Machine Learning, test 2

Name: .....

Student Number: .....

Part 1, SVM

1-4. Complete the following sentences about SVM

SVM uses support vectors ...(1).....	A. to create soft margin for SVM
We can use kernel function ...(2)....	B. to separate a linear dataset
We can use linear kernel ...(3)....	C. to classify a new input
We can use parameter C ...(4)...	D. to separate the non-linear dataset

1-C, 2-D, 3-B, 4-A

5-8. Circle the correct statements about support vectors

5. Support vectors are near the decision boundary (confusion arear)

6. Support vectors can be found efficiently using Gradient Descending

7. Support vectors are vectors with non-zero alpha coefficients

8. Support vectors can be used to form the w parameters in f(x) = sign(w*x - b)

Circle 5, 7, 8

Part 2, Classifier combination

9-11. Complete the following sentences about classifier combination

Boosting is ...(9).....	A. to combine week classifiers by using weights to emphasize misclassified examples
Bagging is ...(10).....	B. to combine trees, which are created by removing both rows and columns of the training data table
Random forest is ...(11).....	C. to combine trees created derived datasets via sample with replacement
	D. to combine trees created derived datasets via sample without replacement

9-A, 10-C, 11-B

12-15. Circle the correct statements about classification methods

12. Bootstrapping is to create the new datasets by selecting rows from original dataset with uniform distribution U(1, n) where n is the number of samples in the original dataset.

13. Bootstrapping is to take the columns randomly from the dataset to create new datasets.

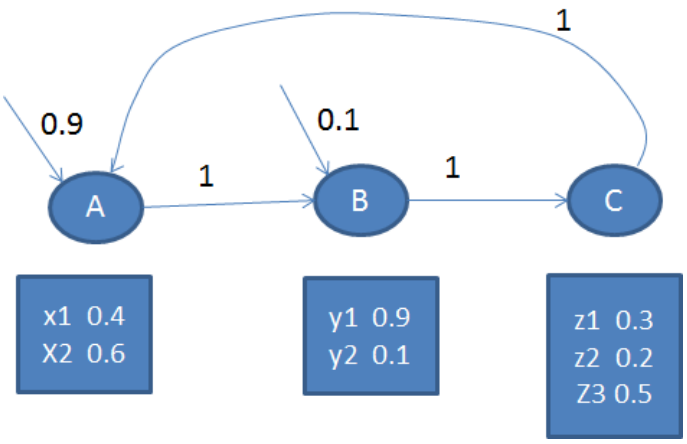
14. Voting is to combine the categorical results from weak classifiers by counting the numbers of categories and take the category with max count as the final output.

15. Averaging is to combine the categorical results from weak classifiers by adding the results together and divide by the number of weak classifiers.

Circle only 12, 14

Part 3, HMM

You are given the following HMM model, which



16. Complete the start probability vector

	A	B	C
π	**0.9**	**0.1**	**0**

17. Complete the transition matrix

	to A	to B	to C
from A	**0**	**1**	**0**
from B	**0**	**0**	**1**
from C	**1**	**0**	**0**

18. Complete the emission matrix

	x1	x2	y1	y2	z1	z2	z3
at A	**0.4**	**0.6**	**0**	**0**	**0**	**0**	**0**
at B	**0**	**0**	**0.9**	**0.1**	**0**	**0**	**0**
at C	**0**	**0**	**0**	**0**	**0.3**	**0.2**	**0.5**