**1. Determining if given regular expressions generate languages, and if so, what languages they generate:**

i. bb(a+b):

Yes and it generates strings that start with "bb" followed by any number of characters (a or b) (including zero). Examples: "bb", "bba", "bbbb", "bbba", etc.

ii. (a+b)(a+b)(a+b):

Yes and it generates strings of length 3 where each character can be either a or b. Examples: "aaa", "aab", "bab", "bbb", etc.

iii. (a+b)ba:

Yes and it generates strings that may start with any combination of a or b (including the empty string), followed by "ba". Examples: "", "ba", "aba", "bba", "ababa", etc.

iv. (a+b)a(a+b):

Yes and it generates strings that start and end with any character (a or b) and have an "a" in the middle, with any combination of a or b before and after it. Examples: "aa", "abaa", "ba", "baba", etc.

v. (a+b)aa(a+b):

Yes and it generates strings that start and end with any character (a or b) and have "aa" in the middle, with any combination of a or b before and after it. Examples: "aa", "baa", "aba", "ababaa", etc.

**2. Writing regular expressions for given languages:**

i. Language of all words that have at least two "a"s: \( (a+b)^\*a(a+b)^\*a(a+b)^\* \)

ii. Language of all words that have at least one "a" and at least one "b":

\( (a+b)^\*a(a+b)^\*b(a+b)^\* + (a+b)^\*b(a+b)^\*a(a+b)^\* \)

**3. Regular expressions for languages defined over \( \Sigma = \{a, b\} \):**

i. Language of even-length strings: \( ((a+b)(a+b))^\* \)

ii. Language of odd-length strings: \( ((a+b)(a+b))^\*(a+b) \)

**4. Regular expressions for given languages:**

i. All words ending with "b": \( (a+b)^\*b \)

ii. All words that start with "a": \( a(a+b)^\* \)

iii. All words that start with a double letter: \( (aa+bb)(a+b)^\* \)

iv. All words that contain at least one double letter: \( (a+b)^\*(aa+bb)(a+b)^\* \)

v. All words that start and end with a double letter: \( (aa+bb)(a+b)^\*(aa+bb) \)

vi. All words of length >= 3: \( (a+b)(a+b)(a+b)^\* \)

vii. All words that contain exactly one "a" or exactly one "b": \( (a+b)^\*(a+b)(a+b)^\* + (a+b)^\*(a+b)^\*(a+b) \)

viii. All words that don’t end at "ba": \( (a+b)^\*(a+b+a)(a+b)^\* \)