| Name:
Enrolment No:	UPES UNIVERSITY OF TOMORROW

UPES
End Semester Examination, May 2023

Course: Cognitive Analytics
Semester: 6th
Program: BTech (CSE – AI&ML)   Time: 03 hrs.
Course Code: CSBA 3009   Max. Marks: 100
Instructions: There are three sections. Attempt all questions.

Q. No.	Question	Marks	CO
	SECTION A		
1	Explain the working architecture of cognitive computing.	4	2
2	Mention some use case scenarios of cognitive analytics.	4	1
3	Write the different category of optimization algorithms to tune a neural network model in enhancing the prediction capability of the network.	4	2
4	How is machine learning model affected by higher dimension data?	4	1
5	Explain different type of service models in cloud computing.	4	2
	SECTION B		
6	Why Random Forest algorithm is popular? Explain random forest ensemble bagging and boosting techniques in detail.	10	2
7	Imagine you are working on a project which is a binary classification problem. You trained a model on the training dataset and got the below confusion matrix on the validation dataset. | n=165	Predicted: NO	Predicted: YES
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Actual: NO	50	10
Actual: YES	5	100 | Based on the above confusion matrix, calculate the following metrics. (a) Accuracy (b) Misclassification Error (c) True Negative Rate (d) True Positive Rate	10	1
8	Why do we need dimensionality reduction technique? Consider the two-dimensional patterns as follows (2, 1), (3, 5), (4, 3), (5, 6), (6, 7), (7, 8), and compute the principal components using PCA algorithm.	10	2

9	Why is feature engineering required? Explain any one wrapper-based feature selection method with suitable example.	10	3
	SECTION-C		
| 10 | Explain residuals, RSS, RSE and p-value with its formulas/conditions. Use some suitable examples.<br><br>**OR**<br><br>The given below Fig. illustrating the summary of fitted linear regression model on Auto dataset of ISLR package in R. Based on this fig., answer the following questions:<br><br>a. Write down the R code to fit linear regression model on Auto dataset, and use response and predictors in given Fig.     (3)<br>b. Is there a weak relationship between each predictor and response? If yes, how?                          (7)<br>c. Which predictors appear to have a statistically significant relationship to response? Justify your answer by rejecting null model. (7)<br>d. Explain the accuracy of fitted model. What will be the reliable parameter(s) to analyze the linear model's performance? (3)<br><br>```
> summary(auto)

Call:
lm(formula = mpg ~ . - name, data = Auto)

Residuals:
    Min      1Q  Median      3Q     Max
-9.5903 -2.1565 -0.1169  1.8690 13.0604

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -17.218435   4.644294  -3.707  0.00024 ***
cylinders     -0.493376   0.323282  -1.526  0.12780
displacement   0.019896   0.007515   2.647  0.00844 **
horsepower    -0.016951   0.013787  -1.230  0.21963
weight        -0.006474   0.000652  -9.929  < 2e-16 ***
acceleration   0.080576   0.098845   0.815  0.41548
year           0.750773   0.050973  14.729  < 2e-16 ***
origin         1.426141   0.278136   5.127 4.67e-07 ***
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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.328 on 384 degrees of freedom
Multiple R-squared:  0.8215,    Adjusted R-squared:  0.8182
F-statistic: 252.4 on 7 and 384 DF,  p-value: < 2.2e-16
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| 11 | Describe the essential characteristics of cloud computing and cognitive services offered by cloud service providers.
OR
Explain the challenges and limitations faced in providing cognitive services by cloud service providers. | 20 | 3 |