

Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics, Margao-Goa
FY BCA Semester-II, Semester End Examination, April 2023
Applied Mathematics (CAC-107)

Duration: 2 Hours

Max Marks: 60

Instructions: 1) Figures to the right indicate Full Marks.

2) All Questions are compulsory.

3) Use of non programmeable calculator is allowed.

Q.1A.State whether the following statements are true or false.

(5x1= 05 marks)

- a) The decimal number system has base 2.
- b) The negation of ' this paper is white' is given as ' this paper is black.'
- c) In Boolean Algebra the dual of $a + 0$ is given as $a * 1$.
- d) Let $A = \{1,2,3\}$ $B = \{2,3,4\}$. then $n(A \cup B) = 4$.
- e) Let A and B be two sets such that $A = B$. Then $A \times B = B \times A$.

Q.1B. Answer the following questions.

(5x1= 05 marks)

- a) Check if the following are statements or not. Justify your answer.
 - i) What is your name?.
 - ii) $10 \leq 8$.
- b) Let $A = \{5,6,7\}$, $B = \{1,2,3\}$ and $R = \{(5,1), (6,3), (7, 2)\}$ Check if R is one one and onto function.
- c) Find the total number of ways in which 4 people can be arranged in one line.
- d) Convert the decimal number 5 to its Binary form.
- e) Find the value of 'n' if $C(n, 1) + 3! = 20$.

Q.2. Answer the following.

10 marks

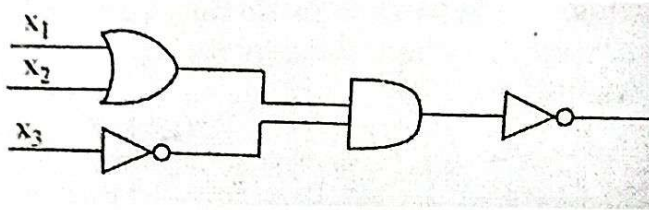
- a) Convert the Decimal number 200 to it's Octal form. (2)
- b) Write the negation of i) Today is Monday.
Write the contrapositive of i) "If today is Sunday, then it is a holiday." (3)
- c) Prove by the Principle of Mathematical Induction
$$p(n): 4 + 8 + 12 + \dots + 4n = 2n(n + 1)$$
 (5)

Q.3. Answer the following

10 marks

- a) Use table and find the values of $f(x,y,z) = \overline{x.y} + z$. (2)
- b) Convert the Hexadecimal number 4A3F to it's Decimal form. (3)

c) Find $f(x_1, x_2, x_3)$ in the given circuit.



Also find the value of output if the input values are as follows:

$$x_1 = 0, \quad x_2 = 1, \quad x_3 = 1$$

(5)

Q.4. Answer the following.

10 marks

a) Define Universal set.

Let X be a universal set and A be subset of X . let $n(x) = 100$ and $n(A) = 80$ then find $n(A^c)$.

(2)

b) Construct the truth table for the logical statement $p \wedge (\sim (p \vee q))$ and check if it is a Tautology.

(3)

c) Let $X = \{1, 2, 3, 4, 5, 6\}$ $A = \{2, 4, 6\}$ $B = \{1, 2, 3, 4\}$ Verify the two De Morgan's Laws for the sets A and B .

(5)

Q.5. Answer the following.

10 marks

a)
$$F(x) = \begin{cases} 3 & \text{for } -3 \leq x \leq -1 \\ -6x - 3 & \text{for } -1 \leq x \leq 0 \\ 3x - 3 & \text{for } 0 < x \leq 1 \end{cases}$$

Evaluate $F(-2)$ and $F(0)$

(2)

b) Let $A = \{2, 4, 6\}$ and $R = \{(x, y) / x \geq y, x \in A, y \in A\}$.

Check if R is reflexive, symmetric and Transitive.

(3)

c) Expand $(x + 2x^2)^4$ using Binomial theorem. Also find the middle term of the expansion $(x + 2x^2)^4$.

(5)

Q.6. Answer the following.

10 marks

a) Let $f(x) = x + 2$ and $g(x) = 2x^2$.

Then find i) $f(g(x))$ ii) $f(f(x))$

(2)

b) State the Basic Pigeonhole Principle.

Find the minimum number of students that should be present in a class so that three of them are born in the same month?

(3)

c) In how many ways can a man invite 7 of his friends for a party so that 3 or more than 3 of his friends will remain present?

(5)