

K21U 1073

Reg. No. :

Name :

**IV Semester B.C.A. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)
General Awareness Course
4A 14 BCA : DISCRETE MATHEMATICAL STRUCTURES**

Time : 3 Hours

Max. Marks : 40

**PART - A
(Short Answer)**

Answer **all** questions.

(6×1=6)

1. A set with no elements is called _____
2. Define proposition.
3. a. $a = ?$
4. Define onto mapping.
5. Let $G = (V, E)$ be a graph. If the elements of E are ordered pairs of vertices, then the graph G is called _____
6. What is planar graph ?

**PART - B
(Short Essay)**

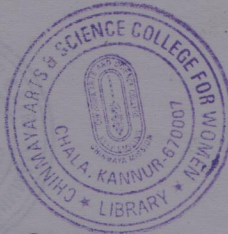
Answer **any 6** questions.

(6×2=12)

7. Determine the truth table of $\sim p (q \vee p)$.
8. Let p be "it is cold" and q be "it is raining". Give a simple verbal sentence which describes each of the following :
 - a. $\sim p$
 - b. $\sim p \wedge \sim q$
9. Define Hasse diagram.
10. Define relation from A to B with example.
11. Describe laws of Boolean Algebra.
12. Simplify $F = A + A + AB$.
13. Define complete graph with example.
14. What is graph coloring ?

P.T.O.

K21U 1073



PART – C
(Essay)

Reg. No. :

Answer any 4 questions.

(4×3=12)

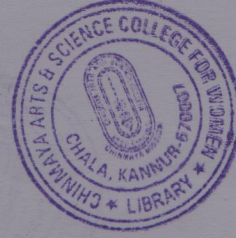
15. Prove that $(p \wedge q) \rightarrow p$ is tautology.
16. $A = \{1, 2\}$, $B = \{1, 2, 4, 5\}$, $C = \{5, 7, 9, 10\}$. Find the following :
 - a) $(A \cup B) \cup C$
 - b) $(A \cap B) \cap C$
 - c) $(A \cup B) \cap C$.
17. Prove that the theorem : Let $f : A \rightarrow B$ then $g : B \rightarrow C$ be both one-one and onto functions, then $g \circ f : A \rightarrow C$ is also one-one and onto.
18. Simplify $Y = (P + Q) (P + Q') (P' + Q)$.
19. Prove that K_5 is non planar graph.
20. The adjacency structure of a graph G is given as $G = [A : B, E; B : A, E, F, G; C : D, G, H; D : C, H; E : A, B; F : G; G : B, C, F; H : C, D]$.

PART – D
(Long Essay)

Answer any 2 questions.

(2×5=10)

21. Compare DFS and BFS graph.
22. Describe shortest paths in weighted graphs.
23. Without using truth tables prove that $(\sim p \vee q) \wedge (p \wedge (p \wedge q)) = p \wedge q$.
24. Write down the properties of Union operations in sets.



K21U 1074

Reg. No. :

Name :

**IV Semester B.C.A. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)**

**Core Course
4B08BCA : SOFTWARE ENGINEERING**

Time : 3 Hours

Max. Marks : 40

PART – A

(Short Answer)

Answer **all** questions.

1. SDLC stands for
2. What is Slack Time ?
3. Explain Unit Testing.
4. SRS document is formal specification of system. True or False.
5. UML stands for
6. RAD stands for

PART – B

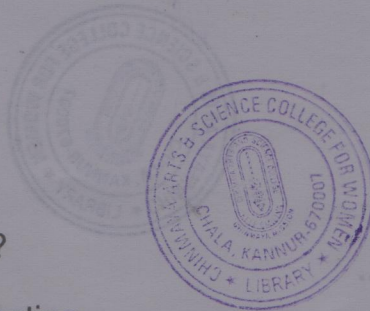
(Short Essay)

Answer **any 6** questions.

7. What do you mean by Software engineering ?
8. Differentiate Programs and Products.
9. Discuss the importance of feasibility study in software development.
10. Explain Cohesion and Coupling.
11. Explain Multiple Inheritance.

P.T.O.

K21U 1074



12. What is code inspection ?
13. Explain Alpha and beta testing.
14. What is the need of validation ?

PART - C

(Essay)

Answer any 4 questions.

(4×3=12)

15. Explain different types of Software Development Projects.
16. What is requirement analysis ?
17. Explain main classifications of design activities.
18. Explain different approaches of software design.
19. Advantages of object oriented design.
20. Differentiate verification and validation.

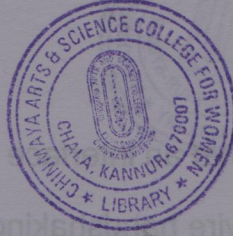
PART - D

(Long Essay)

Answer any 2 questions.

(2×5=10)

21. Discuss different software life cycle models.
22. Explain different types of testing.
23. Explain importance and objectives of software design.
24. Discuss various steps of requirement analysis.



K21U 1075

Reg. No. :

Name :

**IV Semester B.C.A. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)
CORE COURSE
4B09BCA : Computer Organization**

Time : 3 Hours

Max. Marks : 40

**PART – A
Short Answer**

Answer **all** questions :

(6×1=6)

1. The symbolic notation used to describe the microoperation transfers register transfer among registers is called a
2. Define stack.
3. What is the use of cache memory ?
4. Expand RAM and ROM.
5. What is a Multiprocessor System ?
6. Write note on parallel Processing.

**PART – B
Short Essay**

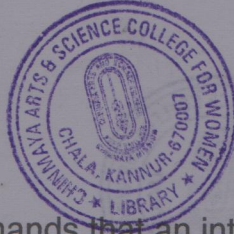
Answer **any 6** questions :

(6×2=12)

7. Define Read and Write operation of a basic computer system.
8. What is an instruction code ?
9. List the address sequence capabilities required in control memory.
10. Write note on Flynn's classification.

P.T.O.

K21U 1075



11. What are the types of commands that an interface may receive ?
12. What is the basic principle of two-wire handshaking ?
13. Explain the time shared common bus organization of interconnection network.
14. Write note on the benefits of multiprocessing.

PART – C
Essay

Answer **any 4** questions :

(4×3=12)

15. Explain the method of constructing a common bus system with multiplexers.
16. Write note on Subroutine call and Return.
17. Explain about Pipelining.
18. Explain in detail about I/O bus and interface modules.
19. Write note on Magnetic Disk.
20. Explain about the role of crossbar switch in interconnection structures.

PART – D
Long Essay

Answer **any 2** questions :

(2×5=10)

21. Explain about the Computer Registers and common bus system.
22. Explain in detail about the design of a control unit with neat sketch.
23. Explain the techniques used in Asynchronous data transfer.
24. Define main memory. Explain about the main memory classification.



K21U 1076

Reg. No. :

Name :

IV Semester B.C.A. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)

Core Course
4B10BCA : LINUX ADMINISTRATION

Time : 3 Hours

Max. Marks : 40

PART – A

Short answer. Answer **all** questions : (6×1=6)

1. What are two types of Linux User Mode ?
2. What is pipe ?
3. Which command is used to delete the current line ?
4. Which command is used to view the disk usage within a directory ?
5. What do you understand by Linux Kernal ?
6. What is BASH ?

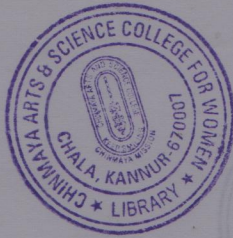
PART – B

Short essay. Answer **any 6** questions : (6×2=12)

7. What are the basic components of Linux ?
8. What is the use of cron command in Linux ?
9. Which are the Shells used in Linux ?
10. What does a nameless (empty) directory represent ?
11. What are the key features of the bourne shell ?
12. Define Bourne shell scripts.
13. Why Linux is called free software ?
14. What are shell variables ?

P.T.O.

K21U 1076



PART – C



Essay. Answer **any 4** questions :

(4×3=12)

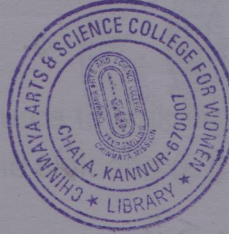
15. How do you copy and move a file in Linux ?
16. What is Xwindows in Linux ?
17. What is a shell in programming ?
18. What is wild-card interpretation ?
19. What are the different modes when using vi editor ?
20. What is the command to change the group ownership of a file ?
Write its syntax.

PART – D

Long essay. Answer **any 2** questions :

(2×5=10)

21. Explain conditional control structure in linux.
22. What are the different Linux system backup types ? How are they different ?
23. Explain file management commands.
24. Explain free software concepts.



K21U 1131

Reg. No. :

Name :

IV Semester B.Sc. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)

COMPLEMENTARY ELECTIVE COURSE IN MATHEMATICS
4C04MAT – BCA : Mathematics for BCA – IV

Time : 3 Hours

Max. Marks : 40

PART – A
(Short Answer)

Answer **any 4** questions. **1 mark each** :

1. What is the probability of getting a sum of 7 when two dice are thrown ?
2. Define a surplus variable in a linear programming problem.
3. Number of edges in a tree with n vertices.
4. Define a spanning tree.
5. Give the Simpson's $\frac{1}{3}^{\text{rd}}$ rule for numerical integration. **(4x1=4)**

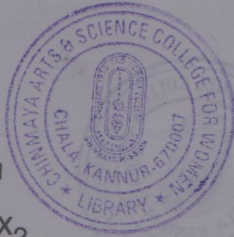
PART – B
(Short Essay)

Answer **any 7** questions. **2 marks each** :

6. Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even ?
7. A bag contains 20 balls, 3 are coloured red, 6 are coloured green, 4 are coloured blue, 2 are coloured white and 5 are coloured yellow. One ball is selected at random. Find the probability that the ball selected is either red or white or blue.

P.T.O.

K21U 1131



-2-



8. Given an LP Problem

$$\text{Maximise } z = 3x_1 + 5x_2$$

subject to the constraints $x_1 \leq 5$

$$x_2 \leq 7$$

$$3x_1 + 2x_2 \leq 25$$

$$x_1, x_2 \geq 0$$

Convert it to the canonical form.

9. Define optimum basic feasible solution of a Linear Programming Problem.

10. Vitamin C and K are found in two different foods A_1 and A_2 . One unit of food A_1 contains 4 units of vitamin C and 10 units of vitamin K. One unit of food A_2 contains 8 units of vitamin C and 4 units of vitamin K. One unit of food A_1 and A_2 cost Rs 60 and Rs. 50 respectively. The minimum daily requirements (for an individual) of vitamin C and K is 80 and 100 units respectively. Assuming that anything in excess of daily minimum requirements of Vitamin C and K is not harmful. Find out the optimal mixture of food A_1 and A_2 at the minimum cost which meets the daily minimum requirements of vitamin C and K. Formulate this as a linear programming problem.

11. Find the dual of the following LPP

$$\text{Minimise } z = x_1 - x_2 - x_3$$

$$\text{Subject to the constraints } -3x_1 - x_2 + x_3 \leq 3$$

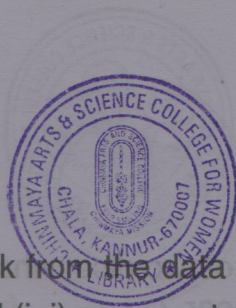
$$2x_1 - 3x_2 - 2x_3 \geq 4$$

$$x_1 - x_3 = 2$$

$$x_1, x_2 \geq 0$$

12. Draw the network diagram for the project whose activities and their precedence relationship are given below.

Activity	A	B	C	D	E	F	G	H	I
Predecessors	-	A	A	-	D	B, C, E	F	E	G, H



13. Find the maximum flow from source to sink from the data given below where node s is the source, node t is the sink and (i, j) represents the capacity of the directed arc from i to j

Directed arc	Capacity
(s, 1)	4
(s, 4)	2
(1, 2)	4
(1, 3)	2
(2, t)	3
(3, 2)	1
(3, t)	1
(4, 3)	1
(4, t)	3

14. Use Euler's method to compute $y(0.02)$ in the equation $\frac{dy}{dx} = x^3 + y$, $y(0) = 1$, $h = 0.01$.
15. $y' = x - y^2$, $y(0) = 1$. Find $y(0.1)$ correct to four decimal places using Taylor's series method. (7×2=14)

PART - C
(Short Essay)

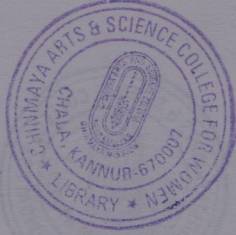
Answer **any 4** questions. **3** marks **each** :

16. A survey was taken in 30 classes of a school to find the total number of left-handed students in each class. The table below shows the results:

No. of left-handed students	0	1	2	3	4	5
Frequency (no. of classes)	1	2	5	12	8	2

A class was selected at random.

- Find the probability that the class has 2 left-handed students.
- What is the probability that the class has at least 3 left-handed students ?
- Given that the total number of students in the 30 classes is 960, find the probability that a student randomly chosen from these 30 classes is left-handed.



17. In a single throw of two dice, what is the probability that neither a double nor a sum of 9 will appear ?

18. Use Simplex method to maximise $z = 5x_1 + 3x_2$

Subject to the constraints

$$\begin{aligned} x_1 + x_2 &\leq 2 \\ 5x_1 + 2x_2 &\leq 10 \\ 3x_1 + 8x_2 &\leq 12 \\ x_1, x_2 &\geq 0 \end{aligned}$$

Directed arc	Capacity
(1,2)	2
(2,1)	2
(1,3)	2
(2,3)	2
(3,1)	2
(3,2)	2
(3,3)	2
(4,1)	2
(4,2)	2
(4,3)	2

19. Solve the following problem graphically

Maximise $z = 60x_1 + 40x_2$

Subject to the constraints $2x_1 + x_2 \leq 60$

$$x_1 \leq 25$$

$$x_2 \leq 35$$

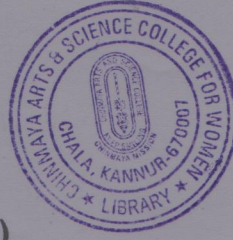
$$x_1, x_2 \geq 0$$

20. Find the minimum spanning tree in the following undirected graph where arc(A, B) is denoted as the arc connecting A and B

ARC	WEIGHT
(A, B)	5
(A, C)	6
(C, E)	5
(A, D)	4
(B, C)	1
(B, D)	2
(C, D)	2
(D, F)	4
(C, F)	3
(E, F)	4

21. Use Simpson's rule with $n = 6$ to estimate the integral $\int_0^1 \sqrt{1+x^3} dx$ correct to four decimal places.

22. Determine $y(0.1)$ from the differential equation $y'' - xy' - y = 0$, $y(0) = 1$, $y'(0) = 0$ by Taylor's method. (4x3=12)



**PART – D
(Long Essay)**

Answer **any 2** questions. **5** marks **each** :

23. In a class, there are 15 boys and 10 girls. Three students are selected at random. Find the probability that 1 girl and 2 boys are selected.

24. Solve using graphical method

$$\text{Maximise } z = 8000 x_1 + 7000 x_2$$

$$\text{Subject to the constraints } 3x_1 + x_2 \leq 66$$

$$x_1 \leq 20$$

$$x_2 \leq 40$$

$$x_1 + x_2 \leq 45$$

$$x_1, x_2 \geq 0$$

25. Find the maximum flow in the directed graph from a to b whose directed arcs and capacities are given below as a table where (i, j) denotes as the directed arc from i to j.

Directed arc	Capacity
(a, 1)	3
(a, 2)	2
(a, 3)	1
(1, 4)	1
(1, 5)	4
(1, 6)	2
(2, 4)	2
(2, 6)	1
(3, 5)	1
(3, 6)	1
(4, b)	0
(4, 3)	2
(5, b)	5
(6, b)	2
(5, 2)	1

26. $\frac{dy}{dx} = 1 + y^2, y(0) = 0$. Find $y(0.2)$ and $y(0.4)$ by fourth order Runge-Kutta

method.

(2x5=10)