1.)

a)

|  |  |  |
| --- | --- | --- |
|  | Training Accuracy | Testing Accuracy |
| Softmax Regression | 0.916582 | 0.9198 |
| Convolutional NN | step 0, 0.040000  step 100, 0.880000  step 200, 0.920000  step 300, 0.860000  step 400, 0.980000  step 500, 0.900000  step 600, 0.980000  step 700, 0.980000  step 800, 0.920000  step 900, 1.000000 | 0.963100 |
| Connected NN | 0.8933 | 0.9013 |

b)

|  |  |  |
| --- | --- | --- |
|  | Training Accuracy | Testing Accuracy |
| Rectified Linear Units | step 0, 0.040000  step 100, 0.880000  step 200, 0.920000  step 300, 0.860000  step 400, 0.980000  step 500, 0.900000  step 600, 0.980000  step 700, 0.980000  step 800, 0.920000  step 900, 1.000000 | 0.963100 |
| Sigmoid Units | step 0, 0.040000  step 100, 0.080000  step 200, 0.220000  step 300, 0.160000  step 400, 0.520000  step 500, 0.620000  step 600, 0.860000  step 700, 0.780000  step 800, 0.800000  step 900, 0.840000 | 0.793000 |

c)

|  |  |  |
| --- | --- | --- |
| Keep Probability | Training Accuracy | Testing Accuracy |
| 0.25 | step 0, 0.040000  step 100, 0.700000  step 200, 0.920000  step 300, 0.840000  step 400, 0.960000  step 500, 0.900000  step 600, 0.980000  step 700, 0.960000  step 800, 0.860000  step 900, 0.960000 | 0.952700 |
| 0.5 | step 0, 0.040000  step 100, 0.880000  step 200, 0.920000  step 300, 0.860000  step 400, 0.980000  step 500, 0.900000  step 600, 0.980000  step 700, 0.980000  step 800, 0.920000  step 900, 1.000000 | 0.963100 |
| 0.75 | step 0, 0.040000  step 100, 0.780000  step 200, 0.900000  step 300, 0.860000  step 400, 0.960000  step 500, 0.940000  step 600, 1.000000  step 700, 0.960000  step 800, 0.980000  step 900, 1.000000 | 0.972400 |
| 1 | step 0, 0.020000  step 100, 0.820000  step 200, 1.000000  step 300, 0.840000  step 400, 0.960000  step 500, 0.920000  step 600, 0.980000  step 700, 0.980000  step 800, 0.920000  step 900, 0.980000 | 0.973200 |