Quiz-1 Solutions by Dakshan Mir.

(a). For this we first calculate number of ~~ways~~ strings not containing the vowel "a". These are 25^6

$\therefore$ No. of strings containing letter "a" =

All strings of six letters − Strings not containing letter "a"

$= 26^6 - 25^6$.

(b). Let us first calculate number of strings which do not contain "a" or "b", this is

$25^6 + 25^6 - 24^6$

- 25^6: not containing "a"
- 25^6: not containing "b"
- 24^6: not containing both "a" and "b"

$\therefore$ Answer $= 26^6 - (25^6 + 25^6 - 24^6)$.

(c). The substring "a b" can occur in the string in 5 ways, the rest of the 4 positions may be filled up in $P(24, 4)$ ways.

Similarly for the substring "b a"

$\therefore$ Answer $= 2 \cdot 5 \cdot P(24, 4)$

(d). There are 5 ways of choosing a vowel, each of these chosen vowels may be placed in 6 different ways in the string, the remaining positions may be filled with $(26-5)^5$ ways

$\therefore$ Answer $= 5 \cdot 6 \cdot 21^5$

(e). Two vowels may be chosen in 5^2 ways, each of these may be placed in 6 different positions in the string in ${}^6C_2$ ways, the remaining 4 positions may be filled in 21^4 ways.

$\therefore$ Answer $= {}^6C_2 \cdot 5^2 \cdot 21^4$.

(f). At least one vowel
= total no. of strings − no. of strings with no vowels

$= 26^6 - 21^6$

(g). At least two vowels
= total no. of strings − (no. of strings with at least one vowel + no. of strings with exactly one vowel)

$= 26^6 - (21^6 + 5 \cdot 6 \cdot 21^5)$

(h). No. of ways of placing "a" and "b" $= {}^6C_2$

$\therefore$ Answer $= {}^6C_2 \cdot P(24,4)$