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Printed Page:-3 **Subject Code:- ABT0612**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (2025 - 2026)

Subject: Probability and Statistics using R in Biotechnology

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

(1.1) In FeedForward ANN, information flow is _____. CO1, K2 1

(a) Unidirectional
(b) Bidirectional
(c) Multidirectional
(d) None

(1.2) Which of the following is an Applications of Neural Networks? CO1, K2 1

(a) Automotive
(b) Aerospace
(c) Electronics
(d) All of above

(1.3) Which of the following R code generate a sequence of integers from 1 to 10? CO2, K2 1

(a) > for(i in 1:9) { print(i)}
(b) > for(i in 1:10) { print(i)}
(c) > for(i in 0:10) { print(i)}
(d) All of above

(1.4) The syntax of the if condition is? CO2, K3 1

(a) if (condition){ Statement1}
(b) ifelse (condition){ Statement1}
(c) if (condition): Statement1
(d) if-else (condition): Statement1

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(1.5) Equation of linear regression: CO3, K2 1

(a) y= a+ bX
(b) y=a-bX
(c) y=a*bX
(d) y=a**bX

(1.6) Logistic Regression is _____ learning model. CO3, K2 1

(a) Supervised
(b) Unsupervised
(c) Semi-supervised
(d) Reinforcement

(1.7) Amongest the following is not an example of ensemble method? CO4, K2 1

(a) Decision tree
(b) Adaboost
(c) Random forest
(d) Bootstraping

(1.8) A _____ is a sequence of observations over a certain period. CO4, K2 1

(a) Theano
(b) scikit
(c) time series
(d) tensor

(1.9) The most advanced form of AI? CO5, K3 1

(a) Neural netwrok
(b) Machine Learning
(c) Data Science
(d) Deep Learning

(1.10) A part of the population selected for study is called: CO5, K3 1

(a) Variable
(b) Data
(c) Sample
(d) Parameter

2. Attempt all parts:-

(2.1) Define features of Neural Network. CO1 K2 2

(2.2) Define R vector. CO2, K1 2

(2.3) Define Random variables. CO3, K1 2

(2.4) Define ARMA. CO4, K1 2

(2.5) Write down the types of DNA. CO5, K2 2

SECTION-B 30

Answer any one of the following:-

(3.1) Difference between Feedforward and Feed backward network. CO1, K2 6

(3.2) Explain unsupervised learning. Discuss its types. CO1, K2 6

Answer any one of the following:-

(3.3) Write a short note on List. CO2, K2 6

(3.4) Write the syntax and program for while and do-while statements. CO2, K2 6

Answer any one of the following:-

(3.5) Differentiate between Linear Regression and Logistic Regression. CO3, K3 6

(3.6) Define: (i) odd ratio (ii) probability (iii) log odd ratio CO3, K3 6

Answer any one of the following:-

(3.7) Differentiate between random forest and decision tree. CO4, K2 6

(3.8) Explain Chi-square test. Why do we use it? CO4, K2 6

Answer any one of the following:-

(3.9) Differentiate between bio technology and bio medicine. CO5, K3 6

(3.10) Explain, how biotechnology is useful in your day to day life. CO5, K2 6

SECTION-C 50

4. Answer any one of the following:-

(4.1) Briefly explain different types of ANN with examples. Also give their real life applications. CO1, K3 10

(4.2) Examine in detail about machine learning process with an example. CO1, K3 10

5. Answer any one of the following:-

(5.1) Write a short note on matrix. How can we access the matrix element using a program? CO2, K3 10

(5.2) Define matrix in R. Explain the computations performed in R matrix along with program. CO2, K3 10

6. Answer any one of the following:-

(6.1) Explain: (i) Overfitting and Underfitting (ii)Parametric model and Non-parametric model (iii)Dependent variable and independent variable CO3, K3 10

(6.2) Explain Normal Distribution and Binomial Distribution. Define symmetric and non symmetric functions. CO3, K3 10

7. Answer any one of the following:-

(7.1) Define non linear least square problem. how least square problem can be solved? CO4, K3 10

(7.2) (i) Explain the difference between linear least square and non linear least square. (ii) Time series Analysis and Survival Analysis CO4, K3 10

8. Answer any one of the following:-

(8.1) Explain biostatistics and biotechnology. CO5, K3 10

(8.2) Explain the biological processes in detail. CO5, K2 10