**PRACTICAL: -7**

**Write a program for support vector machine using jupyter notebook**

**In [2]:**

import numpy as np

import matplotlib.pyplot as plt

import pandas as pd

**In [3]:**

df = pd.read\_csv('data(1).csv')

df.head(10)

**Out[3]:**

|  | **grade1** | **grade2** | **label** |
| --- | --- | --- | --- |
| 0 | 34.623660 | 78.024693 | 0 |
| 1 | 30.286711 | 43.894998 | 0 |
| 2 | 35.847409 | 72.902198 | 0 |
| 3 | 60.182599 | 86.308552 | 1 |
| 4 | 79.032736 | 75.344376 | 1 |
| 5 | 45.083277 | 56.316372 | 0 |
| 6 | 61.106665 | 96.511426 | 1 |
| 7 | 75.024746 | 46.554014 | 1 |
| 8 | 76.098787 | 87.420570 | 1 |
| 9 | 84.432820 | 43.533393 | 1 |
|  |  |  |  |

**In [4]:**

**from** **sklearn.model\_selection** **import** train\_test\_split

x=df[["grade1","grade2"]]

y=df["label"]

x\_train,x\_test,y\_train,y\_test=train\_test\_split(x,y,test\_size=0.35,random\_state=4)

**In [5]:**

print(x\_train.shape)

print(y\_train.shape)

x\_train.head()

(65, 2)

(65,)

**Out[5]:**

|  | **grade1** | **grade2** |
| --- | --- | --- |
| 78 | 60.455556 | 42.508409 |
| 18 | 70.661510 | 92.927138 |
| 88 | 78.635424 | 96.647427 |
| 7 | 75.024746 | 46.554014 |
| 39 | 34.183640 | 75.237720 |

**In [6]:**

y\_train.head()

**Out[6]:**

78 0

18 1

88 1

7 1

39 0

Name: label, dtype: int64

**In [7]:**

print(x\_test.shape)

print(y\_test.shape)

x\_test.head()

(35, 2)

(35,)

**Out[7]:**

|  | **grade1** | **grade2** |
| --- | --- | --- |
| 20 | 67.372028 | 42.838438 |
| 10 | 95.861555 | 38.225278 |
| 96 | 42.261701 | 87.103851 |
| 16 | 69.070144 | 52.740470 |
| 63 | 30.058822 | 49.592974 |

**In [8]:**

y\_test.head()

**Out[8]:**

20 0

10 0

96 1

16 1

63 0

Name: label, dtype: int64

**In [10]:**

**from** **sklearn** **import** svm

**In [11]:**

model = svm.SVC(gamma='scale')

**In [12]:**

model.fit(x\_train,y\_train)

**Out[12]:**

SVC(C=1.0, cache\_size=200, class\_weight=None, coef0=0.0,

decision\_function\_shape='ovr', degree=3, gamma='scale', kernel='rbf',

max\_iter=-1, probability=False, random\_state=None, shrinking=True,

tol=0.001, verbose=False)

**In [14]:**

score=model.score(x\_test,y\_test)

print("prediction accuracy : ",score,"%")

prediction accuracy : 0.8571428571428571 %

**In [15]:**

f=np.array([60.6,60.9]).reshape(1,-1)

print(f)

res=model.predict(f)

res

[[60.6 60.9]]

**Out[15]:**

array([0], dtype=int64)

**In [16]:**

yp = model.predict(x\_test)

**In [17]:**

plt.plot(x\_train['grade1'],y\_train,'o',color='blue')

plt.plot(x\_test['grade1'],yp,'.',color='r')

plt.legend(['training values','predicted values'])

**Out[17]:**

<matplotlib.legend.Legend at 0x28c8b583a88>

