

University of Asia Pacific
Department of Computer Science and Engineering
Mid-Semester Examination Spring-2020
Program: B.Sc. in Computer Science and Engineering
Course Title: Machine Learning Course No.: CSE 427 Credit: 3.00
Time: 1.00 Hour. Full Mark: 60
Instruction(s): Answer any three questions

1. a) Describe the basic components of the machine learning process with necessary diagram [10]
b) What is the classification problem in machine learning? Explain using the following example data. [10]

Score1 29 22 10 31 17 33 32 20
Score2 43 29 47 55 18 54 40 41
Result Pass Fail Fail Pass Fail Pass Pass Pass

2. a) Give the Basic of naive Bayes algorithm. How various probabilities are computed in naive Bayes algorithm? [5]
b) Given the following data on a certain set of patients seen by a doctor, can the doctor conclude that a person having chills, fever, mild headache and without running nose has the flu? (Use naive Bayes algorithm to classify) [15]

chills	running nose	headache	fever	has flu
Y	N	mild	Y	N
Y	Y	no	N	Y
Y	N	strong	Y	Y
N	Y	mild	Y	Y
N	N	no	N	N
N	Y	strong	Y	Y
N	Y	strong	N	N
Y	Y	mild	Y	Y

3. a) Discuss linear regression with Ordinary Least Squares method. [5]
b) In the table below, the x_i row shows scores in an aptitude test. Similarly, the y_i row shows statistics grades. If a student made an 83 on the aptitude test, what grade would we expect her to make in statistics?(Explain with obtaining a linear regression) [15]

Student	1	2	3	4	5
x_i	95	85	80	70	60
y_i	85	95	70	65	70

4. a) Use ID3 algorithm to calculate Gain for each feature for the data in the following table: [20]

Gender	Car ownership	Travel cost	Income level	Class
Male	0	Cheap	Low	Bus
Male	1	Cheap	Medium	Bus
Female	1	Cheap	Medium	Train
Female	0	Cheap	Low	Bus
Male	1	Cheap	Medium	Bus
Male	0	Standard	Medium	Train
Female	1	Standard	Medium	Train
Female	1	Expensive	High	Car
Male	2	Expensive	Medium	Car
Female	2	Expensive	High	Car