Q1

(1 x 1) + (1 x -1) = 0

(0 x 1) + (0 x -1) = 0

(0 x 1) + (0 x -1) = 0

(0 x 1) + (0 x -1) = 0

(1 x 1) + (1 x -1) = 0 ; ……

ANSWER =

0 0 0 0 0

0 -1 -1 -1 0

0 1 1 1 0

0 0 0 0 0

Q2

(1 x 0) + (0 x 1) + (0 x 1) + (1 x 0) = 0

(0 x 0) + (0 x 1) + (1 x 1) + (0 x 0) = 1

(0 x 0) + (0 x 1) + (0 x 1) + (1 x 0) = 0

(0 x 0) + (1 x 1) + (1 x 1) + (0 x 0) = 2 ; ……

ANSWER =

0 1 0 2

1 0 2 0

0 2 0 1

2 0 1 0

Q3

X = [1 0 0 0 1; 0 1 0 1 0; 0 0 1 0 0; 0 1 0 1 0; 1 0 0 0 1]; K = [0 1; 1 0];

R = [0 0 0 0 0]; X = [X; R];

C = [0; 0; 0; 0; 0; 0]; X = [X C];

con = conv2(X, K, 'valid');

ANSWER = con(1:2:end, 1:2:end);

ANSWER =

0 0 0

0 0 0

0 0 0

Q4

(1 + 0 + 0 + 1 + 0 + 0 + 1 + 1 + 1) / 9 =

(0 + 0 + 0 + 0 + 0 + 0 + 1 + 1 + 1) / 9 =

(0 + 0 + 1 + 0 + 0 + 1 + 1 + 1 + 1) / 9 =

(1 + 0 + 0 + 1 + 1 + 1 + 1 + 0 + 0) / 9 =

(0 + 0 + 0 + 1 + 1 + 1 + 0 + 0 + 0) / 9 =

(0 + 0 + 1 + 1 + 1 + 1 + 0 + 0 + 1) / 9 =

(1 + 1 + 1 + 1 + 0 + 0 + 1 + 0 + 0) / 9 =

(1 + 1 + 1 + 0 + 0 + 0 + 0 + 0 + 0) / 9 =

(1 + 1 + 1 + 0 + 0 + 1 + 0 + 0 + 1) / 9 =

ANSWER =

Q5

The Figure 6.6 shows that the deeper the neural network, the better its generalization and the higher the test set accuracy. From the depth of 3 to the depth of 6, as the depth of neural network increases, the accuracy of the test set increases significantly, However, when the depth of the neural network exceeds 6, as the depth increases, the test set accuracy increases more and more slowly, until it becomes flat.

As a control group, Figure 6.7 shows that increasing the number of parameters in the convolutional network layer without increasing the depth is not obvious in improving the performance of the test set, and the features of different neural network models are not the same. The interesting point is that as the number of parameters increases, the performance of the shallow model first increases and then decreases, while the performance of the deep model decreases first and then slightly increases, from the perspective of big data, the advantage of the deep model is greater than that of the shallow model. This also further supports the conclusion of Figure 6.6.

Of course, the conclusions drawn from this experiment may have limitations because we don’t know how large the data set used for training and testing is. If the data set is too small, the accuracy of the conclusion will be compromised. If the data set is collected from a specific aspect, the conclusions drawn are only applicable to this aspect and not generalized.