

**Vidhya Vikas Mandal's**  
**Shree Damodar College of Commerce & Economics Margao Goa**  
**F.Y.BCA, Semester II, April 2019 Semester End Assessment**  
**BCA 204 : DISCRETE MATHEMATICS**

**Duration: 2 Hours**

**Total Marks: 50**

**INSTRUCTIONS:**

- I. Figures to the right indicate maximum marks
- II. Start each answer on a fresh page.
- III. Non scientific, non programmable calculator allowed.
- IV. Graph paper will be provided on request

**1. Answer the following**

**A. Convert the following**

**[4 marks]**

- i. Hexadecimal number 5F1C to decimal form
- ii. Decimal number 824 to octal form

**B. Define the following**

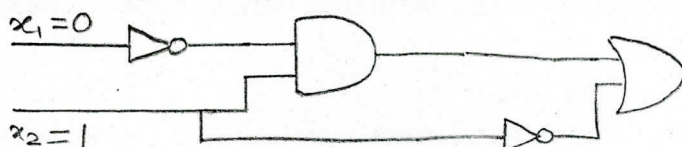
**[6 marks]**

- i. Null set
- ii. Singleton set
- iii. Cardinal number of a finite set
- iv. Subsets
- v. Power set
- vi. Difference between two sets

**2. Answer the following**

**[5x2=10 marks]**

i. Find the output for the following circuit



- ii. Construct the truth table for  $(p \wedge q) \rightarrow (\neg p \vee q)$
- iii. If  $A = \{x, y, z\}$  and  $L = \{y^3\}$ , find  $L^*$  and  $L^+$
- iv. Prove that  $x \cup x = x$  for  $x \in A$
- v. Verify whether  $f(x) = x^2$  is one one function for  $x \in \mathbb{R}$ .

**3. Answer any two of the following**

**[10 marks]**

- A. Find the term independent of  $x$  in  $(x^2 - \frac{1}{x})^9$
- B. Define an equivalence relation and hence examine whether relation  $R$  defined on the set  $\mathbb{Z}$  by  $aRb$  if and only if  $a-b$  is divisible by 5.
- C. Verify whether statements  $p \rightarrow q$  and  $\neg(p \wedge \neg q)$  are logically equivalent

4. Answer any two of the following

[10 marks]

A. Prove by mathematical induction that

$$1+3+5+\dots+(2n-1)=n^2$$

B. Find the number of words that can be formed when the letters of each of the words given below are permuted

i. COMMITTEE

ii. REPETITION

iii. INDIFFERENCE

iv. ASSASSINATION

v. EQUILLIBRIUM

C. Draw a state diagram of the finite state machine

$$M=\{A,O,S,f,g,s_0\}$$

	f		g	
	a	b	a	b
$S_0$	$S_0$	$S_1$	0	0
$S_1$	$S_1$	$S_1$	1	1

5. Answer any two of the following

[10 marks]

A. Find  $f(3)$ ,  $g(2.5)$ ,  $f(g(x))$  and  $g(f(x))$  for  $f(x)=2x$  and  $g(x)=4x+1$

B. In a consumer preference survey of an item, 15 were found to use Brand A, 20 were found to use Brand B, 5 were found to be in the habit of using both Brand A and B. draw a Venn Diagram and find number of consumers using at least one of the 2 Brands of item.

C. An organization consists of 9 members of which 4 are doctors. A selection of 4 persons is to be done among these members. Find how many selections will have

i. No doctor

ii. Exactly 2 doctors

iii. All 4 doctors

iv. At least 3 doctors