

K21U 6751

Reg. No. : .....

Name : .....

**I Semester B.C.A. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/  
Improvement) Examination, November 2021  
(2019 Admission Onwards)  
GENERAL AWARENESS COURSE  
1A11BCA : Informatics for Computer Applications**

Time : 3 Hours

Max. Marks : 40

**PART – A  
(Short Answer)**

Answer **all** questions.

**(6×1=6)**

1. What is primary memory ?
2. What is programming language ?
3. What is ROM ?
4. Write two features of operating system.
5. What are the five components that make up an information system ?
6. What is the use of 'rm' command in Linux ?

**PART – B  
(Short Essay)**

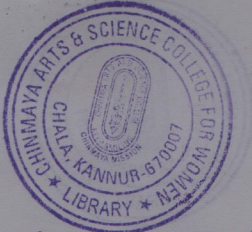
Answer **any 6** questions.

**(6×2=12)**

7. What is cache memory ?
8. What are the advantages of cyber security ?
9. What is Hacking ?
10. What is Static RAM ?

P.T.O.

K21U 6751



11. What are the differences between Interpreter and Assembler ?
12. Explain Impact printers.
13. Explain benefits of a network.
14. Explain vi editor.

**PART - C**  
**(Essay)**

Answer **any 4** questions.

**(4×3=12)**

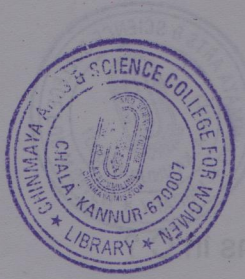
15. Explain basic organization of computer.
16. Discuss the types of secondary storage devices and its characteristics.
17. What is Time sharing operating system ?
18. What do you mean by registers ?
19. Explain in detail on hard disk.
20. What are file system commands in Linux ?

**PART - D**  
**(Long Essay)**

Answer **any 2** questions.

**(2×5=10)**

21. Explain various input devices in detail.
22. Explain in detail about language translators.
23. What is the 'cp' command and what it does ?
24. What are guidelines that you should follow while using mobile phones ?
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**I Semester B.C.A. Degree (CBCSS – OBE – Regular/Supplementary/  
Improvement) Examination, November 2021  
(2019 Admission Onwards)  
Core Course  
1B01 BCA : PROGRAMMING IN C**

**Time : 3 Hours**

**Max. Marks : 40**

**PART – A  
(Short Answer)**

**Answer all questions :**

**(6×1=6)**

1. Mention any two unary operators.
2. The \_\_\_\_\_ operator returns the number of bytes the operand occupies.
3. A global variable is also known as \_\_\_\_\_
4. What are the two conditional operators ?
5. The \_\_\_\_\_ specification is used to read or write a short integer.
6. What do you mean by recursion ?

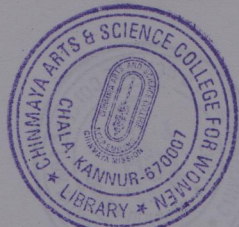
**PART – B  
(Short Essay)**

**Answer any 6 questions :**

**(6×2=12)**

7. How to declare a variable ? Explain with example.
8. Mention input/output statements in C.
9. Differentiate structure and Union.

**P.T.O.**



K21U 6752

10. What is the use of library functions in C ?
11. Mention any two special operators in C.
12. Define function prototyping.
13. What do you mean by implicit type conversion ?
14. Mention the common operations performed on character strings.

**PART - C**  
**(Essay)**

Answer **any 4** questions :

**(4×3=12)**

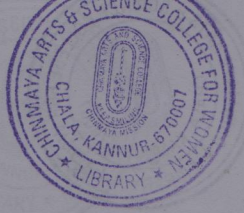
15. Explain the storage classes in C.
16. Explain different types of arrays with syntax.
17. Distinguish between getchar and scanf function.
18. Explain the rules for switch statement.
19. Explain dynamic memory allocation in C.
20. Mention parameter passing techniques in C.

**PART - D**  
**(Long Essay)**

Answer **any 2** questions :

**(2×5=10)**

21. Explain the data types in C.
22. Explain string handling function in C with syntax and examples.
23. Explain the looping statements in C.
24. Explain the steps to open and close a file in C and mention the input and output operations on file.



K21U 6563

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (C.B.C.S.S. – Supplementary)  
Examination, November 2021  
(2015-2018 Admissions)  
COMPLEMENTARY COURSE IN MATHEMATICS  
1C01MAT – BCA : Mathematics for BCA – I

Time : 3 Hours

Max. Marks : 40

SECTION – A

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

1.  $\sinh(x+y) =$  \_\_\_\_\_
2. State the Lagrange's mean value theorem.
3. If  $u = \cos(x^2+y)$ , find  $\frac{\partial^2 u}{\partial x^2}$ .
4. Identify the curve whose polar equation is  $r = 6$ .

SECTION – B

Answer **any seven** questions. **Each** question carries **2** marks :

5. Find  $\frac{d}{dx}(\coth^{-1}x)$ .
6. Find  $D^n(a^{mx})$ .
7. State the Taylor's theorem.
8. Verify Rolle's theorem for the function  $f(x) = x^3 - 9x$  on  $[0, 3]$ .

P.T.O.

K21U 6563



9. Find the intervals on which the function  $f(x) = 2x^3 - 3x^2 - 36x + 7$  is decreasing.

10. Evaluate  $\lim_{x \rightarrow 0} x \log x$ .

11. Verify Euler's theorem for the function  $z = ax^2 + 2hxy + by^2$ .

12. If  $u(x, y) = x^2 + y^2$ ,  $x(r, s) = 2r^2 - 3s + 4$  and  $y(r, s) = r + s^2$ , find  $\frac{\partial u}{\partial r}$ .

13. Define chord of curvature and write the equation of chord of curvature through origin.

#### A - SECTION - C

Answer **any four** questions. **Each** question carries **3** marks :

14. If  $y = (\cos x)^{\log x}$ , find  $\frac{dy}{dx}$ .

15. Find the  $n^{\text{th}}$  derivative of  $x^2 e^x \cos x$ .

16. Expand  $\sin x$  by Maclaurin's series.

17. Discuss the geometrical interpretation of first order partial derivatives.

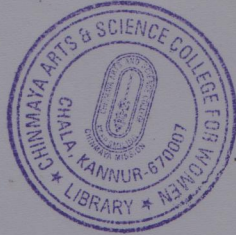
18. Find the y-coordinate of the centre of curvature of the parabola  $y^2 = 4ax$ .

19. Graph the sets of points  $0 \leq r \leq 1$  and  $\frac{\pi}{4} \leq \theta \leq \frac{3\pi}{4}$  in the polar plane.

#### SECTION - D

Answer **any two** questions. **Each** question carries **5** marks :

20. Change the independent variable to  $\theta$  in the equation  $\frac{d^2y}{dx^2} + \frac{2x}{1+x^2} \frac{dy}{dx} + \frac{y}{(1+x^2)^2} = 0$  by means of the transformation  $x = \tan \theta$ .



21. Evaluate :

a)  $\lim_{x \rightarrow 0} (\cot x)^{1/\log x}$

b)  $\lim_{x \rightarrow 0} (\sin x)^{\tan x}$ .

22. Show that  $f_{xy}(0,0) \neq f_{yx}(0,0)$  for the function

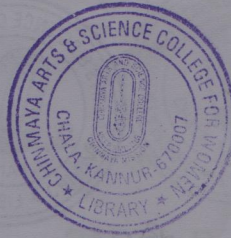
$$f(x,y) = \begin{cases} x^2 \tan^{-1}\left(\frac{y}{x}\right) - y^2 \tan^{-1}\left(\frac{x}{y}\right) & \text{if } xy \neq 0 \\ 0 & \text{if } xy = 0 \end{cases}$$

23. Find the spherical coordinate equation of

a)  $x^2 + y^2 + (z - 1)^2 = 1$  and

b)  $z = \sqrt{x^2 + y^2}$ .

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K21U 6804

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I Semester B.Sc. Degree (CBCSS – O.B.E. – Regular/Supplementary/  
Improvement) Examination, November 2021

(2019 Admission Onwards)

COMPLEMENTARY ELECTIVE COURSE IN MATHEMATICS

1C01 MAT-BCA : Mathematics for BCA I

Time : 3 Hours

Max. Marks : 40

PART – A

Answer **any 4** questions from this Part. **Each** question carries **1** mark.

1. Derive the derivative of  $\tan x$ .

2. Find the derivative of  $\sin^{-1} \left( \frac{2x}{1+x^2} \right)$ .

3. Write the dual of the following statement.

$$a + a'b = a + b.$$

4. If the rank of the matrix  $\begin{bmatrix} 1 & 2 \\ 3 & \lambda \end{bmatrix}$  is 1, find  $\lambda$ .

5. If  $A$  is an orthogonal square matrix, then prove that  $|A| = \pm 1$ .

PART – B

Answer **any 7** questions from this Part. **Each** question carries **2** marks.

6. Find the derivative of  $\sqrt{\sin \sqrt{x}}$ .

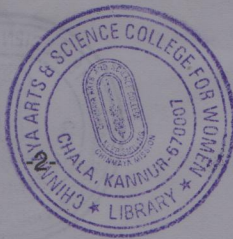
7. If  $y = \sin^{-1} x$ , prove that  $(1 - x^2) y_2 - 2xy_1 = 0$ .

8. Find the  $n^{\text{th}}$  derivative of  $e^{2x} \sin x \sin 2x$ .

P.T.O.



K21U 6804



9. If  $x = \frac{1}{2}\left(t + \frac{1}{t}\right)$ ,  $y = \frac{1}{2}\left(t - \frac{1}{t}\right)$ , find  $\frac{d^2y}{dx^2}$ .

10. Prove that in a Boolean algebra B,  $a + 1 = 1$  for all  $a \in B$ .

11. Show that the power set of  $A = \{a, b\}$  is a Boolean algebra.

12. Solve the system of equations  $x + y + z = 3$ ,  $2x + 4y - z = 0$ ,  $x - 3y + 2z = 5$ .

13. Find value of a and b, if  $A = \frac{1}{\sqrt{2}} \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$  is orthogonal.

14. Determine the rank of the matrix  $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 2 \\ 1 & 1 & 4 \end{bmatrix}$ .

15. Test for consistency the equations  $x + y + z = 2$ ,  $x + 2y + 3z = 4$ ,  $x + 3y + 4z = 5$ .

### PART - C

Answer **any 4** questions from this Part. **Each** question carries **3** marks.

16. Derive the derivative of  $\cos^{-1} x$ .

17. Find  $\frac{dy}{dx}$ , if  $y = \frac{x^{\frac{1}{2}}(1-2x)^{\frac{2}{3}}}{(2-3x)^{\frac{3}{4}}(3-4x)^{\frac{4}{5}}}$ .

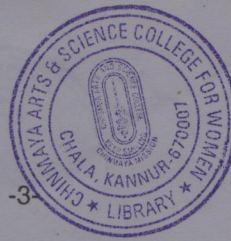
18. If  $x^3 + y^3 = 3axy$ , prove that  $\frac{d^2y}{dx^2} = -\frac{2a^2xy}{(y^2 - ax)^3}$ .

19. Find the  $n^{\text{th}}$  derivative of  $\frac{1}{x^2 + a^2}$  in terms of r and  $\theta$ .

20. State and prove absorption laws.

21. Find the value of  $\lambda$  and  $\mu$  so that the system of equations  $4x + 5y + 6z = 16$ ,  $x - 5z = -9$ ,  $x + 2y + \lambda z = \mu$  has (i) no solution, (ii) unique solution, (iii) infinite number of solutions.

22. Are the vectors  $x_1 = (1, 3, 4, 2)$ ,  $x_2 = (3, -5, 2, 2)$ ,  $x_3 = (2, -1, 3, 2)$ , linearly independent? If so, express one of these as a linear combination of the others.



K21U 6804

PART - D

Answer **any 2** questions from this Part. **Each** question carries **5** marks.

23. Find the derivatives of the following.

a)  $y = \frac{x \sin^{-1} x}{\sqrt{1-x^2}}$ .

b)  $x^{\tan x} + (\sin x)^{\cos x}$ .

24. If  $y = e^{a \cos^{-1} x}$ , prove that  $(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - (a^2+n^2)y_n = 0$ . Further, find  $(y_n)_0$ .

25. Show that the following statements are equivalent in a Boolean algebra.

a)  $a + b = a$

b)  $a * b = b$

c)  $a + b = 1$

d)  $a * b' = 0$ .

26. a) Using Gauss-Jordan method find the inverse of the matrix  $\begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$ .

b) Solve by Cramer's rule the system of equations  $4x + 5y + 6z = 16$ ,  
 $x - 5z = -9$ ,  $x + 2y + 3z = 7$ .