22-BCADS-022

ECHELON INSTITUTE OF TECHNOLOGY

First Sessional Test, November 2022

Programme: BCA **Branch:** BCA **Sem:** 1st
Course Code: BCA-DS-103 **Subject:** Computer Fundamentals & Organization
Duration: 90 minutes **Max Marks:** 25

Note: 1-*It is compulsory to answer Question 1 of* ***Part-A*** *in short.*
2-*Answer any two questions from* ***Part-B*** *in detail*

PART-A

1. **(a)** Define Computer. (1)
   (b) Define cache memory. (1)
   (c) Write any 3 limitations of computer. (1)
   (d) Define flash memory. (1)
   (e) Define any two Input and Output devices. (1)

PART-B

2. (a) Explain the classification of computer in detail. (5)
   (b) Explain the main components of computer with the help of neat diagram. (5)

3. (a) Explain Flynn's classification of computer. (5)
   (b) Differentiate between RAM and ROM. (5)

4. (a)Explain the memory hierarchy in detail. And why it is required? (5)
   (b) Differentiate between primary and secondary memory. (5)

5. (a) Explain the use of computer in medical and education field. (5)
   (b) What do you by sequential and direct access and which one better? (5)

Roll No .....

First Sessional Test, November- 2022

B.C.A (Data Science) –I SEMESTER

Algebra and Calculus (DS-104)

Time: 90 Minutes [Max **Marks**: 25]

Instructions:

1. It is Compulsory to answer all the questions (1 mark each) of **Part –A** in short
2. Answer any three questions from **Part – B** in detail.
3. Different **Sub-parts** of a question are to be attempted adjacent to each other.

Part - A

1 Demonstrate the Orthogonal and Unitary Matrices with an Example (1)

2 Differentiate Symmetric and Skew Symmetric Matrices with example (1)

3 Show that $\begin{bmatrix} cos\theta & sin\theta \\ -sin\theta & cos\theta \end{bmatrix}$ *is Orthogonal matrix* . (1)

4 Demonstrate the Singular and Non Singular Matrices with an Examples (1)

5 Show that the matrix $\begin{bmatrix} 4 & 1+i \\ 1-i & 4 \end{bmatrix}$ is Hermitian. (1)

6 If A is Orthogonal matrix show A^{-1} is also Orthogonal. (1)

7. find the Rank of a Matrix A if $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ (1)

8 . Write the Statement of Cayley – Hamilton's Theorem. (1)

9. If λ is an Eigen Value of $A = \begin{pmatrix} 2 & 2 \\ 1 & 3 \end{pmatrix}$. Then what is the value of λ. (1)

10. Show that the Matrix A = $\begin{bmatrix} 0 & 2 & -45 \\ -2 & 0 & -4 \\ 45 & 4 & 0 \end{bmatrix}$ is Skew Symmetric. (1)

Part - B

1. Verify Cayley – Hamilton theorem of the Matrix $\begin{bmatrix} 5 & 6 \\ 1 & 2 \end{bmatrix}$. Also ,find the Inverse of the Matrix . (5)

2. If N = $\begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$. *Show that* (I-N)(I+N)$^{-1}$ is a Unitary Matrix . (5)

3. Find all eigenvalues and corresponding eigenvectors for the matrix A If A = $\begin{bmatrix} 2 & -3 & 0 \\ 2 & -5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ (5)

4. Show that the Martix $A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ Satisfies its Characteristic equation and find A^{-1} and A^{-2} . (5)

22-BCADS-022

ECHELON INSTITUTE OF TECHNOLOGY

First Sessional Test, November 2022

Program : BCA
Course Code : BCA-DS-101
Date : 29.11.2022

Branch: BCA
Subject: Programming in C
Duration: 90 minutes

Sem: 1st
Max Marks: 25

Note: *Question No. 1 is compulsory. Attempt any 3 questions from question 2 to 6.*

Q1. Short answer type questions: (10)

a. When and where C was invented and by whom?
b. Where C language is used, mention any 2 points?
c. Why #include directive is used?
d. What commands are used to compile and run the C program.
e. How to declare a variable?
f. How to declare a constant?
g. What are keywords? Define any three.
h. How is data read from the keyboard in a C program?
i. Write the print format for printing "Hello C" on the screen.
j. Differentiate binary, unary and ternary operators.

Q2. Differentiate between Compiler and Interpreter. (5)

Q3. Explain Arithmetic operators. (5)

Q4. (a) Draw truth table for logical operators. (3)

(b) Evaluate the values of X, Y and Z if a=9; b=12; c=3
X=a-b/3+c*2-1 , Y=a-b/(3+c)*(2-1) and Z=a-(b/(3+c)*2)-1 (2)

Q5. Write a program to calculate simple interest in C. (5)

X = 9 - 12/3 + 3 * 2 - 1 -1, -2, 7

+ − x /

3/4

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PXRXT / 100

BODMAS

ECHELON INSTITUTE OF TECHNOLOGY

First Sessional Test, November 2022

Programme: BCA(DS) **Branch:** Computer Applications **Sem:** 1st
Course Code: BCA-DS-102 **Subject:** Internet & Web Fundamentals
Date: 29 Nov. 2022 **Duration:** 90 minutes **Max Marks:** 25

Note: *Answer any three questions in total. Question No. 1 is compulsory. Marks are indicated against each question.*

Q. 1 Objective / short answer type questions

1) A piece of icon or image on a web page associated with another web page is called (1 Mark)
a) URL
b) Hyperlink
c) Plugin
d) Extension

2) _____ is known as father of WWW (1 Mark)
a) John T. Thomson
b) Denis Ritchie
c) Tim Berners-Lee
d) None of the above

3) Internet is a (1 Mark)
a) Local Computer Network
b) World wide network of computers
c) An interconnected network of computers
d) A world wide interconnected network of computers which use a common protocol to communicate with one another.

4) Set of rules used to communicate various applications to each other is called _____(1 Mark)

5) FTP is built on _____ architecture. (1 Mark)

Q. 2 Discuss the list of all internet tools for internet access. Why internet address plays an important role for tasks performed on internet? (10 Marks)

Q. 3 Explain the term complexity with reference to software. How many types of complexities are found while designing software? Explain. (10 Marks)

Q. 4 "Encryption is considered as a safe guard for data security" Do you agree with this statement? Explain all types of data encryption schemes used for security of data. (10 Marks)

Q. 5 Differentiate the following: (5 x 2=10 Marks)
a) Encryption vs. Decryption
b) Internet, Intranet and Extranet

Roll No. .....

First Sessional Test, December 2022

BCA (DS) 1th Semester

Self-Guided Improvement (BCA-CC-105)

Time: 90 Minutes **Max Marks: 25**

Instructions:

1. *It is compulsory to answer all the questions (1 mark each) of **Part-A** in short.*
2. *Answer any three questions from **Part-B** in detail.*
3. *Different **sub-parts** of a question are to be attempted adjacent to each other.*

PART-A

1.	(a)What are Attributes?	(1)
	(b) Define Personality	(1)
	(c) What is Self-Efficacy?	(1)
	(d)What is belief?	(1)
	(e) Why Confidence is necessary?	(1)
	(f) What are Values	(1)
	(g) What is Self-Guided Improvement?	(1)
	(h) Define Environmental Influences.	(1)
	(i) What is relation between personality and positivity in life?	(1)
	(j) Differentiate between self-efficacy and self-esteem.	(1)

PART-B

2.	(a) What is SWOT Analysis?	(3)
	(b) What is self Esteem and explain the importance of Self Confidence?	(2)
3.	(a) What is Personality and why does it matter?	(2)
	(b) How do personalities develop?	(3)
4.	Why matching of Career and Personality is important?	(5)
5.	Explain the Big Five Dimensions.	(5)
6.	Explain the Basic Personality Traits.	(5)

F-32. (8)

Roll No. .....

Pre University Test, December 2022

BCA (DS) 1st Semester

Self-Guided Improvement (BCA-CC-105)

Time: 3 Hrs. **Max Marks: 75**

Instructions:

1. *It is compulsory to answer all the questions (1.5 marks each) of **Part-A** in short.*
2. *Answer any four questions from **Part-B** in detail.*
3. *Different **sub-parts** of a question are to be attempted adjacent to each other.*

PART-A

1.	(a)What are Etiquette?	(1.5)
	(b) Define Personality	(1.5)
	(c) What is Self Talk?	(1.5)
	(d)What is belief?	(1.5)
	(e) Why Confidence is necessary?	(1.5)
	(f) What are Values	(1.5)
	(g) What is Self-Guided Improvement?	(1.5)
	(h) Define Environmental Influences.	(1.5)
	(i) What is relation between personality and positivity in life?	(1.5)
	(j) Differentiate between self-efficacy and self-esteem.	(1.5)

PART-B

2.	(a) What is SWOT Analysis?	(8)
	(b) What is self Esteem and explain the importance of Self Confidence?	(7)
3.	(a) What is Personality and why does it matter?	(7)
	(b) How do personalities develop?	(8)
4.	Why matching of Career and Personality is important?	(15)
5.	Explain the Big Five Dimensions.	(15)
6.	(a) What are factors of Motivation?	(7)
	(b) What are Intrinsic and an Extrinsic motivators?.	(8)
7.	(a)What are the factors that influence attitude ?	(7)
	(b) What are the lessons from Attitude?	(8)

Roll No. 22-BCADS-022

Pre University Test, December 2022

BCA (DS) 1st Semester

Self-Guided Improvement (BCA-CC-105)

Time: 3 Hrs. **Max Marks: 75**

Instructions:

1. *It is compulsory to answer all the questions (1.5 marks each) of **Part-A** in short.*
2. *Answer any four questions from **Part-B** in detail.*
3. *Different **sub-parts** of a question are to be attempted adjacent to each other.*

PART-A

1.	(a)What are Etiquette?	(1.5)
	(b) Define Personality	(1.5)
	(c) What is Self Talk?	(1.5)
	(d)What is belief?	(1.5)
	(e) Why Confidence is necessary?	(1.5)
	(f) What are Values	(1.5)
	(g) What is Self-Guided Improvement?	(1.5)
	(h) Define Environmental Influences.	(1.5)
	(i) What is relation between personality and positivity in life?	(1.5)
	(j) Differentiate between self-efficacy and self-esteem.	(1.5)

PART-B

2.	(a) What is SWOT Analysis?	(8)
	(b) What is self Esteem and explain the importance of Self Confidence?	(7)
3.	(a) What is Personality and why does it matter?	(7)
	(b) How do personalities develop?	(8)
4.	Why matching of Career and Personality is important?	(15)
5.	Explain the Big Five Dimensions.	(15)
6.	(a) What are factors of Motivation?	(7)
	(b) What are Intrinsic and an Extrinsic motivators?.	(8)
7.	(a)What are the factors that influence attitude ?	(7)
	(b) What are the lessons from Attitude?	(8)

Roll No. .....

December 2022

BCA- 1 Semester(DS)

Programming in C (BCA-DS-101)

Time: 3 Hrs **Max Marks: 75**

Instructions:

1. *It is compulsory to answer all the questions (1.5 mark each) of **Part-A** in short.*
2. *Answer any 4 questions from **Part-B** in detail.*
3. *Different **sub-parts** of a question are to be attempted adjacent to each other.*

PART-A

Q1. (a) What is variable. [CO2]
(b) What is Data Type. [CO2]
(c) What does scanf and printf function do. [CO2]
(d) Difference in Assignment and equality operator[CO2]
(e) Explain few keywords. [CO2]
(f) Why is GOTO Statement used ? [CO2]
(g) Where gets and puts functions are used? [CO2]
(h) What does RETURN statement do? [CO2]
(i) why continue statement is used in loops? [CO3]
(j) why is Break statement used in Loop? [CO3]

PART-B

Q2. a) what is operator hierarchy and associativity is applied in solving an expression? Explain with example. [CO2](10)
b) what is the difference in Post and Pre increment/decrement operators explain with short example. [CO2](5)

Q3. a) Explain inbuild data types. [CO2] (8)
b) Explain Arithmetic operators. [CO2](7)

Q4 a) What is type casting and type conversion? Explain with example. [CO3](5)
b) write a C program to implement nested IF ELSE ladder. [CO3] (10)

Q5. Explain the difference in Pass by value and pass by reference with programs in C. [CO3] (15)

Q6. a) what are inbuild Math and String functions? Explain any five. [CO3] (10)
b) explain the difference in getch(),getche(),getchar() and gets() functions. [CO3] (5)

Q7 write a C program to explain the difference in while and do-while loops using break and continue statements. [CO3] (15)

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Roll No. ..... Total Pages: 2

December 2022

BCA (DS)- I Semester

Internet & Web Fundamentals (BCA-DS-102)

Time: 3 Hrs **Max Marks: 75**

Instructions:

1. *It is compulsory to answer all the questions (1.5 mark each) of **Part-A** in short.*
2. *Answer any four questions from **Part-B** in detail.*
3. *Different **sub-parts** of a question are to be attempted adjacent to each other.*

PART-A

1. (i) HTML stands for

A) Hypotext Markup Language
B) Hypertext Markup Language
C) Heuristic Language
D) Hypertext Manipulation Language *[CO-2] (1.5)*

ii). An _____ is a company that provides internet access to users or subscribers of its service. *[CO-1](1.5)*

iii) The process of transferring files from a web page on the internet to your computer is called *[CO-2](1.5)*

a) Uploading b) Transferring
c) Forwarding d) Downloading

iv) _____ are set of rules and procedures for communicating in the network. [CO-2][1.5]

v). A unique address assigned to each computer in the network is called _____. [CO-1] (1.5)

vi) A web page is located using a _____.

A. Universal Record Linking
B. Uniform Resource Locator
C. Universal Record Locator
D. Uniformly Reachable Links [CO-1] (1.5)

vii) Which of the following protocol is used for WWW?

A. FTP
B. SMTP
C. TCP
D. HTTP [CO-1] (1.5)

viii) _____ is a computer program running to serve the requests of other programs.

A. Server
B. Client
C. Software
D. Application [CO-4] (1.5)

ix) _____ programs are automatically loaded and operates as a part of browser.

A. Utilities
B. Plug-ins
C. Widgets
D. Add-ons [CO-4] (1.5)

10. _____is to protect data and passwords.

A. Encryption
B. Authentication
C. Authorization
D. Non-repudiation [CO-4] (1.5)

PART-B

2. Write short notes on : (5 Marks each) [CO-1](15)
i) Newsgroup
ii) Internet Congestion
iii) Domain Name Server (DNS)

3. Define search engine? Why we need the search engine. Explain all categories of search engine and their working. [CO-2](15)

4. (a) Give a brief detail of WWW. Also write the emergence of web also. [CO-1] (7)
(b) What is the need of markup language in web technology? Discuss. [CO-2] (8)

5. What do you understand by data encryption? Explain all schemes used for data encryption for the purpose of data security. [CO-4] (15)

6. Differentiate the following: (5 Marks each) [CO-2,4] (15)
(a) Telnet and FTP
(b) SMTP and HTTP
© Stateful and Stateless Firewall

7. a) What are digital signatures in computer network? What is its need? Explain. [CO-4](10)
b) Write a short note on software complexity. [CO-4](5)

Roll No. 22-BCADS-022 Total Pages: 2

December 2022

BCA(DS)- 1st Semester

Computer Fundamental and Organization (BCA-DS-103)

Time: 3 Hrs **Max Marks: 75**

Instructions:

1. *It is compulsory to answer all the questions (1.5 mark each) of **Part-A** in short.*
2. *Answer any four questions from **Part-B** in detail.*
3. *Different **sub-parts** of a question are to be attempted adjacent to each other.*

PART-A

1.

(a) Differentiate between HLL and LLL. [CO-1] (1.5)
(b) Define runtime error. [CO-1] (1.5)
(c) Define Assembler. [CO-1] (1.5)
(d) Define Linker. [CO-1] (1.5)
(e) Discuss the any two attributes of good programming languages. [CO-1] (1.5)
(f) Discuss the term flash memory. [CO-2] (1.5)
(g) Define structured programming language. [CO-3] (1.5)
(h) Define the term debugging. [CO-3] (1.5)
(i) Define the virtual memory. [CO-1] (1.5)
(j) Define the term software? [CO-1] (1.5)

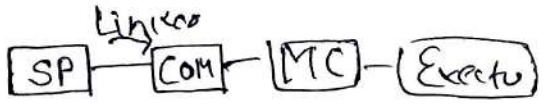
PART-B

2. (a)Describe the programming methodologies with respect of top down and bottom up Approach. [CO-1] (7)
(b) List the all applications of computers in various fields of day-to-day life.[CO-1] (8)

3. (a) Explain memory unit of computer in detail along with primary and Secondary memory. [CO-1] (10)
(b) List out the difference between sequential and direct access of data [CO-1] (5)

4. (a) Write short note on: (5 Marks each) [CO-1,2] (15)
i) MISD
ii) Storage Devices
iii) Cache Memory

5. Explain all generations of programming languages in detail. With context to artificial intelligence, which language is best and why? [CO-2](15)



6. (a) What is memory hierarchy? Why we need it? Explain with the help of an example.[CO-1] (7)
(b) Discuss the various types of errors occurred during the software development. [CO-1](8)

7. How a problem can be defined and designed in a computer program? Explain with the help of an example. Also explain the debugging while locating errors in the given program. [CO-1] (15)

Roll No 2201531 2020 Total Pages : 3

312105

January 2023
BCA (DS) Ist Semester
Self-Guided Improvement (BCA-DS-105)

Time: 3 Hours] [Max. Marks. : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Expand SWOT. (1.5)

(b) Define Empathy. (1.5)

(c) What is self-image? What is its correlation with First Impression? (1.5)

(d) What role does self-esteem play in developing a good self-image? (1.5)

(e) Define SMART goals. (1.5)

(f) Define Procrastination. (1.5)

(g) What is Everyday Leadership? (1.5)

(h) Define Positive Thinking. (1.5)

(i) Adaptability (1.5)

(j) Self-esteem. (1.5)

PART-B

2. (a) Many people confuse goal setting with wishful thinking. Explain how setting goals require effort and good judgment? (10)

(b) Whose personality is likely to lead to faster career growth-one who glorifies his real successes much more than the disappointments or one who presents both in a balanced manner? Why? (5)

3. (a) How does personality change under (i) stress and (ii) anger? How should one deal with these traits? (5)

(b) Enlist some ways in which a person can become more creative? (10)

4. Analyse your strengths and weaknesses in your current position. Now do the same for your previous role and comment on the differences. (15)

5. (a) As part of time management, how do you prioritize tasks when they appear equally important to you? (5)

(b) Why is it important to practice proper etiquette rules and good manners? (10)

6. (a) List the ways of developing your personal brand. (10)

(b) Enlist some ways to develop Emotional Intelligence. (5)

7. Why are soft skills so much in demand? Give reasons with detailed explanation. (15)

Roll No. ..... Total Pages : 3

2020

312103

January 2023

BCA(DS)- 1st SEMESTER

Computer Fundamentals and Organization

(BCA-DS -103)

Time: 3 Hours] [Max. Marks. : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What is volatile Memory? (1.5)

(b) What is the full form of SISD? (1.5)

(c) Explain the advantages of structured programming. (1.5)

(d) What is the difference between implied and immediate addressing modes? (1.5)

(e) What do you mean by instruction format? (1.5)

(f) What is a loader? (1.5)

(g) What are the limitations of computer? (1.5)

(h) Explain pointing devices. (1.5)

(i) Difference between Assembler and Compiler. (1.5)

(j) What is the difference between-an error and a bug? (1.5)

PART-B

2. (a) What is Computer? Explain the Block diagram of Computer along with its Components. (10)

(b) What are various types of programming methodologies? (5)

3. (a) Difference between RISC and CISC. (5)

(b) What do you mean by the network? Explain its various types. (10)

4. (a) Explain the following terms: Linker, Debugging, Virtual Memory, Stored program Concept, and Web. (5)

(b) What is an instruction? Also, explain various types of instructions. (10)

5. Explain addressing mode. What are the various types of addressing modes? (15)

6. What is Memory Hierarchy? Explain Secondary memory with its various types. (15)

7. (a) What is the Instruction Cycle? (5)

(b) What is an Instruction Format? Also, explain its types. (10)

Roll No. ..... Total Pages : 3

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312101

January 2023

BCA(DS) 1st SEMESTER

Programming in C (BCA-DS-101)

Time : 3 Hours] [Max. Marks : 75

Insturuction :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Define an Algorithm. What are the characteristics of an algorithm? (1.5)

(b) What do you understand by function prototype? What is its significance? (1.5)

(c) What is meant by memory bleeding? (1.5)

(d) What are basic data types in C? Also give their memory requirement. (1.5)

(e) Name any *six* library functions used in C language. (1.5)

(f) Differentiate between gets() and puts() functions. (1.5)

(g) What is the difference between break and continue statement? (1.5)

(h) Differentiate between Formal parameters and actual parameters. (1.5)

(i) What is the difference between Array and Structures? (1.5)

(j) What is Nesting of if-else? (1.5)

PART-B

2. (a) Write a program in C to find rout the roots of a quadratic equation. (8)

(b) Discuss in detail the various types of logical operators used in C with small programming examples. (7)

3. (a) Write a program in C to print all Armstrong numbers up to 1000. (6)

(b) Differentiate between user defined functions and library functions. Explain in detail parameter passing techniques with suitable programming example. (9)

4. (a) Write a program in C to find out the smallest number and its position in a given Array. (7)

(b) Define a string. How is it stored in memory? Write a program to that reads a string and counts the number of vowels, words and white spaces present in the string. (8)

5. (a) What is the difference between recursion and iteration? Write a recursive function to print N terms of Fibonacci series and call this function in main () program to print 20 terms of the series. (9)

(b) What are different storage classes used in C? (6)

6. (a) Differentiate between the following functions with small programming examples :

(i) getchar() and putchar().

(ii) getc() and putc().

(iii) getch() and getche(). (9)

(b) Draw a flow chart to find out the largest out of given three numbers. (6)

7. (a) Discuss any four library functions used on strings with suitable programming examples. (8)

(b) Write a program that reads two variables x and y of type integer. It prints the exchanged contents of these variables with the help of pointers, without altering the variables. (7)

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Sr. No. 312102

January 2023

BCA(DS)- I SEMESTER

Internet and Web Fundamentals (BCA-DS-102)

Time: 3 Hours **Max. Marks:75**

Instructions:
1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART -A

Q1 (a) What do you mean by web browser? (1.5)

(b) What do you mean by the internet service providers (ISP) (1.5)

(c) What is file transfer protocol (FTP) (1.5)

(d) What is the use of the form in HTML? (1.5)

(e) What do you mean by the chatrooms? (1.5)

(f) What do you mean by the internet congestion? (1.5)

(g) What is the firewall? (1.5)

(h) What do you mean by secure web document? (1.5)

(i) Write the difference between the HTML and XML? (1.5)

(j) What do you mean by the network? (1.5)

PART -B

Q2 (a) What is internet? Explain the various modes of connecting to internet. (8)

(b) What is e-mail? Explain the components of an email message? (7)

Q3 (a) What do you mean by the web server? Give an overview of the Microsoft personal web server. (7)

(b) What do you mean by the hyperlink? How can we create a hyperlink in HTML? Explain it by giving a suitable example. (8)

Q4 (a) What is HTML? What types of pages are created with the help of HTML. Explain the structure of the HTML document. (10)

(b) Why do we need the digital signature? Explain it. (5)

Q5 (a) How java script can be embedded in HTML page? Explain it by giving a suitable example. (8)

(b) Why are search strategies important in searching the web? Explain it. (7)

Q6 (a) What is a search engine? How Does a search engine work? Explain it. (10)

(1.5)

(b) What is client side programming? How does client side programming differ from server side programming? Explain it. (5)

Q7 Write short note on following (5*3)

(a) Encryption Schemes
(b) Plug-ins
(c) Business Culture on Internet

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	Sr. No 312104
Jan 2023	
BCA (Data Science) -1st Semester,	
Algebra & Calculus (BCA-DS-104)	
Time: 3 Hours	**Max. Marks:75**
Instructions:	*1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.* *2. Answer any four questions from Part -B in detail.* *3. Different sub-parts of a question are to be attempted adjacent to each other.*

PART –A

Q1 (a) Prove that the inverse of Orthogonal matrix is also orthogonal.. (1.5)

(b) Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$. (1.5)

(c) Factorize by Partial Fractions method, $\frac{5x-4}{(x-2)(x+1)}$. (1.5)

(d) State Leibnitz Theorem.. (1.5)

(e) Solve the equation $4x^3 - 4x^2 - 15x + 18 = 0$, two of its roots being equal. (1.5)

(f) Find the nth order derivative of $\frac{1}{1-5x+6x^2}$. (1.5)

(g) If $V = \frac{x^3y^3}{x^3+y^3}$, show that $x\frac{\partial V}{\partial x} + y\frac{\partial V}{\partial y} = 3V$. (1.5)

(h) Evaluate $\int x^2 e^{2x} dx$, by bernoulli's rule. (1.5)

(i) Write the reduction formula of $\int_0^{\pi/2} cos^m x\, dx$ (1.5)

(j) Evaluate the integral $\int_0^3 \int_0^1 (x^2 + 3y^2) dy dx$. (1.5)

PART –B

Q2 (a) Find the Eigen values and Eigen Vectors of the matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$. (8)

(b) Using Rank method, find the values of k for which the system of equations (7)

$$(3k-8)x+3y+3z=0;\ 3x+(3k-8)y+3z=0;\ 3x+3y+(3k-8)z=0$$

Q3 (a) Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix}7 & -1 & 3\\ 6 & 1 & 4\\ 2 & 4 & 8\end{bmatrix}$. Hence evaluate A^{-1}. (8)

(b) Factorize $\frac{3x+2}{(x-3)(x-1)^2(x^2+4)}$. (7)

Q4 (a) Diminish the roots of the equation $x^5+4x^3-x^2+11=0$ by 3. (8)

(b) Transform the equation into one whose roots are twice the reciprocals of the equation $x^4+3x^3+6x^2+2x-4=0$. (7)

Q5 (a) If $y=e^{mcos^{-1}x}$, then prove that (8)

$$(1-x^2)y_{n+2}-(2n+1)xy_{n+1}+(m^2+n^2)y_n=0$$

(b) Show that the rectangular solid of maximum volume that can be inscribed in a given sphere is a cube. (7)

Q6 (a) If $u=tan^{-1}\frac{x^3+y^3}{x-y}$, prove that $x^2\frac{\partial^2u}{\partial x^2}+2xy\frac{\partial^2u}{\partial x\partial y}+y^2\frac{\partial^2u}{\partial y^2}=-sin2usin^2u$. (8)

(b) Deduce the reduction formula of $\int sin^m xcos^n x\,dx$ (7)

Q7 (a) Find by double integration, the area bounded by circle $r=2sin\theta$ and $r=4sin\theta$. (8)

(b) Evaluate $\iiint_R (x^2+y^2+z^2)dxdydz$, where R denotes the region bounded by (7)

x = 0,y = 0,z = 0 and x+y+z = a,(a>0)

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