**Practical Law**

**“Cerebral Exercise”**

**Mr. Fernandez**

**A company employee generates a series of five-digit product codes according to the following rules:**

* **The codes use the digits 0, 1, 2, 3, and 4, and no others.**
* **Each digit occurs exactly once in any code.**
* **The second digit has a value exactly twice that of the first digit.**
* **The value of the third digit is less than the value of the fifth digit.**
1. If the third digit of an acceptable code is not 0, which one of the following must be true?

(A) The second digit of the product code is 2.

(B) The third digit of the product code is 3.

(C) The fourth digit of the product code is 0.

(D) The fifth digit of the product code is 3.

(E) The fifth digit of the product code is 1.

2. Which one of the following must be true about any acceptable product code?

(A) There is exactly one digit between the digit 0 and the digit 1.

(B) There is exactly one digit between the digit 1 and the digit 2.

(C) There are at most two digits between the digit 1 and the digit 3.

(D) There are at most two digits between the digit 2 and the digit 3.

(E) There are at most two digits between the digit 2 and the digit 4.

3. Which one of the following must be true about any acceptable product code?

(A) The digit 1 appears in some position before the digit 2.

(B) The digit 1 appears in some position before the digit 3.

(C) The digit 2 appears in some position before the digit 3.

(D) The digit 3 appears in some position before the digit 0.

(E) All of the above are false.

**Exactly three films—Greed, Harvest, and Limelight—are shown during a film club’s festival held on Thursday, Friday, and Saturday. Each film is shown at least once during the festival but never more than once on a given day. On each day at least one film is shown. Films are shown one at a time. The following conditions apply:**

* **On Thursday Harvest is shown, and no film is shown after it on that day.**
* **On Friday either Greed or Limelight, but not both, is shown, and no film is shown after it on that day.**
* **On Saturday either Greed or Harvest, but not both, is shown, and no film is shown after it on that day.**

3. Which one of the following could be a complete and accurate description of the order in which the films are shown at the festival?

(A) Thursday: Limelight, then Harvest; Friday: Limelight; Saturday: Harvest

(B) Thursday: Harvest; Friday: Greed, then Limelight; Saturday: Limelight, then Greed

(C) Thursday: Harvest; Friday: Limelight; Saturday: Limelight, then Greed

(D) Thursday: Greed, then Harvest, then Limelight; Friday: Limelight; Saturday: Greed

(E) Thursday: Greed, then Harvest; Friday: Limelight, then Harvest; Saturday: Harvest

4. Which one of the following CANNOT be true?

1. *Limelight* is shown on each day of the festival.
2. *Greed* is shown second on each day of the festival.
3. A different film is shown first on each day of the festival.
4. A different film is shown last on each day of the festival.
5. *Harvest* is the last film shown on each day of the festival.

5. If *Limelight* is never shown again during the festival once *Greed* is shown, then which one of the following is the maximum number of film showings that could occur during the festival?

(A) three

(B) four

(C) five

(D) six

(E) seven

**A cruise line is scheduling seven week-long voyages for the ship Freedom. Each voyage will occur in exactly one of the first seven weeks of the season: weeks 1 through 7. Each voyage will be to exactly one of four destinations: Guadeloupe, Jamaica, Martinique, or Trinidad. Each destination will be scheduled for at least one of the weeks. The following conditions apply to Freedom’s schedule:**

* **Jamaica will not be its destination in week 4.**
* **Trinidad will be its destination in week 7.**
* **Freedom will make exactly two voyages to Martinique, and at least one voyage to Guadeloupe will occur in some week between those two voyages.**
* **Guadeloupe will be its destination in the week preceding any voyage it makes to Jamaica.**
* **No destination will be scheduled for consecutive weeks.**

6. Which one of the following is an acceptable schedule for Freedom, in order from week 1 through week 7?

(A) Guadeloupe, Jamaica, Martinique, Trinidad, Guadeloupe, Martinique, Trinidad

(B) Guadeloupe, Martinique, Trinidad, Martinique, Guadeloupe, Jamaica, Trinidad

(C) Jamaica, Martinique, Guadeloupe, Martinique, Guadeloupe, Jamaica, Trinidad

(D) Martinique, Trinidad, Guadeloupe, Jamaica, Martinique, Guadeloupe, Trinidad

(E) Martinique, Trinidad, Guadeloupe, Trinidad, Guadeloupe, Jamaica, Martinique

7. Which one of the following CANNOT be true about Freedom’s schedule of voyages?

1. Freedom makes a voyage to Trinidad in week 6.
2. Freedom makes a voyage to Martinique in week 5.
3. Freedom makes a voyage to Jamaica in week 6.
4. Freedom makes a voyage to Jamaica in week 3.
5. Freedom makes a voyage to Guadeloupe in week 3.

8. If Freedom makes a voyage to Martinique in week 3, which one of the following could be an accurate list of Freedom’s destinations in week 4 and week 5, respectively?

(A) Guadeloupe, Trinidad

(B) Jamaica, Guadeloupe

(C) Martinique, Trinidad

(D) Trinidad, Jamaica

(E) Trinidad, Martinique

There are exactly three recycling centers in Rivertown: Center 1, Center 2, and Center 3. Exactly five kinds of material are recycled at these recycling centers: glass, newsprint, plastic, tin, and wood. Each recycling center recycles at least two but no more than three of these kinds of material. The following conditions must hold:

* Any recycling center that recycles wood also recycles newsprint.
* Every kind of material that Center 2 recycles is also recycled at Center 1
* Only one of the recycling centers recycles plastic, and that recycling center does not recycle glass.

9. Which one of the following is a complete and accurate list of the recycling centers in Rivertown any one of which could recycle plastic?

(A) Center 1 only

(B) Center 3 only

(C) Center 1, Center 2

(D) Center 1, Center 3

(E) Center 1, Center 2, Center 3

10. If Center 2 recycles three kinds of material, then which one of the following kinds of material must Center 3 recycle?

(A) glass

(B) newsprint

(C) plastic

(D) tin

(E) wood

11. If each recycling center in Rivertown recycles exactly three kinds of material, then which one of the following could be true?

(A) Only Center 2 recycles glass.

(B) Only Center 3 recycles newsprint.

(C) Only Center 1 recycles plastic.

(D) Only Center 3 recycles tin.

(E) Only Center 1 recycles wood.