F.Y.DS Sem II

OR

F.Y.B.Sc.(D.S.) – Semester II

WEB PROGRAMMING FUNDAMENTALS

(Time: 2 hours)

Total Marks: 60

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**.

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

a. Write a short note on the components of the web.

b. Differentiate between:
1. Container Tags 2.Empty Tags
Provide examples of each.

c. Write an HTML program demonstrating the use of logical tags. Include examples of , , and <sub> in meaningful text.

d. What is the meaning of a universal selector? Explain by example.

e. Create an HTML page that uses **inline CSS** to style a heading and a paragraph. Apply different colors and font sizes using the style attribute.

f. Write a program to demonstrate the basic structure of HTML programming.

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

a. Discuss the concept of Rowspan with an example.

b. What is the meaning of < label>? Explain with an example.

c. Explain the following attributes of the <img> tag:
1. Src 2. Alt 3. width and height

d. Explain jQuery syntax.
Describe the meaning of the expression: $(selector).action() with an example.

e. Define an HTML table.
Explain the purpose of the following tags:
1.<table> 2.<tr> 3.<th> 4.<td>

f. Create a course selection form with the following fields:
1.Student Name (text input) 2. Select Course (dropdown list with at least 4 options)
3.Hobbies (checkboxes – Reading, Sports, Music, Travelling) 4. Submit button

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

a. Explain the if...else statement with syntax and an example.

b. Write a JavaScript program using a while loop to display numbers from 1 to 10.

c. Discuss JavaScript's new Operator with an example.

d. What are JavaScript variables? Explain the use of var and const with an example.

e. Write a JavaScript program with a button that navigates forward in browser history using history.forward().

f. Explain the rules for naming variables (identifiers) in JavaScript.

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

a. Write a difference between JSON and XML.

b. Write a short note on addEventListener().

c. Explain the JavaScript window object.

d. Write a JavaScript program to demonstrate the following events.
1.pageLoaded() 2.buttonClicked()

e. What are mouse events in JavaScript? Explain their importance in web development.

f. Explain JSON syntax.

F.Y.B.Sc.(D.S.) – Semester II
Data Analytics using R
(Time: 2 hours)

Total Marks: 60

N. B.: (1) **All** questions are **compulsory**.
(2) Answers to the **same question** must be **written together**.
(3) Numbers to the **right** indicate **marks**.
(4) Draw **neat labeled diagrams** wherever **necessary**.

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

a. Explain classs() function and is() function in R?
b. What are arithmetic operators in R?
c. How do you create a data frame in R?
d. Write a note on factors.
e. How will you access components of a list using indices?
f. Explain matrices in R.

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

a. What are control structures in R?
b. What is for loop? Explain with an example.
c. Write a note on a repeat loop.
d. Explain lapply() function with an example.
e. Write down steps to call a function in R.
f. What are components of a function?

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

a. How to install and load packages in R? Explain with an example.
b. Explain mutate() and transmute() functions in dplyr with an example.
c. What is right join in dplyr? Explain.
d. Write down steps to create a csv file using both the methods.
e. What is ggplot2?
f. Write a program to create a scatter plot showing the relationship between car weight and mileage using the 'mtcars' dataset.

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

a. Define median and range. How are they calculated in R?
b. Explain how maximum and minimum values are calculated in R with an example.
c. How to interpret correlation tests?
d. Describe linear regression with an example.
e. What is time series analysis?
f. The scores for nine students in history and algebra are as follows:

History	35	23	47	27	10	43	9	6	28
Algebra	30	33	45	23	8	49	12	4	31

Compute the Spearman rank correlation.

F.Y. D.S. – Semester II
Linear Algebra and Matrix Theory
(Time: 2 hours)

Total Marks: 60

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 **scientific** calculator is **allowed**.

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

a. Solve the given matrix using Row echelon form.

$$A=\begin{pmatrix} 0 & 1 & 2 \\ -4 & 5 & 7 \\ 2 & 8 & 9 \end{pmatrix}$$

b. Find the distance between the vectors u=(2,1,6) , v=(3,5,1) and also find projection of vector u onto v.

c. Find the value of x, y, z by solving the given system of equations using Gauss Jordan Elimination method.

$x - 3y + 2z = 2$
$3x - 2y+4z = 6$
$x + y + z = 2$

d. Find the rank of the given matrix.

$$E=\begin{pmatrix} 2 & 1 & 6 \\ 4 & -2 & 3 \\ 3 & 2 & -1 \end{pmatrix}$$

e. Calculate the length of vectors u = (5,7,2) and v = (8,4,2). Also find their cross product.

f. Calculate volume of parallelepiped for the given vectors a=(6,5,3), b=(1,9,7), c=(7,0,2). Also calculate a-2b+c.

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

a. Check whether the given set D ={(0,3),(2,1)} is basis of $\mathbb{R}^2$ or not.

b. Check whether the given set is linearly dependent or independent.
R = {x+5, x^2-2, x^2+6}

c. Write the definition of vector space and state all the properties of vector space.

d. Verify properties of addition for the space $\mathbb{R}^2$ having x, y $\in \mathbb{R}^2$ and k $\in \mathbb{R}$.

e. Will the vectors u_1 = (4,-1,0), u_2 = (1,-3,1), u_3 = (0,-2,-1) span R^3 ?

f. Check whether W={$(x_1, x_2, x_3) \in \mathbb{R}^3 \mid x_1 + x_2 - x_3 = 0$ } is subspace or not.

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

a. Find the eigenvalues of the given matrix.

$$A=\begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{pmatrix}$$

b. Write the Diagonal matrix of the given matrix

$$L=\begin{pmatrix} 2 & 3 & 5 \\ 4 & 6 & 10 \\ 6 & 9 & 15 \end{pmatrix}$$

having the characteristic equation as $P(\lambda) = -\lambda^3 + 23\lambda^2$

c. If $A=\begin{pmatrix} -2 & 1 \\ 1 & 6 \end{pmatrix}$, then show that A^2-4A-13I=0 by using Cayley-Hamilton Theorem

and hence find A^{-1}.

d. Write the properties of eigenvalues.

e. Find the eigenvectors of the matrix M= $\begin{pmatrix} -2 & 1 \\ 0 & -1 \end{pmatrix}$ having eigenvalues -2 and -1.

f. Find the characteristic polynomial for the given matrix C= $\begin{pmatrix} 1 & 0 & 3 \\ 1 & 5 & 4 \\ 3 & -2 & 1 \end{pmatrix}$

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

a. Calculate the inner product of the given vectors u=(1,-5,4), v=(-7,0,8). Also find i)u-2v+w , ii)w-v, where w= (5,-3,6) .

b. Let T:$R^3 \rightarrow R^3$ defined by T(x,y,z)= (x+0y-z, 2x+y-3z, x-4y+z). Find a basis and the dimension of the kernel and image of T.

c. Check whether the mapping is linear or not linear.
T:$R^2 \rightarrow R^2$ defined by T(x,y)=(x+11, y+11)

d. Check whether the given matrix is orthogonal or not.
B= $\begin{pmatrix} 6 & 5 \\ 3 & 3 \end{pmatrix}$

e. Write the definition of Kernel and Image. Also state Rank-Nullity Theorem.

f. Using Gram Schmidt orthogonalization process construct the orthonormal set of vectors. Given: (1,1,1), (0,1,1), (0,0,1).

F.Y.B.Sc. (D.S.) NEP – Semester II
Semester II
Subject: - Effective Communication II

Date: **(Time: 1 hour)** **Total Marks: 30 marks**

14/03/2025

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**.

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

a. Explain the different parts of formal letter.
b. What are the keys to write for LinkedIn?
c. Write an Application Letter with C.V for the job to Mastek India Ltd. Andheri East.
d. Write a thank you letter to Chief Guest for attending College's Annual Day.
e. Write paragraph on 'My concept of Happiness.'

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

a. What are the important factors in writing impressive project proposal?
b. How you can make Instagram post more visible?
c. A students committee has been appointed to investigate the possibility of starting a book stall in your college. Draft a report as member of committee with suitable recommendations.
d. As an Operation Manager draft a memo for the employees announcing strict new policies regarding use of mobile phone in the office.
e. Complete the following story:
Saloni didn't have any brother or sister. Her parents were often busy working. Saloni was never bored because she loved being on her own in the garden. One day when she was in the garden.....

F. Y. B. Sc. (D.S.) – Semester II
SUBJECT: Differential & Integral Calculus
(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. Define the following terms:
i) Left Hand Limit
ii) Right Hand Limit
iii) Polynomial Function
iv) Continuity of Function
v) Power Function

b. Evaluate: $\lim_{x\to 4} \frac{x^2-16}{\sqrt{x}-2}$

c. Find the value of k if given function is continuous at $x = 4$

$f(x) = 3x + 5, \quad x \neq 4$
$= kx^2 + 4x + 5, x = 4$

d. Evaluate: $\lim_{x\to 0} \frac{e^{6x}+e^{7x}-2}{x}$

e. Evaluate: $\lim_{x\to 4} \frac{x^3-9x^2+26x-24}{x^2-6x+8}$

f. Evaluate: $\lim_{x\to 0} \frac{sin4xtan7x}{sin5xtan3x}$

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

a. Find $3rd$ order derivative of $y = x^5 + 2x^4 - x^3 + 5x^2 + 30x - 1$ at $x = 3$

b. Examine extreme values of the function $y = x^3 - 6x^2 + 9x - 32$

c. Find the interval in which function $y = 4x^3 - 42x^2 + 144x + 12$ is increasing & decreasing.

d. Prove that $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$ where $u = 2x^3y + 3xy^3 + x^3 + y^3$

e. Evaluate $\int_1^3 (x^4 + 2x^3 - x^2 + 10x - 4)\, dx$

f. Find the area of the region in the first quadrant bounded by parabola $x^2 = 16y$, y-axis & the lines $y = 1$ & $y = 4$

F.Y.B.Sc. (D.S.) NEP – Semester II

Digital Marketing

Date: **(Time: 1 hour)** **Total Marks: 30 marks**

17/03/2026

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**.

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

a. Explain briefly the benefits of Digital Marketing.
b. Explain in brief the evolution of digital marketing.
c. Describe the 7 Cs of Digital Marketing.
d. Explain the need for digital marketing plan.
e. Explain the basis of digital customer segmentation.
f. Write a note on Vodcast.

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

a. What are the types of email marketing?
b. Explain in detail uses of content marketing.
c. Explain ways for creation and management of social media profiles for business?
d. What are the key elements of campaign marketing?
e. Explain the methods of online marketing research.
f. Explain the principles of website designing.

F.Y.B.Sc.(D.S.) – Semester II

OBJECT ORIENTED PROGRAMMING WITH C++

(Time: 30 minutes)

18/03/2026

Total Marks: 15

N. B.: (1) **All** questions are **compulsory**.
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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**.

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

a. Describe the process of compiling and executing a C++ program with a neat diagram.

b. Define operators. Write a program to perform arithmetic operations using operators.

c. What is Object-oriented programming? List the features of OOPs.

d. Define constructor? Explain parameterized constructor with example?

e. Define function overriding. Demonstrate the working using program.

f. Write a function in C++ to swap two numbers using Call by Value.