Examination Question Paper

University of East London

Pioneering Futures Since 1898

Module Code:	*CN6005*		
Component No:	*001*	Paper Type:	*EXA1*
Module Title:	*Artificial Intelligence*		
Term	*Term 1*		
Level:	*6*		
Credits:	*20*		
Date:	*13 Dec 2023*	Time:	
Duration:			

Instruction to Candidates:

1. On **each** answer book write:

    - your full 7 digit student enrolment number – as on your Student ID card
    - the title of the module and the module code, as above
    - the number of the questions answered

How to submit:

Take the scanned copy of your Exam solution change it into PDF and submit on Moodle link.

Examination Questions Total Marks 50

Question 1: (10 Marks)

Predict the class label using Naïve Bayes algorithm for the following scenario:

Student = Is_a_student , Salary < 20K, Studies = Engineering, Credit rating =Good ,Refer to Table below.

Show all the steps that lead to the answer.

Student	Salary	Studies	Credit rating	CLASS Buys a car
Is_a_student	>20k	Computer Science	Fair	YES
Not_a_student	<20k	Computer Science	Good	NO
Not_a_student	>20k	Maths	Excellent	NO
Is_a_student	>20k	Engineering	Fair	MAYBE
Is_a_student	>20k	Maths	Good	MAYBE
Not_a_student	>20k	Engineering	Excellent	YES
Is_a_student	>20k	Maths	Fair	YES
Not_a_student	>20k	Computer Science	Good	YES
Is_a_student	<20k	Computer Science	Fair	NO
Is_a_student	<20k	Maths	Excellent	MAYBE

Question 2: 5 Marks

Refer to table below, Calculate the sentiment for the following sentences using the formula: Polarity= Sum of words (Please note that each positive word equals to 1 and each negative word equals to -1)

Positive words:	Negative words:
Engaging	Boring
Stimulating	Tedious
Enriching	Stultifying
Empowering	Disengaging
Liberating	Alienating
Transformative	Uninspiring
Inspiring	Unmotivating
Motivating	Unrewarding
Enlightening	Frustrating
Rewarding	Demeaning

Sentence 1:
Engaging, exciting, and **stimulating** education can be **enriching** and **empowering**, while **boring** and **tedious** education can be **stultifying** and **disengaging.** (2 Marks)

Sentence 2:
Liberating and **transformative** education can be **inspiring** and **motivating**, while **alienating** education can be **unmotivating**. (2 Marks)

Sentence 3:

Enlightening education can be **frustrating** and **demeaning**, but it is still worthwhile in the long run. (2 Marks)

Question 3) (7 Marks)

Using the table below, calculate the lift support and confidence of the following:

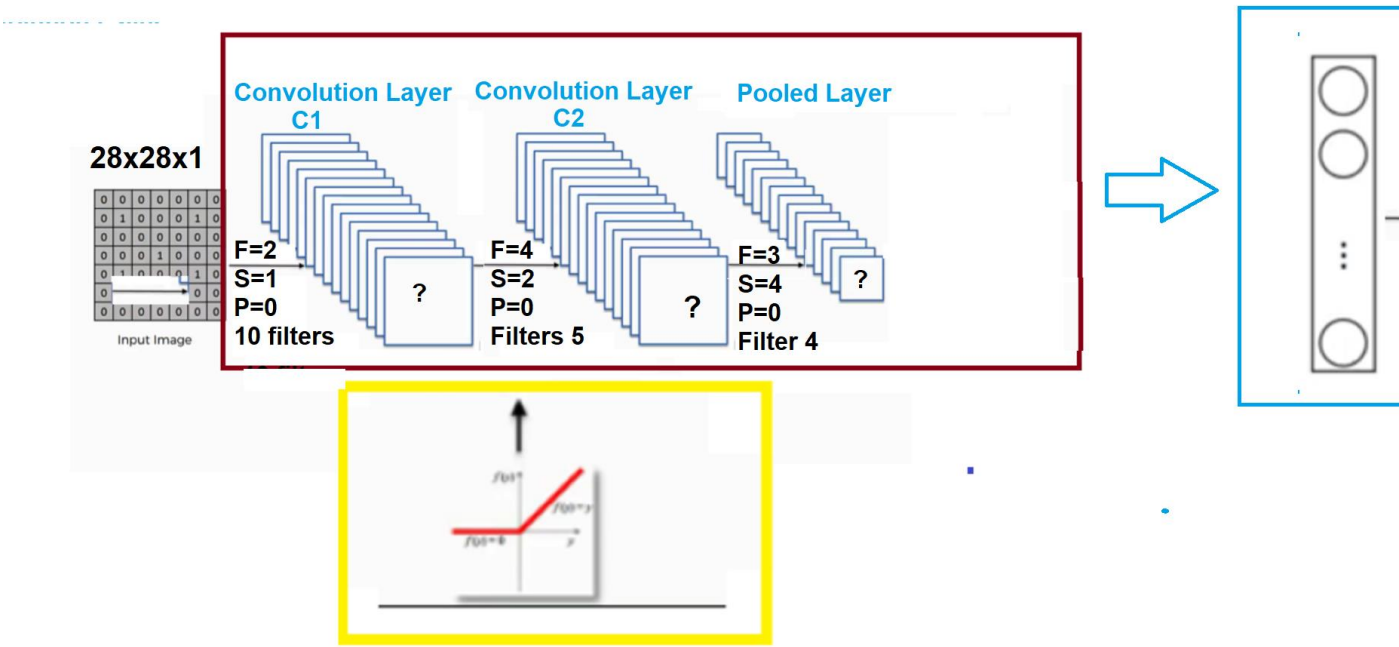
ITEM 1	Maths, Computer, English, Drama
ITEM 2	Drama, Maths, Computer, PE
ITEM 3	Music, Physics, Maths, Geography
ITEM 4	Biology, Drama, Physics, Computer
ITEM 5	Computer, Drama, PE

Support = Frequency (X,Y)/total of items
Confidence = Frequency (X,Y)/ Frequency (X)
Lift : Support / (Support (x) * Support (y)

1) Maths, Computer => Drama
2) Drama => Maths, Computer
3) Computer, Drama => Physics

Q4 (25Marks)

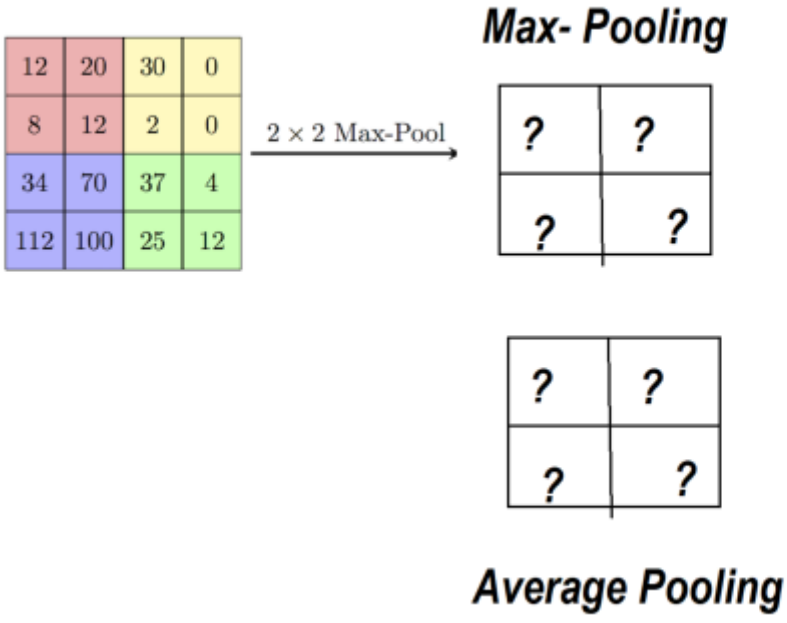
Look at the figure below and answer the following Questions



1. In above figure, there are two units represented as red and blue . What is name and functions of these red and blue unit in the above figure, and what this network is called **(2)**
2. How many classes the above network can classify**. (1)**
3. What is name of the function represent in yellow unit and what is its function in the network **(1)**
4. Looking at red rectangle , where F represents filter size, S represents stride , P represents passing What would dimension of Layer C1 and C2 using the formula (n-f+2p)/s+1 (n-f+2p)/s+1 **(4)**
5. suppose you have 8000 training images to train this network , how many iteration it takes to complete 1 epoch of you use batch size of 500 **(2)**
6. suppose you use Keras Library and sequential model to code this model. Following is the line of the code to create first two layers. What should you write for input_shape. **(2)**

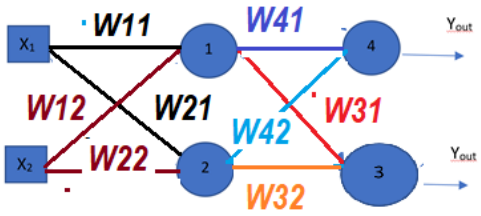
```
model=Sequential()
model.add(Conv2D(32, kernel_size = 3, activation='relu', input_shape = ?? kernel_initializer='he_normal'))
model.add(Conv2D(32, kernel_size = 3,
activation='relu',kernel_initializer='he_normal'))
```

7. Look at the figure below and Calculate the max and average pooling **(2)**



7.

8. Look at the figure below



Assuming
W_{11}=1, W_{21}=-1, W_{22}=1, W_{12}=-2,

W_{31}=-2,W_{32}=1, W_{41}=2,W_{42}=-3

Assume X1 =1 and X2=-1

Each of Node 1,2,3,4, uses following activation function

- f(v)=0 when v≥0;
- f(v)=1 otherwise

Calculate the output of Neuron1 ,Neuron2,Neuron3 and Neuron 4 **(4)**

9. Suppose you want to predict the Car price based on milage area (M) and Number of Years used (Y) and Engine Size €, suggest a Linear Regression formula to predict the car price (CP). **(1)**
10. Differentiate between machine learning and Deep learning , how does the number of training samples effects the accuracy of classifiers in both of these cases. **2**
11. How do you measure the accuracy of KMean Clustering **(1)**
12. What is padding used for in CNN **(1)**
13. What is the Stride in CNN **(1)**
14. Write down the activation function for perceptron **(1)**
15. Suppose we receive 2x2 matrix at the end of the CNN network , what would be the size of this matrix after flattening process before the fully connected layer **(1)**
16. Differentiate between supervised , unsupervised and Reinforcement Learning (**1**)
17. Write down steps required for the classification **(1)**