circle = πr^2, area of a rectangle = length × width, area of a square = side^2.

SECTION A (20 Marks)

Question 1 [8 × 1 = 8]

Part	Ans.	Working
(i)	**(b)**	Red kings: 2 (hearts and diamonds), so P = 2/52 = 1/26.
(ii)	**(c)**	P(not E) = 1 − 0.37 = 0.63.
(iii)	**(a)**	Sum 8: (2,6), (3,5), (4,4), (5,3), (6,2) = 5 outcomes, so P = 5/36.
(iv)	**(d)**	A probability cannot exceed 1; 1.2 > 1.
(v)	**(c)**	HHT, HTH, THH = 3 favourable out of 8, so P = 3/8.
(vi)	**(b)**	4/(4 + b) = 1/3 ⇒ 4 + b = 12 ⇒ b = 8.
(vii)	**(c)**	Both true: every face shows a number less than 7 (a certain event), so (R) explains (A).
(viii)	**(b)**	(A) is false: P(not E) = 1 − 0.35 = 0.65. (R) is true.

Question 2 [4 + 4 + 4 = 12]

(i)

Outcomes: HHH, HHT, HTH, HTT, THH, THT, TTH, TTT; total = 8 [1]

(a) Exactly two heads: HHT, HTH, THH = 3 ⇒ P = **3/8** [1]

(b) At least one tail = all outcomes except HHH = 7 [1]

P = **7/8** [1]

(ii)

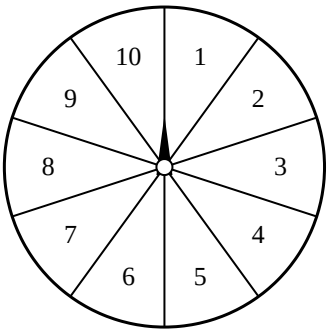
Total outcomes = 52 [1]

(a) Kings = 4, hearts = 13, king of hearts counted twice: 4 + 13 − 1 = 16 ⇒ P = 16/52 = **4/13** [1]

(b) Cards that are not face cards = 52 − 12 = 40, of which spades = 13 − 3 = 10 [1]

Required cards = 40 − 10 = 30 ⇒ P = 30/52 = **15/26** [1]

(iii)



Total outcomes = 10 [1]

(a) Multiples of 3: 3, 6, 9 ⇒ 3 favourable; P = **3/10** [1]

(b) Primes: 2, 3, 5, 7 ⇒ 4 favourable [1]

P = 4/10 = **2/5** [1]

SECTION B (20 Marks) — any two questions

Question 3 [3 + 3 + 4 = 10]

	1	**2**	**3**	**4**	**5**	**6**
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

(i)

Total outcomes = 36. Sum 4 occurs 3 times, sum 8 occurs 5 times, sum 12 once (shaded) [1]

Favourable = 3 + 5 + 1 = 9 [1]

P = 9/36 = **1/4** [1]

(ii)

Prime sums: 2 (1 way), 3 (2), 5 (4), 7 (6), 11 (2) [1]

Favourable = 1 + 2 + 4 + 6 + 2 = 15 [1]

P = 15/36 = **5/12** [1]

(iii)

(a) Sum > 9: sum 10 (3 ways), 11 (2), 12 (1) = 6 [1]

P = 6/36 = **1/6** [1]

(b) Sum < 5: sums 2, 3, 4 = 1 + 2 + 3 = 6; sum > 10: 2 + 1 = 3; total = 9 [1]

P = 9/36 = **1/4** [1]

Question 4 [3 + 3 + 4 = 10]

CALENDAR

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

(i)

Total dates = 31 [1]

Fridays (shaded column): 3, 10, 17, 24, 31 = 5 [1]

P = **5/31** [1]

(ii)

Saturdays: 4, 11, 18, 25 = 4; Sundays: 5, 12, 19, 26 = 4 [2]

P = 8/31 [1]

(iii)

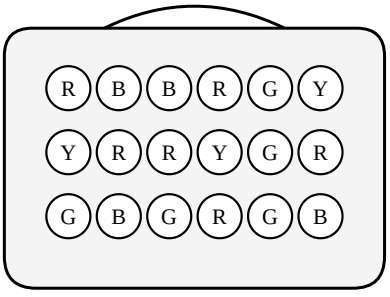
(a) Prime dates: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31 = 11 [1]

P = **11/31** [1]

(b) Mondays: 6, 13, 20, 27; multiples of 3 among them: 6, 27 [1]

P = **2/31** [1]

Question 5 [3 + 3 + 4 = 10]



(i)

Counting from the figure: R = 6, B = 4, G = 5, Y = 3 [1]

Total balls = 6 + 4 + 5 + 3 = 18 [1]

P(blue) = 4/18 = **2/9** [1]

(ii)

Neither red nor blue = green or yellow = 5 + 3 = 8 [2]

P = 8/18 = **4/9** [1]

(iii)

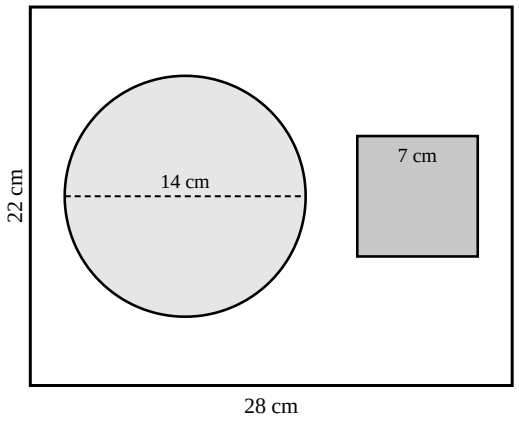
Let y yellow balls be added. Yellow = 3 + y, total = 18 + y [1]

(3 + y)/(18 + y) = 1/4 ⇒ 12 + 4y = 18 + y [1]

$3y = 6 \Rightarrow \mathbf{y = 2}$ [1]

Check: $5/20 = 1/4$ ✓ [1]

Question 6 [3 + 3 + 4 = 10]



(i)

Area of board = $28 \times 22 = 616$ cm² [1]

Area of circle = $\pi r^2 = (22/7) \times 7 \times 7 = 154$ cm² [1]

P = 154/616 = **1/4** [1]

(ii)

Area of square = $7 \times 7 = 49$ cm² [1]

P = 49/616 [1]

= **7/88** [1]

(iii)

(a) The circle and the square do not overlap: area = 154 + 49 = 203 cm² [1]

P = 203/616 = **29/88** [1]

(b) P(outside both) = 1 − 29/88 [1]

= **59/88** (check: 413/616 = 59/88 ✓) [1]

— End of Solutions —