b) Describe what is likely to happen when a learning rate is used that is too large, and when one is used that is too small. How can one optimize the learning rate?  c) Explain the main reasons why a Back-Propagation training algorithm might not find a set of weights which minimizes the training error for a given feed-forward neural network.  d) Explain the purpose of the momentum term that is often included in the Back-Propagation learning algorithm.  2. a) The Pants Pizza Parlour sells pizzas with optional toppings: pepperoni, pineapple and pickled onion. Every day this week you have tried a pizza (A to E) and kept a record of which you liked:    Pepperoni   Pineapple   Pickled onion   Liked     A   True   True   True   False     B   True   False   False   True     C   False   True   False   True     D   False   True   False   True     E   True   False   False   True     Using Hamming distance throughout, show how the 3-NN classifier with majority voting would classify {pepperoni = false, pineapple=true, pickledOnion=true}.  b) What are the drawbacks of using k-NN algorithm to classify objects? Also, provide the remedies to overcome the drawbacks.							Pai	rt I				
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d)   Explain the purpose of the momentum term that is often included in the Back-Propagation learning algorithm.		c) Explain the main reasons why a Back-Propagation training algorithm might not find a set of weights										[3]
1 The Pants Pizza Parlour sells pizzas with optional toppings: pepperoni, pincapple and pickled onion.		d) Explain the purpose of the momentum term that is often included in the Back-Propagation learning										[2]
Pepperoni   Pineapple   Pickled onion   Liked	2.	a)	a) The Pants Pizza Parlour sells pizzas with optional toppings: pepperoni, pineapple and pickled onion.									
B   True						Pickled						
C   False												
D   False   True   False   True												
E   True						1						
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Ipepperoni = false, pineapple=true, pickled(Onion=true).     What are the drawbacks of using k-NN algorithm to classify objects? Also, provide the remedies to overcome the drawbacks.						1	the state of the s					
14												
Overcome the drawbacks.											remedies to	[4]
With GATE qualified						5				· · · · · · · · · · · · · · · · · · ·		
Id   Gate   Qualified   Qualified   Qualified   Performance   Qualified   Qualified   Performance   Qualified   Performance   Performance   Performance   Qualified   Performance   Performance   Qualified   Performance   Pe	3.				ves Classifier for the dataset given in the following table to determine the Class for an instance							
Qualified   Qualified   Performance		With	IGAIE	quannea =	= No, Publicat	10ns = N	o, written	rest q	iaiiiied = No, I	nterview perio	rmance = Bad.	
1			Id							Decision		
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4											-	
S   No   Yes   No   Bad   Reject											_	
6											-	
7											-	
Solution   Solution											-	
9 No No Yes Good Reject   10 No Yes No Bad Reject   11 No No No No Good Reject   12 No Yes No Good Accept   13 Yes Yes Yes Bad Accept   14 Yes No No Bad Reject   15 Yes No No Bad Reject   16 Yes No No Bad Reject   17 Yes No No Bad Reject   18 Yes Pes No No Bad Reject   19 Yes No No Bad Reject   19 Yes No No Bad Reject   19 Yes No No Bad Reject   10 Yes No Yes No No No No Bad Reject   10 Yes No Yes No No No No No Bad Reject   10 Yes No Yes										-	-	
10 No   Yes   No   Bad   Reject												
11 No No No No Good Reject   12 No Yes No Good Accept   13 Yes Yes Yes Bad Accept   14 Yes No No Bad Reject   15 Yes No Yes Bad Accept   16 Imitations?   10   17   18   19   19   19   19   10   19   10   19   10   19   10   19   10   19   10   19   10   10											_	
12 No   Yes   No   Good   Accept											-	
13   Yes   Yes   Yes   Bad   Accept     14   Yes   No   No   Bad   Reject     15   Yes   No   Yes   Bad   Accept     4. Describe the principal component analysis method: what is it used for, what is the algorithm, what are limitations?   [10]   5   a) Write short notes on any two of the followings:   I. Data space and feature space   [4]   II. Margin in Support vector Machine     b) Suppose a support vector machine for separating pluses from minuses finds a plus support vector at the point x1= (1, 0), a minus support vector at x2= (0, 1). You are to determine values for the classification vector w and the threshold value b.     6.   a) Perform K-means clustering on all the points in the following table, where K=2. Randomly select the initial seeds and perform the algorithm for two iterations.     Foints   X co-ordinate   Y co-ordinate     p1										•	1	
14   Yes   No   No   Bad   Reject											1	
15   Yes   No   Yes   Bad   Accept										-		
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limitations?	1	Desc	_								what are	[10]
I. Data space and feature space II. Support vector III. Margin in Support Vector Machine b) Suppose a support vector machine for separating pluses from minuses finds a plus support vector at the point x1= (1, 0), a minus support vector at x2= (0, 1). You are to determine values for the classification vector w and the threshold value b.  6. a) Perform K-means clustering on all the points in the following table, where K=2. Randomly select the initial seeds and perform the algorithm for two iterations.    Points   X co-ordinate   Y co-ordinate     p1	т.				component ar	iarysis iii	ethod. wh	at 15 1t t	isca ioi, what i	s the argorithm	, what are	[10]
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initial seeds and perform the algorithm for two iterations.    Points   X co-ordinate   Y co-ordinate     p1	_											[7.2]
Points         X co-ordinate         Y co-ordinate           p1         1         9           p2         2         10           p3         7         4           p4         10         3           p5         5         9           p6         7         2           p7         3         8           p8         4         10           p9         8         1	о.								ing table, when	re K=2. Rando	mry select the	[/+3]
p1     1     9       p2     2     10       p3     7     4       p4     10     3       p5     5     9       p6     7     2       p7     3     8       p8     4     10       p9     8     1			muai 8									
p2     2     10       p3     7     4       p4     10     3       p5     5     9       p6     7     2       p7     3     8       p8     4     10       p9     8     1						1						
p3         7         4           p4         10         3           p5         5         9           p6         7         2           p7         3         8           p8         4         10           p9         8         1												
p4     10     3       p5     5     9       p6     7     2       p7     3     8       p8     4     10       p9     8     1												
p5         5         9           p6         7         2           p7         3         8           p8         4         10           p9         8         1												
p6         7         2           p7         3         8           p8         4         10           p9         8         1												
p7         3         8           p8         4         10           p9         8         1												
p8         4         10           p9         8         1												
p9 8 1												

	b) Describe the major drawbacks of K-means algorithm for clustering.										
	Part II										
7.	<ul> <li>a) Derive the Lagrangian for the optimization problem as defined by linear SVM – separable case.</li> <li>b) A linearly separable dataset is given in the following Table. Predict the class of (0.6, 0.8) using a support vector machine classifier.</li> <li>X<sub>1</sub></li></ul>										
		0.3858 0.4871 0.9218 0.7382 0.1763 0.4057 0.9355 0.2146	0.4687 0.611 0.4103 0.8936 0.0579 0.3529 0.8132 0.0099 inearly sep	+1 -1 -1 -1 +1 +1 -1 +1	Multiplier 65.5261 65.5261 0 0 0 0 0 0						
8.	<ul> <li>a) Define, with example, Core point, Border Point and Noise point in the perspective of DBSCAN clustering algorithm.</li> <li>b) Describe the DBSCAN Algorithm</li> <li>c) Describe the process of selecting the parameters Eps (radius that defines the neighborhood of a point) and MinPts (minimum number of points in the neighborhood of the core point) in DBSCAN.</li> <li>d) Explain why DBSCAN does not work well for the data having varying density.</li> </ul>										
9.	e) Define Information gain, Gain Ratio and Gini Index. f) Draw a decision tree to predict whether a student will be accepted in the post-graduate program using the data provided in the Table of Question 3.										

Name & Signature of the moderator

Name & Signature of the paper setter