CHAPTER – 6

GAMES AND TOURNAMENTS

Worked out Examples:

These questions are based on the information given below.

64 players are scheduled to take part in a tennis tournament. The players are seeded from 1 to 64 with seed 1 being the top seed and seed 64 being the last seeded player. The tournament takes place in a knockout format with different rounds. In each round the winner of a match between two players advances to the next round while the loser is eliminated. This process is repeated till the finals. In the first round player seeded 1 plays the player seeded 64, the player seeded 2 plays the player seeded 63 and so on. An upset is said to happen if a lower seeded player beats a higher seeded player. The matches are scheduled such that, in case of no upsets, in each round, the highest seeded player plays the lowest seeded player left in the tournament, the second highest seeded player plays the second lowest seeded player left and so on.

6.01: What is the total number of rounds in the tournament?
(A) 5 (B) 6 (C) 7 (D) 8

Sol: As there are a total of 64 players, in the first round 32 players would be eliminated and 32 players would be left. In the next round half of 32, i.e., 16 players would be eliminated. In this way after 6 rounds there will be only one player left who is the winner of the tournament.

Note: Number of rounds is a factor of the power of 2. For 2 players, the number of rounds required is 1 as $2^1 = 2$, for 3 or 4 players the number of rounds required is 2 as $2^2 = 4$, for 5, 6, 7 or 8 players the number of rounds is 3 as $2^3 = 8$ and so on. Choice (B)

6.02: How many matches are played in the tournament?
(A) 52 (B) 60 (C) 63 (D) 64

Sol: As the tournament stated with 64 players and in the end only one player was undefeated, a total of 63 matches are played as one player is eliminated per match. Choice (C)

6.03: Which player faced the player seeded 3 in the quarter finals (round of 8) if the tournament had no upsets?
(A) 6 (B) 9 (C) 11 (D) 5

Sol: In any round, in case of no upsets, the sum of the seedings of the players is one more than the number of players left in the tournament.

As the match happens in the quarterfinals, the number of players left = 8.

$\therefore$ Sum of seedings of players = 8 + 1 = 9.
Since 9 – 3 = 6, player seeded 3 faced the player seeded 6 in the quarterfinals.
Choice (A)

6.04: If the tournament had no upsets, in which round was the player seeded 15 eliminated?
(A) 6 (B) 5 (C) 4 (D) 3

Sol: In case of no upsets, the player seeded 15 would be in the pre-quarterfinals (round of 16). In the next round as 8 players are left he will be eliminated.
$\therefore$ The player seeded 15 was eliminated in the 3rd round. Choice (D)

6.05: How many matches did the player who lost in the semi-finals, win in the tournament?
(A) 2 (B) 3 (C) 4 (D) 5

Sol: As the player reached the semi-finals, he was among the last 4 players.
$\therefore$ he won four matches and reached the fifth round. Choice (C)

Exercise – 6(a)

Directions for questions 1 to 5: These questions are based on the information given below.

128 players take part in a chess tournament. The players are ranked from 1 to 128, based on their FIDE ratings, such that rank 1 was given to the highest rated player, rank 2 to the next and so on till rank 128 to the lowest rated player. The tournament follows a knockout format in every round, with the winner advancing to the next round and the loser getting eliminated from the tournament till only a single player is left. There are no draws in the tournament. From the first round till the final round, in every round, among the players who are still in the tournament, the highest ranked player plays the lowest ranked player, the second highest ranked player plays the second lowest ranked player and so on. An upset is said to happen when a higher ranked player loses to a lower ranked player.

1. After which round do a prime number of players advance to the next round?
(A) 2nd (B) 5th (C) 6th (D) 7th

2. How many matches were played in the tournament?
(A) 127 (B) 128 (C) 125 (D) 126

3. If there were no upsets in the tournament till the end of the 4th round, then which of these players could possibly play in the 6th round?
(i) 10th ranked player (ii) 7th ranked player
(iii) 9th ranked players (iv) 8th ranked player
(A) (ii), (iii), (iv) (B) (ii), (iv)
(C) (i), (iii), (iv) (D) (iii), (iv)

4. If there were no upsets in the tournament, then what was the rank of the player who defeated the 65th ranked player?
(A) 1 (B) 63 (C) 64 (D) 127

5. At most how many matches did a player who lost to the 8th ranked player win, if no upsets were recorded in the tournament?
(A) 1 (B) 2 (C) 3 (D) 4

Directions for questions 6 to 10: These questions are based on the information given below.

The following table gives the statistics of all the bowlers in a cricket match between India and New Zealand.

India	O	M	R	W
Sharmi	10	3	61	1
Kumar	8	0	48	1
Aaron	10	0	60	2
Ashwin	6	0	37	0
Jadeja	9	0	54	0
Kohil	7	0	36	1

New Zealand	O	M	R	W
Millis	10	1	35	2
Mc lead	10	0	45	0
Henry	10	1	38	4
Nishaan	6	0	45	1
Macaulay	10	1	33	1
Williams	4	0	19	2

O – Overs bowled, M – Maidan overs (over in which no runs are conceded),
R – Runs conceded, W – Wickets taken

6. Which bowler bowled the least number of balls per wicket taken?
(A) Aaron (B) Millis (C) Henry (D) Williams

7. Which bowler conceded the least number runs per balls bowled?
(A) Kohil (B) Millis
(C) Macaulay (D) Williams

8. If there are 11 batsmen in a team and the only runs that India scored are that conceded by the New Zealand bowlers, then how many runs did India score per batsman?
(A) 21.54 (B) 19.54
(C) 23.88 (D) 25.37

9. If economy rate is calculated as number of runs conceded per over, then what is the highest number of bowlers having the same economy rate in the match?
(A) 3 (B) 2
(C) 4 (D) Cannot be determined

10. If the economy rate (runs conceded per over) of the entire match is calculated, how many bowlers from either side, had a better economy rate than the overall economy rate?
(A) 4 (B) 5
(C) 6 (D) Cannot be determined

Directions for questions 11 to 15: These questions are based on the information given below.

Kapil and Sachin were playing a game which involved picking up coins from a table. Each player in his turn was to pick a minimum of two and a maximum of six coins, except when there is only one coin left in which case, he has to pick up that coin. The game continues till all the coins are removed from the table. Assume that both players play intelligently so as to win the game.

For questions 11 – 13, assume that the player who picks the last coin loses the game.

11. If the game starts with 60 coins and it is Kapil's turn to pick first, then how many coins should he pick up so as to ensure his win?
(A) 2 (B) 3
(C) 4 (D) either 2 or 3

12. Which of the following can be the number of coins on the table, before Kapil's turn to play, if it is known that Sachin would win the game, no matter how many coins Kapil picks?
(A) 64 (B) 54
(C) 97 (D) None of these

13. If the number of coins to be picked up in Sachin's turn so as to win the game no matter what Kapil picks is 5, then which of the following could be the number of coins on the table?
(A) 38 (B) 50
(C) 77 (D) None of these

For questions 14 and 15 assume that the player who picks up the last coin wins the game.

14. How many coins should Kapil pick up to ensure his win, if there are 900 coins on the table before his turn to play?
(A) 4 (B) 5
(C) 6 (D) either 4 or 5

15. If the number of coins Sachin picked up in his turn, to ensure his victory was 2, then, which of the following could have been the number of coins on the table before his turn?
(A) 49
(B) 67
(C) 101
(D) More than one of the above

Directions for questions 16 to 20: These questions are based on the information given below.

Eight teams A, B, C, D from Pool I and E, F, G, H from Pool II play in the world cup tournament. In each pool, every team plays with the remaining teams in that pool exactly once. The team which wins a game gets 5 points and the team which loses any game loses 5 points. No game ended in a draw. At the end of all the pool matches, the maximum difference between the points scored by any two teams in pool I is 30 and in pool II is 10. The teams which stand in the first two positions in each pool enter into the semi-finals. In the semifinals, a team in pool I plays with a team in pool II and the other team in pool I plays with the remaining team in pool II. The points are awarded as in the pool stage, with the teams carrying forward their points from the pool stage. After the semifinals, the maximum difference between the points scored by any two teams is 20 and the two teams which stand in the first two positions played the final and they were not from the same pool. The team from pool I won the tournament.

16. If A lost only one match and C won against only B in the pool stage, then which of the following teams would have won the tournament?
(A) A (B) B (C) C (D) D

Directions for questions 17 to 20: Type in your answer in the input box provided below the question.

17. If A lost only against D in the pool stage, then what is the total number of points scored by A in the tournament?

18. If E won three matches in the tournament and G lost against only E in the pool stage, then what is the number of points scored by E in the tournament?

19. What is the number of points scored by the team which won the tournament including the points scored in the finals?

20. What is the total number of matches won by the team which won the tournament?

Exercise – 6(b)

Directions for questions 1 to 5: These questions are based on the information given below.

Teams from six countries participated in the Ice Hockey world championship. Every team plays every other team once. A team is awarded 3 points for a win, no points for a loss and 1 point for a draw. Teams are ranked on the basis of their total points and in the case of a tie, the result of the match between the teams that tied is used to determine their rank. Both Russia and Czech Republic scored 7 points each, while the match they played didn't end in a draw. Sweden topped the tournament with 15 points. It is also known that Finland defeated Czech Republic when the two played, and that Canada got 4 points overall where as the United States lost all the matches.

1. Which team was ranked fourth in the tournament?
(A) Finland
(B) Russia
(C) Canada
(D) Czech Republic

Directions for questions 2 to 5: Type in your answer in the input box provided below the question.

2. How many points did Finland score overall?

3. What were the total points scored by all the teams together?

4. How many matches definitely ended in a draw?

5. The teams, which had the same number of points, defeated how many teams in common?

Directions for questions 6 to 10: These questions are based on the information given below.

ICC's top – 8 test Cricket teams played in ICC Test Champions Tournament. Each team plays a match against every other team and the teams are awarded 2 points for a win, 1 point for a draw and no points for a loss. In the end, the team with the highest total points is declared the winner, the next one second and so on. In case two or more teams are tied for a position, the outcomes of the matches played by them earlier serve as the tie-breaker, with the winner being ranked higher. The table given below gives partial information about the points scored in the matches played in the tournament.

ICC Ranks		South Africa	India	Australia	England	Pakistan	Sri Lanka	West Indies	New Zealand	Total
1	South Africa		2		2		2	2	1	
2	India			2	2		2	0		
3	Australia	1				2	2	1	2	
4	England			1		2		1	2	
5	Pakistan	0	1		0		2	1		
6	Sri Lanka				2			2		
7	West Indies	0		1	1	1				
8	New Zealand	1		0			2			

It is also known that:
(i) The number of matches won by West Indies is not less than those won by New Zealand.
(ii) The match between India and New Zealand did not end in India's favour.
(iii) New Zealand had the same number of points as exactly one other team and India was not ranked third in the final ranking.

6. How many matches ended in a draw?
(A) 8
(B) 7
(C) 6
(D) Cannot be determined

7. As upset is said to happen every time a team lower in the ICC rankings, beats a higher ranked team. How many upsets happened in the tournament?
(A) 3 (B) 4 (C) 2 (D) zero

8. Which team has the second lowest total points at the end of the tournament?
(A) New Zealand (B) India
(C) Pakistan (D) Sri Lanka

9. How many teams retained the same rank in the ICC Test rankings as well as the final tournament rankings?
(A) None
(B) One
(C) Two
(D) Cannot be determined

10. Which of the following statements can be true?
(i) The India – New Zealand match ended in a draw.
(ii) The Pakistan – New Zealand match ended in a draw.
(iii) Australia won two matches more than Pakistan.
(iv) West Indies drew four matches.
(A) (i), (ii), (iv)
(B) (ii), (iii), (iv)
(C) (iii), (iv)
(D) (ii), (iii)

Directions for questions 11 to 15: These questions are based on the information given below.

The 32 players who took part in the world match play golf tournament were seeded from 1 to 32. The tournament was to be played in a knock out format in five rounds – first round, second round, quarter-finals, semi-finals and the finals. The matches were scheduled such that in any round, in case of no *upset*, i.e., a lower seeded player beating a higher seeded player, the highest seeded player would play the lowest seeded player left, the second highest seeded player would play the second lowest seeded player left and so on. In case of an upset, the player who caused the upset would take the designated place of the player whom he had upset, without any change in the seedings.

11. The lowest seeded player who can win the tournament without himself causing an upset is
(A) 32 (B) 26 (C) 24 (D) 16

12. If it was known that the player seeded 9 won the tournament, which of the following seeded players could have reached the finals?
(A) seed 8 (B) seed 4
(C) seed 3 (D) seed 1

13. What was the minimum number of upsets in the tournament if it was known that the player seeded 25 reached the finals?
(A) 2 (B) 3
(C) 4 (D) 5

14. If it was known that the winner of the tournament had caused only a single upset, his seeding was at most
(A) 32 (B) 16
(C) 24 (D) 17

15. Had there been only one upset in the tournament, then what is the earliest stage at which seed 2 could have been eliminated?
(A) Finals (B) Semi-finals
(C) 2nd round (D) 1st round

Directions for questions 16 to 20: These questions are based on the information given below.

Six teams – Brazil, Argentina, Germany, France, Italy and Portugal – participated in the 'Super Six', Football Tournament held in Brazil. The tournament comprised five rounds, such that every team played exactly one match in every round and by the end of the five rounds, every team played exactly one match with every other team. For every win, a team got 5 points. If the team won by a margin of 2 or more goals, it got another bonus point. For a draw, the team got 2 points and for a loss, it did not get any points. However, if a team lost by a margin of 2 or more goals, a point was deducted.

The following table gives the tally of the goals scored, goals conceded and the points earned by the teams after the first two rounds of the tournament.

Team	Goals Scored	Goals Conceded	Total Points earned
Brazil	3	4	5
Argentina	6	2	11
Germany	3	5	0
France	2	3	2
Italy	2	1	7
Portugal	4	5	4

It is also known that the hosts, Brazil, lost their first round match. However, they scored at least one goal in every match that they played.

16. Which of the following statements is/are true of the two matches played by Brazil?
I. It won a match and lost a match without gaining or conceding bonus points in either match.
II. It won a match by gaining a bonus point and lost a match by conceding a bonus point.
III. It lost its first round match to Argentina by 1 goal to 4 goals.

(A) Only I and III (B) Only I
(C) Only II and III (D) Only III

17. Which of the following statements is/are true?
I. Portugal lost its second round match to Brazil by conceding a bonus point.
II. Portugal, in its first round match, played against neither France nor Italy but scored 4 goals.
III. Argentina played against France in its second round match.

(A) Only II
(B) Only II and III
(C) Only I and II
(D) All the three statements

18. What is the number of goals scored by France in its first round match?
(A) 0 (B) 1 (C) 2 (D) 0 or 1

19. By the end of the first round, which of the following teams is in the last position in terms of the points scored?
(A) Germany (B) France
(C) Portugal (D) Brazil

20. If Goal difference = goals scored – goals conceded, then what was the goal difference for Argentina in it's match with Brazil.
(A) 1 (B) 2 (C) 3 (D) 4

Key

Exercise – 6(a)

1. C	5. C	9. A	13. A	17. 0
2. A	6. D	10. B	14. D	18. 5
3. B	7. C	11. D	15. A	19. 25
4. C	8. B	12. C	16. D	20. 5

Exercise – 6(b)

1. B	5. 1	9. B	13. C	17. D
2. 10	6. A	10. D	14. C	18. B
3. 43	7. B	11. D	15. D	19. D
4. 2	8. C	12. C	16. C	20. C