# VITEEE 2024 Solution (April 22)

## (Memory Based Questions)

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**Ques. IUPAC name of a coordination compound**

**Ques. HVZ reaction, direct question asked**

**Solu.** The Hell-Volhard-Zelinsky (HVZ) reaction is used for the alpha bromination of carboxylic acids. It converts a carboxylic acid (RCOOH) to an alpha-bromo carboxylic acid (RCHBrCOOH).

**Ques. Question related to Hoffman bromamide degradation conversion**

**Ques. 2-3 questions from area under the curve , area between parabola and circle and circle and line**

**Ques. Question related to maximizing the perimeter of the rectangle whose sides were parallel to the coordinate axis and was the part of $y^2$=x and y=4?**

**Solu.** Plot y^2=x and y=4. Maximize rectangle's vertical side (length) within boundaries.
Length is greatest when rectangle touches parabola's peak (x=4, y=2).
Horizontal side (width) is always 4 units (y=4 line).
Perimeter = 2(length + width) = 2(2 + 4) = 12 units.
Max perimeter = 12 units.

**Ques. Question based on orthogonality of 2 given curves**

**Ques. BUCKET : ACTVBDJLDFSU : BONUS :?**

**Solu.** Following the logic of the analogy, the answer to the missing term is:
ACMNMOTVRT.
Here's the breakdown:
- Each letter in "BUCKET" is replaced by two letters, following a specific pattern.
  - B -> AC
  - U -> TV
  - C -> BD
  - K -> JL
  - E -> DF
  - T -> SU
- Applying the same pattern to "BONUS", we expect each letter to be replaced by two new letters.
  - BO -> AC (similar to B)
  - NU -> TV (similar to U)
  - S -> BD (similar to C)
Therefore, the missing term "?":
- Would start with "AC" based on the pattern for the first letter in "BONUS".
- Needs to end with "RT" to complete the established pattern observed in the other words.
Hence, the answer is ACMNMOTVRT.

**Ques. Whose calendar is same as the calendar of year 2003**

**Solu.** The calendar of a year repeats itself every 28 years due to the way leap years are distributed.
Therefore, any year that is 28 years more than 2003, or a multiple of 28 years after 2003, will have the same calendar.
Here are some examples:
- 2003 + 28 = 2031

- 2003 + (2 x 28) = 2059
- 2003 + (3 x 28) = 2087

These years (and any other year that is a multiple of 28 years more than 2003) will share the same calendar layout as the year 2003.

**Ques. How many leap years were in 8th century**

**Solu.** Here's how to find the number of leap years in the 8th century:

Method 1: Direct Calculation

1. Define the start and end years of the 8th century:
   - Start year = 701 (since the 8th century starts at year 800 and ends at year 799, we count inclusively)
   - End year = 800
2. Calculate the total number of years:
   - Total years = End year - Start year + 1 = 800 - 701 + 1 = 100 years
3. Determine the number of leap years considering standard leap year frequency (every 4 years):
   - In a normal 100-year period, there would be 25 leap years (every 4th year is a leap year, except for century years not divisible by 400).
4. However, the 8th century doesn't cover a full 100-year period. It only goes from year 701 to year 800.
5. Since 800 is a leap year (divisible by 4), we need to account for it.

Therefore, there are 25 leap years (standard for a century) + 1 (year 800) in the 8th century.

Total leap years in the 8th century = 26

Method 2: Using the divisibility rule (more efficient for large ranges)

1. This method considers the fact that a year is a leap year if it is divisible by 4 but not by 100, or if it is divisible by 400.
2. Iterate through each year in the 8th century (from 701 to 800) and check for divisibility by 4 and 100.

3. In this case, manually checking 100 years is less efficient than the direct calculation method. You can use a more suitable approach for larger century ranges.

Conclusion:

The 8th century had 26 leap years.