1.

(a)yes (b)no (c)no (d)no

2.

(a)yes (b)yes (c)no (d)yes

3.

(a)no (b)yes (c)no (d)yes

4.

A drawing of a person

Description automatically generated

5.

((aaUbb)(aUb)\*)U((aUb)\*bb)

6.

A drawing of a person

Description automatically generated

7.

A close up of text on a white background

Description automatically generated

8.

A close up of text on a white background

Description automatically generatedA close up of text on a white background

Description automatically generated

9.

A drawing of a person

Description automatically generated

10.

S=a^(p)b^(2p)

Y=a^k for some a<=k<=p

If we pump with i=2

We get a^(p+k)b^(2p) which is not in L

Contradiction, so language is not regular.

11.

S=a^pb^(2p+4)

Y=a^k for some 1<=k<=p

If we pump with i=0

We get a^(p-k)b^(2p+4)

2(p-k)+5<=2p+3<2p+4 not in L

Contradiction, so language is not regular.

13.

A close up of a map

Description automatically generated