Done

F.Y.B.Sc.(D.S.) – Semester II
LINEAR ALGEBRA
(Time: 1 hour)

Total Marks: 30

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. Find the value of x, y, z by solving the given system of equations using Gauss Elimination method.
$x-3y+2z=2$
$6x-2y+4z=4$
$x+5y+z=2$

b. Find the eigenvalues of the given matrix.
$A=\begin{pmatrix}1 & 2 & 3\\ 2 & 3 & 4\\ 1 & 2 & 3\end{pmatrix}$

c. Check whether the given set is linearly dependent or independent.
$R = \{x+2, x^2+3, 2x^2+3x+12\}$

d. Check whether the mapping is linear or not linear.
$T:\mathbb{R}^2 \rightarrow \mathbb{R}^2$ defined by $T(x,y)=(x+1, y+1)$

e. If $A=\begin{pmatrix}2 & 1\\ 1 & 8\end{pmatrix}$, then show that $A^2-10A+15I=0$ by ~~sung~~ using Cayley-Hamilton Theorem and hence find A^{-1}.

2. Attempt *any three* of the following: **15**

a. Find the rank of the given matrix.
$E=\begin{pmatrix}2 & 1 & 6\\ 2 & -5 & 3\\ 3 & 6 & -1\end{pmatrix}$

b. Write the Diagonal matrix of the given
$L=\begin{pmatrix}1 & 1 & 3\\ 1 & 5 & 1\\ 3 & 1 & 1\end{pmatrix}$
having the characteristic equation as $P(\lambda)=\lambda^3 - 7\lambda^2 + 36$.

c. Calculate the inner product of the given vectors u=(1,-1,4), v=(-2,0 -5). Also find i)u-2v-w , ii)w+3v, where w= (1,-3,8) .

d. Let $T:\mathbb{R}^3 \rightarrow \mathbb{R}^3$ defined by $T(x,y,z)= (x+2y-3z, 2x+5y-4z, x+4y+z)$. Find a basis and the dimension of the kernel and image of T.

e. Will the vectors $u_1 = (1,-2,0)$, $u_2 = (2,-3,2)$, $u_3 = (1,-2,1)$ span $\mathbb{R}^3$?

F.Y.B.Sc.(D.S.) – Semester II
R-Programming

(Time: 30 Minutes)

Total Marks: 15

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1. **Attempt *any three* of the following:** 15

a. 1) What are the factors in R? How they are useful?
2) Write a simple R script to add two numbers and print the result.

b. What are the user defined functions in R? Create a function that calculates the square of a number

c. Explain the conditional statements: if-else, switch statement with examples.

d. What is ggplot2? Explain how to create scatter plot using ggplot2.

e. What are the different data types in R.

F.Y.B.Sc.(D.S.) – Semester II
Eco Friendly Computing

(Time: 1 hour)

Total Marks: 30

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(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. Explain the efforts towards greening the data centres.
b. What are the three approaches that enterprise can adopt to green their IT? Explain.
c. Write a note on PDA and TabletPC.
d. What is intranet? What are different components that are required for building intranet?
e. Justify the statement- "Green IT is a burden or an opportunity"?

2. Attempt *any three* of the following: **15**

a. Write a short note on the hazardous materials present in a computer.
b. Write a short note on the life of a computer system.
c. Give advantages and disadvantages of leasing equipment.
d. Write a note on SMART goals.
e. List and explain key strategies to review action plan.

immediately

efficiency

F.Y.B.Sc.(D.S.) – Semester II
Effective Communication II

(Time: 1 hour)

Total Marks: 30

N. B.: (1) All questions are compulsory.
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(5) Draw neat labeled diagrams wherever necessary.
(6) Use of Non-programmable calculators is allowed.

1. Attempt *any three* of the following: **15**

a. Explain the Email etiquette.
b. What are the key factors for writing Twitter post?
c. Write letter to Manager asking permission for the leave from job for personal reason.
d. Write an application letter to Mantra Infotech, Andheri East for the post of web developer in reference to their advertisement in newspaper.
e. Write Thank you letter to Chief guest for attending college annual program.

2. Attempt *any three* of the following: **15**

a. What are the important factors associated with blog writing?
b. Write the major factors which helps to increase the reach of Instagram post.
c. A committee has been appointed to investigate the possibility of starting a book stall in your college. Draft a report of the committee making suitable recommendations.
d. Write article on subject - AI – merits and demerits.
e. Complete the following story – On Monday morning Suhas was walking for the school. It was an exam day. He was rehearsing all the answers for Civics paper in his mind. Suddenly he heard a loud noise.....

F.Y.B.Sc.(D.S.) – Semester II
Advanced Python Programming

(Time: 1 hour)

Total Marks: 30

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1. **Attempt *any three* of the following:** **15**

a. Explain monthrange() method of calendar module. State any four classes of Datetime module with one line explanation for each.

b. Consider x=np.arange(10) statement is executed. What will be the output for the following commands -
x[:4]
x[-4:9]
x[2:6]
x[::2]
x[::-1]

c. Explain the term vectorization in Python. Consider following statements –
M = np.ones((3, 2))
a = np.arange(3)
M+a
What will be the output?

d. What is a line magic command in IPython? State and briefly explain any four line magic commands.

e. Write a note on NumPy structured array concept with example.

2. **Attempt *any three* of the following:** **15**

a. Create a Series which has all even numbers between 10 to 100. This Series should have index from 1,2,3….. and so on.

b. What will be the output -
1. df = pd.DataFrame({'key': ['A', 'B', 'C', 'A', 'B', 'C'], 'data': range(6)}, columns=['key', 'data'])
2. df
3. df.groupby('key').sum()

c. Create a Series which has 10 numbers generated randomly and index as 0,10,20,30….and so on. Create a line plot for this series data. Give title as 'A Simple Line plot' to the plot. Give Label names as 'X axis' and 'Y Axis'. Write complete code.

d. Write a note on Bar charts.

e. Explain isnull() and dropna() functions. Can we drop a single value from a DataFrame? What will be output for following commands -
1. data = pd.Series([1, np.nan, 2, None, 3], index=list('abcde'))
data
2. data.fillna(0) where data is Series.
3. data.ffill()

F.Y.B.Sc.(D.S.) – Semester II
Web Programming

(Time: 30 minutes)

Total Marks: 15

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(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. Explain the JSON data type with an example.
b. Explain the Keyboard events with a suitable example.
c. Write down a short note on the go() of the history object with the program.
d. Discuss any 5 Date Object methods with examples.
e. Write a short note Object Constructor Functions

F.Y.B.Sc.(D.S.) – Semester II
Fundamentals of Statistics

(Time: 1 hour)

Total Marks: 30

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(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt *any three* of the following: **15**

a. Explain primary and secondary data and differentiate them with suitable examples.

b. Define Histogram and create a Histogram to show the distribution of exam scores.

Score Range	Frequency (Number of students)
0-10	3
11-20	5
21-30	8
31-40	12
41-50	10
51-60	7
61-70	5

c. Calculate Mean, Median, Mode for the following data

Class	0-10	10-20	20-30	30-40	40-50	50-60
Interval	12	18	27	20	17	6

d. Calculate Quartile-2, Decile-6 and percentiles-45 from the following data
85,96,76,108,85,80,100,85,70,95

e. Find the coefficient of variation of the following data.

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	14	23	27	21	15

2. Attempt *any three* of the following: **15**

a. For the following data find the Karl Pearson's coefficient of skewness.
12,18,25,15,16,10,8,15,27,14

b. The first four raw moments of the distribution are 0, 2.5, 0.7, 18.75. Comment on the Skewness and Kurtosis.

c. Find the lines of Regression for the following data:

x	2	4	6	8	10
y	3	5	7	10	12

d. Calculate (i) three yearly (ii) five yearly, Moving average for the following data

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
y	242	250	252	249	253	255	251	257	260	265	262

e. Fit a straight line trend by method of least square

Year	1961	1962	1963	1964	1965	1966	1967	1968
Profit	80	90	92	83	94	99	92	104

F.Y.B.Sc.(D.S.) – Semester II
SUBJECT- Object Oriented Programming with C++

(Time: 30 minutes)

Total Marks: 15

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(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.
(6) Use of Non-programmable calculators is allowed.

1. Attempt *any three* of the following: 15

a. What does inheritance mean in C++? Give an example of anyone inheritance.
b. What is the Overloading function? Explain with an example.
c. What is a constant in C++, and how does it differ from a regular variable?
d. Define class and object with suitable example.
e. What is a virtual function? Explain with an example.

F.Y.B.Sc.(D.S.) – Semester II
DATABASE DESIGN MANAGEMENT II

(Time: 1 hour)

Total Marks: 30

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(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.
(6) Use of Non-programmable calculators is allowed.

1. Attempt *any three* of the following: **15**

a. Write a PL/SQL code to multiply two numbers using substitution variables.
b. Explain Simple CASE Statement with syntax and example.
c. Discuss EXIT Statement and CONTINUE WHEN Statement with Syntax.
d. Write a note on operators in PL/SQL.
e. Explain PL/SQL packages with syntax.

2. Attempt *any three* of the following: **15**

a. List and explain the advantages of NoSQL.
b. Explain Velocity, Volume, Variety, Veracity and Value.
c. Explain deleteOne() and deleteMany() methods with example.
d. Explain the concept of MapReduce in MongoDB with example.
e. Discuss Regular expressions in MongoDB with syntax and example.