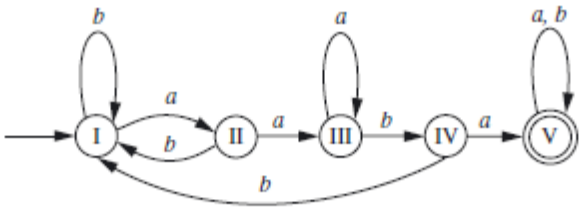
Problem Sheet -1 Automata

Q. no. 1

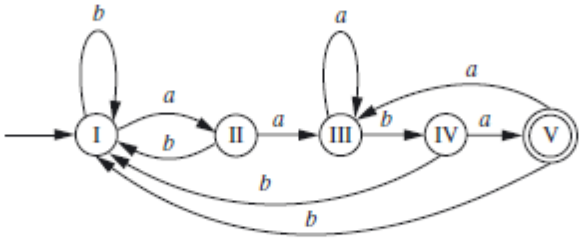
In each part below, draw an FA accepting the indicated language over $\{a, b\}$.

a. The language of all strings containing exactly two a's.
b. The language of all strings containing at least two a's.
c. The language of all strings that do not end with ab.
d. The language of all strings that begin or end with aa or bb.
e. The language of all strings not containing the substring aa.
f. The language of all strings in which the number of a's is even.
g. The language of all strings in which both the number of a's and the number of b's are even.
h. The language of all strings containing no more than one occurrence of the string aa. (The string aaa contains two occurrences of aa.)
i. The language of all strings in which every a (if there are any) is followed immediately by bb.
j. The language of all strings containing both bb and aba as substrings.
k. The language of all strings containing both aba and bab as substrings.

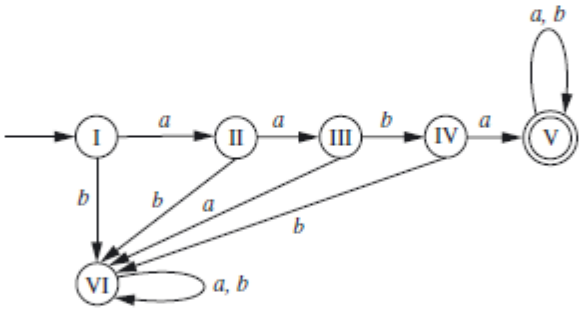
Q. no. 2 Give a simple verbal description of the language accepted by the finite automatons given in page 2.


b
a
a, b
a
a
b
a
I
II
III
IV
V
b
b

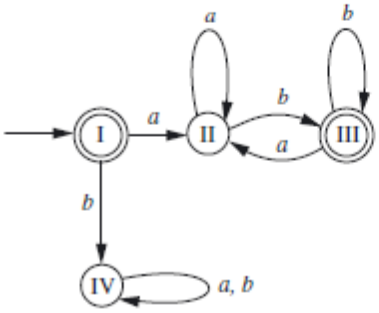
(a)


b
a
a
a
a
b
a
I
II
III
IV
V
b
b

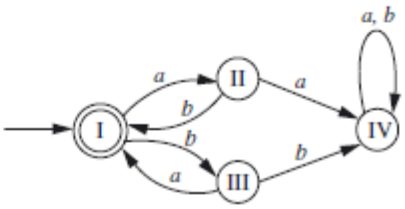
(b)


a, b
a
a
b
a
I
II
III
IV
V
b
b
a
b
VI
a, b

(c)


a
b
a
b
I
II
III
b
IV
a, b

(d)


a, b
a
II
a
b
I
b
IV
b
a
III

(e)