D 13601 (Pages : 2) Name..

Reg. No...................................

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2021

Information Technology

BIT 1C 02—FOUNDATIONS OF INFORMATION TECHNOLOGY

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Ceiling-20 marks.
Each question carries 2 marks.

1. What do you mean by supercomputers ?

2. What are the purposes of registers in Computers ?

3. What do you mean by OCR ? What are the uses of such technology ?

4. What is the use of plotters ?

5. What do you mean by object-oriented programming ? How it is different from procedure -oriented programming ?

6. What is an interpreter ?

7. What do you mean by open and free software ?

8. What do you mean by file allocation table ?

9. What are GNU and OSI ?

10. What are the advantages of virtual LAN ?

11. Write the importance of firewall in the modern, computing era.

12. How the LCD and TFT monitors are differ in their basic working principles.

Section B

Ceiling-30 marks.
Each question carries 5 marks.

13. Explain the evaluation of computers.

14. Explain the working of the computer with an analogy of a human being.

Turn over

15. What do you mean by secondary storage ? Explain the working or architecture of any two secondary storage devices in detail.

16. What are the characteristics of a good programming language ? Explain in detail.

17. What do you mean by computer viruses ? Explain, the working of a virus and the harm that can be created to the PC.

18. Categories and explain the different types, examples, and uses of software in a computer.

19. Explain how cloud technology helps the progress in IT.

Section C

10 *marks.*
Answer any **one** *question.*

20. What is the role of programming languages in Computers ? Explain the different kinds of programming languages in detail.

21. Write the detailed specification of the computer that you are going to buy for daily use in your home. Explain the expected peculiarities of your suggested specification.

FIRST SEMESTER (CBCSS-UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 1C 01—MATHEMATICAL FOUNDATIONS OF IT

(2019—2020 Admissions)

Time : Two Hours　　　　　　　　　　　　　　　　　　　　　Maximum : 60 Marks

Section A (Ceiling 20 Marks)

Each question carries 2 marks.

1. Define matrix. Differentiate symmetric and skew symmetric matrix with one example.

2. Find the trace of the following matrix and examine whether the matrix is invertible or not :

$$A = \begin{pmatrix} 1 & 2 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}.$$

3. Find $a \cdot b$ and $a \times b$ for the vectors $a = (3i + j - 4k)$ and $b = (8i - 8j + 4k)$.

4. Find the unit vector in the direction of sum of two vectors $v = (2, -4)$ and $w = (-3, 2)$.

5. Differentiate $\sin(3x + 5)$ with respect to x.

6. Determine the second derivative of the given function $z = \ln(7 - x^3)$ with respect to x.

7. Differentiate $\sin^2(2x + 1)$ with respect to x.

8. Integrate $1/(1 + x^2)$ for limit $[0, 1]$.

9. Find $\int \left(2x^2 + e^x\right) dx$.

10. Integrate $(x^2 + 1)(2x - 1)$ with respect to x.

Turn over

11. Find the derivative of $f(x) = (x - a)(x - b)$.

12. If $A = \begin{pmatrix} 3 & -6 \\ 5 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 7 & 4 \\ -5 & -8 \end{pmatrix}$ and 3A + X = 2B then find X.

Section B (Ceiling 30 Marks)

Each question carries 5 marks.

13. Verify whether A (B + C) = AB + AC, if A, B, C is given as follows :

$$A = \begin{pmatrix} 2 & 0 & -3 \\ 1 & 4 & 5 \end{pmatrix} B = \begin{pmatrix} 3 & 1 \\ -1 & 0 \\ 4 & 2 \end{pmatrix} C = \begin{pmatrix} 4 & 7 \\ 2 & 1 \\ 1 & -1 \end{pmatrix}.$$

14. Find the eigen values of the matrix $X = \begin{pmatrix} 2 & -3 & 0 \\ 2 & -5 & 0 \\ 0 & 0 & 3 \end{pmatrix}$.

15. Find the value of 'c' if the vectors $i + 2j + 3k$, $ci + 4j + 7k$ and $3i - 2j - 5k$ are collinear.

16. Define coplanar vectors. Examine whether $x = \{1; 2; 3\}$, $y = \{1; 1; 1\}$ $z = \{1; 2; 1\}$ are coplanar vectors.

17. Find the derivative of $f(x) = x^2 / e^{2x}$.

18. Evaluate $\int x \sin x \, dx$ within the limit $[-\pi/2, \pi/2]$ using integral properties.

19. Solve $\int 4 / (x^2 + 5x - 14) dx$ using partial fraction method.

Section C (10 Marks)

Answer any **one** *question.*

20. a) Solve the following system of equations using Gauss Elimination :

$$x + y - z = -3$$
$$2x + 3y - 8z = -18$$
$$5x + 6y - 10z = -25.$$

b) Determine whether the following Matrix is Linearly Independent or not :

$$A = \begin{pmatrix} 2 & 4 & 10 \\ 3 & -7 & 11 \\ -1 & 4 & 10 \end{pmatrix}.$$

21. a) Differentiate $y = (1 - \sin x)/(1 + \cos x)$ with respect to x.

b) Find $\int \sin^3 x / \cos x \, dx$ using substitution method.

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 1B 01—PROBLEM SOLVING USING C

(2019—2020 Admissions)

Time : Two Hours   Maximum : 60 Marks

Section A (Ceiling 20 marks)

Each question carries 2 marks.

1. What do you mean by a top-down approach to problem-solving ?

2. List the features of the C programming language.

3. How the operator precedence in the C programming language works ?

4. What do you mean by logical operators ?

5. Write the usage of the switch statement.

6. What is the difference between break and continue statements ?

7. Write about any two string operations functions.

8. What do you mean by the nesting of functions ?

9. What are the different argument passing methods in C.

10. What do you mean by the union ?

11. What do you mean by an array of structures ?

12. What do you mean by null pointer ?

Section B (Ceiling 30 marks)

Each question carries 5 marks.

13. How is the programming in C different in Windows and Linux platforms ?

14. Write a note on : (a) Keywords (b) Constants (c) Conditional operators.

15. What do you mean by exit control loop ? Explain with an example.

16. What do you mean by recursive functions ? Write a recursive function of generating the Fibonacci series and explain its working.

17. What is the purpose of the file pointers in C ? Explain with an example.

18. What do you mean by function prototyping ? Explain with, an example.

19. What do you mean by an array of pointers and a pointer array ?

Section C (10 marks)

Answer any **one** *question.*

20. Write a C Program to check whether a given number is a palindrome or not (Eg- 25752 is a palindrome).

21. What are the memory allocation strategies in C Programming ? Explain with suitable examples.

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FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 1C 02—FOUNDATIONS OF INFORMATION TECHNOLOGY

(2021 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A

*Answer at least **eight** questions.*
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. What are the components of CPU ?

2. What are the major functions of a computer ?

3. What is an operating system ?

4. Briefly explain different types of Computer Software.

5. What is the use of Assembler ?

6. What is proprietary software ?

7. What is Database Management System ?

8. What is open source software ?

9. What is Trojan Horse ?

10. What is a 4GL ?

11. What is meant by LAN ?

12. What is OMR ?

(8 × 3 = 24 marks)

Turn over

Section B

Answer at least **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. Explain optical disks.

14. Differentiate Compiler and Interpreter.

15. What are the different categories of digital computers ?

16. What is meant by Computer Networks ? Explain its uses.

17. What are the importance of social networks ?

18. Explain the role of multimedia in entertainment.

19. Explain the functions of an operating system.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. Explain various Input and Output devices of a computer system.

21. What is Computer Network ? Explain different types of network topologies and its uses.

(1 × 11 = 11 marks)

FIRST SEMESTER (CBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 1C 01—MATHEMATICAL FOUNDATIONS OF I.T.

(2021 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A

*Answer atleast **eight** questions.*
Each question carries 3 marks.
All questions can be attended.
Overall ceiling 24.

1. If $A = \begin{pmatrix} 3 & 4 & 2 \\ 1 & 0 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 3 & 0 \\ 1 & 0 & 4 \end{pmatrix}$ find $3A - 2B$.

2. Show that the matrix $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$ is singular.

3. Find the cofactors of the matrix $A = \begin{pmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{pmatrix}$.

4. Find $a \times b$ if $a = (2, -1, 1)$ and $b = (3, 4, -1)$.

5. Find α when the scalar projection of $a = \alpha i + j + 4k$ and $b = 2i + 6j + 3k$ is 4 units.

6. Find the derivative of $\sqrt{x}$ using first principle.

7. Differentiate $x^4 - 2\cos x + 3\sin x$ with respect to x.

8. Differentiate $e^x (1 + \log x)$ with respect to x.

Turn over

9. If $x^2 + y^2 - 6x + 8y - 12 = 0$ find $\dfrac{dy}{dx}$.

10. Evaluate $\int \sin \sqrt{x}\, dx$.

11. Evaluate $\int (5x - 2)^3\, dx$.

12. Find $\int_0^1 x e^{x^2}$.

$(8 \times 3 = 24 \text{ marks})$

Section B

Answer atleast **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall ceiling 25.

13. If $A = \begin{pmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ 4 & 5 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 1 & 3 \end{pmatrix}$ verify that $(AB)^1 = (BA)^1$.

14. Find the adjoint of the matrix $A = \begin{pmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{pmatrix}$.

15. If $A = \begin{pmatrix} 4 & 1 \\ 3 & 2 \end{pmatrix}$ prove that $A^2 - 6A + 5I = 0$.

16. Show that the points A $(2, -1, 1)$, B $(3, -5, 1)$ and C $(-1, 11, 9)$ are collinear.

17. If $x^y = e^{x-y}$ prove that $\dfrac{dy}{dx} = \dfrac{\log x}{(1 + \log)^2}$.

18. Evaluate $\int_1^2 \dfrac{(1 + \log)^3 \, dx}{x}$.

19. Evaluate $\int \dfrac{2 \sin x + 5}{\cos^2 x} \, dx$.

<div align="right">(5 × 5 = 25 marks)</div>

Section C

Answer any **one** *question.*
Each question carries 11 *marks.*

20. (a) Solve the following system of equations by Gauss elimination method :

$$x - 2y + z = 1$$
$$-2x + y + z = 1$$
$$x + y - 2z = -2.$$

(b) Find the eigen values of the matrix $\begin{pmatrix} 1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{pmatrix}$.

21. (a) Differentiate $\dfrac{x \sin x}{1 + \cos}$ with respect to x.

(b) Evaluate $\int \dfrac{2x - 3}{(x^2 - 1)(2x + 3)} \, dx$.

<div align="right">(1 × 11 = 11 marks)</div>

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2021

Information Technology

BIT 1B 01—PROBLEM SOLVING USING C

(2021 Admissions)

Time : Two Hours   Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. Differentiate between long and short integer. Give examples.

2. Why do we need to use comments in programs ?

3. What is automatic variable ?

4. What is typecasting ?

5. What do you mean by unary operator ? Give examples.

6. What is the difference between global and local variable ?

7. What is pointer ?

8. Describe the use of putc() function.

9. What is a structure ? Give example.

10. What is dynamic array ?

11. Explain the increment and decrement operators in C language.

12. Explain Conditional Operator with a suitable example.

(8 × 3 = 24 marks)

Section B (Paragraph Questions)

Answer at least **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. Explain switch.. case statement with an example.

14. Explain the difference between break and continue statement with examples.

Turn over

15. What is prototyping ? Why is it necessary ?

16. State the difference between malloc() and calloc().

17. Describe the structure of a C program.

18. Briefly explain the storage class specifications in C.

19. Explain with example any four string-handling functions in C.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. Explain in detail all the basic data types in C. Expand them in terms of the keyword, byte size, range and format specifier.

21. Define an array and develop a C program to sort an array of N numbers in ascending order.

(1 × 11 = 11 marks)

FIRST SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 1C 01—MATHEMATICAL FOUNDATIONS OF INFORMATION TECHNOLOGY

(2016—2018 Admissions)

Time : Three Hours　　　　　　　　　　　　　　　Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Define square matrix.

2. Write the matrix equation for the linear system of equations : $x + 2y = 3, 4x + 3y = 7$.

3. Write the product rule of differentiation.

4. Find the derivative of $y = \sqrt{\sin x}$.

5. Find $\int \dfrac{dx}{x}$.

6. Find $\int \sec^2 x \, dx$.

7. Find the order of the differential equation $\dfrac{d^3y}{dx^3} + \left(\dfrac{dy}{dx}\right)^3 = e^x$.

8. Find the degree of the differential equation $\left(\dfrac{d^3y}{dx^3}\right)^2 + \left(\dfrac{dy}{dx}\right)^3 = \sin x$.

9. Write an example of a second order linear ordinary differential equation.

10. Find the partial derivative of $x \cdot \sin y + x^2$ with respect to x.

(10 × 1 = 10 marks)

Turn over

Section B

Answer **all** *questions.*
Each question carries 2 marks.

11. Find A + B, where $A = \begin{bmatrix} 1 & 3 & 0 \\ 4 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 3 \\ 3 & -1 & 0 \end{bmatrix}$.

12. What are skew-symmetric matrices ? Give an example.

13. Find the derivative of $y = \dfrac{x^2}{\tan x}$ using quotient rule of differentiation.

14. Find the derivative of $y = \sin(2x + 1)$.

15. Evaluate $\int_1^2 x^2 dx$.

16. State Fundamental Theorem of definite integrals.

17. Solve $y' = 2x$, given $y(0) = 1$.

18. Distinguish between homogeneous and non-homogeneous 2nd order linear ODE.

(8 × 2 = 16 marks)

Section C

Answer any **six** *questions.*
Each question carries 4 marks.

19. If $A = \begin{bmatrix} 3 & 5 & -1 \\ 4 & 0 & 2 \\ -6 & -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -2 & 3 & 1 \\ 5 & 0 & 7 & 8 \\ 9 & -4 & 1 & 1 \end{bmatrix}$, find AB.

20. Given $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}$. Verify that $B^{-1}A^{-1} = (AB)^{-1}$.

21. Find the derivative of $y = x \cdot \sin^{-1} x$.

22. If $y = \dfrac{(x+1)^2}{x^2+1}$, find $\dfrac{dy}{dx}$.

23. Integrate $\int 3x^2 \sin\left(x^3\right) dx$.

24. Find $\int x^2 e^x \, dx$.

25. Solve $\dfrac{dy}{dx} = 5xy$, using separation of variables method.

26. Solve $y' + y \cdot \tan x = \sin 2x$, given $y\,(0) = 1$.

27. Write a short note on solution of 2nd order linear differential equation with constant co-efficient.

(6 × 4 = 24 marks)

Section D

*Answer any **three** questions.*
Each question carries 10 marks.

28. Solve the linear system of equations :

$$
\begin{aligned}
x_1 - x_2 + \quad x_3 &= 0 \\
-x_1 + x_2 - \quad x_3 &= 0 \\
10x_2 + 25x_3 &= 90 \\
20x_1 + 10x_2 &= 80.
\end{aligned}
$$

29. Find the eigen values and eigen vectors of $A = \begin{bmatrix} 2 & 2 \\ 5 & -1 \end{bmatrix}$.

30. Find the rank of $A = \begin{bmatrix} 5 & 3 & 0 \\ 1 & 2 & -4 \\ -2 & -4 & 8 \end{bmatrix}$.

Turn over

31. (a) Find the derivative of $f(x) = \dfrac{(x-1)(x^2 - 2x)}{x^4}$.

(b) Differentiate $y = \cos x^2$ and $y = \cos^2 x$ using chain rule of differentiation.

32. (a) Find $\int e^x \cos x \, dx$.

(b) Evaluate $\int_{-5}^{5} x^2 \, dx$.

(c) Evaluate $\int_{-3}^{3} x^3 \, dx$.

(3 × 10 = 30 marks)

FIRST SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 1B 01—PROBLEM SOLVING USING C

(2016—2018 Admissions)

Time : Three Hours   Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 mark.

1. Define flowcharts.

2. char txt [20]: How many bytes are allocated by this definition ?

3. What is the purpose of break in a switch statement ?

4. What do you mean by short hand assignment operator ?

5. Give two examples for entry controlled loops.

6. What are global variables ?

7. Give any two numerical functions in C.

8. Define strings.

9. Specify the range of values supported by integer data type.

10. Define union.

(10 × 1 = 10 marks)

Part B

Answer **all** *questions.*
Each question carries 2 marks.

11. Distinguish between precedence and associativity.

12. Discuss the limitations of using scanf() function for reading strings.

13. Distinguish between identifiers and keywords.

14. What is the use of goto statement ? Give the syntax of goto statement.

15. Differentiate between actual and formal arguments.

(5 × 2 = 10 marks)

Part C

Write short essay on any 5.
Each question carries 4 marks.

16. What are the merits of top down programming ? Explain.

17. What are nested loops ? Explain with an example.

18. Write a C program to generate first n prime numbers.

19. Discuss about type conversions in C.

20. Write a program to check whether the given number is Fibonacci or not.

21. Differentiate between break and continue statements with examples.

22. What do mean by nested if ? Explain with example.

23. Differentiate between call by value and call by reference.

(5 × 4 = 20 marks)

Part D

Write essays on any 5.
Each question carries 8 marks.

24. What are data types ? Discuss about the categories of data types.

25. What is a user defined function ? What advantages it offers in programming ? Write a program to check whether the given matrix is symmetric or not.

26. Write a C program to count number of positive, negative and zeroes in a set of numbers. Also find their percentages.

27. What are arrays ? How are they classified ? Explain.

28. Write a C program to explain arithmetic operations on pointers.

29. Explain the various storage classes in C.

30. Write a C program to sort a list of numbers in ascending order.

31. Explain :

    a)   Basic file operations.

    b)   Array of structures.

$(5 \times 8 = 40 \text{ marks})$