Determine the quota, the number of players, and the weights of the players.

1) \([51 : 20, 20, 20, 10, 10]\)

The weights represent, in order, players \(P_1, P_2, P_3\), and so on. Identify the dictator if there is one, and identify those voters with veto power if there are any.

2) \([15 : 1, 2, 3, 4, 5]\)

The weights represent, in order, players \(P_1, P_2, P_3\), and so on. Write out all of the winning coalitions.

3) \([16 : 1, 5, 7, 9]\)

The weights represent, in order, players \(P_1, P_2, P_3\), and so on. Determine which players are critical in the indicated coalition.

4) \([16 : 1, 5, 7, 9]; \text{coalition } \{P_1, P_3, P_4\}\)

5) \([16 : 1, 5, 7, 9]\)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

6) The total number of votes in the weighted voting system \([20 : 7, 5, 4, 4, 2, 2, 1, 1]\) is

7) In the weighted voting system \([14 : 7, 7, 6]\),
   A) all three players have equal power.
   B) \(P_1\) and \(P_2\) have equal power, \(P_3\) is a dummy.
   C) \(P_1\) has all the power, \(P_2\) and \(P_3\) are dummies.
   D) \(P_1\) and \(P_2\) have equal power, \(P_3\) is not a dummy.

8) In the weighted voting system \([q : 10, 8, 4]\), a strict majority of the votes is needed to pass a motion. The value of the quota \(q\) is

9) In the weighted voting system \([q : 12, 10, 5, 1]\), the smallest possible value that the quota \(q\) can take is

10) In the weighted voting system \([q : 12, 10, 5, 1]\), the largest possible value that the quota \(q\) can take is

11) In the weighted voting system \([21 : 10, 8, 5, 3, 2]\), the total number of possible coalitions is

Refer to the weighted voting system \([35 : 32, 15, 10, 3]\). (The four players are \(P_1, P_2, P_3, \) and \(P_4\).)

12) The weight of the coalition \(\{P_2, P_3, P_4\}\) is
13) The winning coalitions are:
   A) all coalitions with two or more players, one of which is P1.
   B) all coalitions.
   C) all coalitions with two or more players.
   D) all coalitions with three or more players.

14) The number of winning coalitions is

15) Which players in the coalition \{P_1, P_3\} are critical?
   A) P_1 and P_3 B) P_1 only C) None of them D) P_3 only

16) Which players in the coalition \{P_1, P_3, P_4\} are critical?
   A) P_1 only B) All three players C) P_1 and P_3 only D) None of them

17) The Banzhaf power distribution of the weighted voting system is
   A) P_1: 60%; P_2: 20%; P_3: 10%; P_4: 10%. B) P_1: 75%; P_2: 8\frac{1}{3}%; P_3: 8\frac{1}{3}%; P_4: 8\frac{1}{3}%. C) P_1: 70%; P_2: 10%; P_3: 10%; P_4: 10%. D) P_1: 40%; P_2: 20%; P_3: 20%; P_4: 20%.

A committee consists of six members (A, B, C, D, E, and F). A has veto power; B, C, D, and E each have one vote. F is a nonvoting member. For a motion to pass it must have the support of A plus at least two additional voting members.

18) Which of the following is not a winning coalition?
   A) \{B, C, D, E\} B) \{A, C, D, E\} C) \{A, B, E\} D) \{A, B, C, D\}

19) Which are the critical players in the coalition \{A, B, D\}?
   A) A only B) D only C) A, B, and D D) B only

20) A weighted system that could represent this situation is
   A) [5 : 3, 1, 1, 1, 0]. B) [4 : 2, 1, 1, 1, 0]. C) [6 : 3, 1, 1, 1, 0]. D) [6 : 5, 1, 1, 1, 0].

21) The Banzhaf power index of player A is
   A) \frac{11}{23} B) \frac{1}{3} C) \frac{5}{11} D) \frac{7}{11}
Answer Key
Testname: CH 2 REVIEW

1) Quota: 51, number of players: 5, weights: 20, 20, 20, 10, and 10
2) No dictator; P5 and P6 have veto power.
3) {P1, P2, P3, P4}, {P1, P3, P4}, {P2, P3, P4}, {P3, P4}
4) Only P3 and P4 are critical.
5) P1 and P2 have an index of 0. P3 and P4 have an index of \( \frac{1}{2} \).
6) D
7) B
8) A
9) D
10) D
11) B
12) A
13) A
14) D
15) A
16) A
17) C
18) A
19) C
20) A
21) A