

# International Islamic University Chittagong

Department of Business Administration

Program: **BBA**

Mid-Term Examination, Spring 2023

Course Title: **Foundation of Mathematics**

Course Code: **MATH-1101**

Time: **1.5 hours**

Marks: **30**

[Answer the following questions. All parts of a question answer serially]

1. (a) Write down De Morgan's laws for theory of sets and justify by using the following sets; 2 AN CLO2  
 $U = \{1,2,3,0,5,6,7,9\}, A = \{1,3,6\}, B = \{2,3,0\}$
- (b) In a student survey of 525 people, 350 read Newspapers, 215 listened to the radio, and 140 watched Television to get the daily news. If out of them, 75 read newspapers and watched Television, 40 listened to the radio and watched Television, 100 read newspapers and listened to the radio, and 25 used all three sources, draw the Venn diagram and determine 4 APP CLO2  
 (i) How many people utilize none of the three?  
 (ii) How many people utilize Newspaper and Radio but not the Television? 4 APP CLO2  
 (c) 12 of the 25 pupils in the class have taken economics, while 8 have taken economics but not politics. Calculate the number of students who have taken economics and politics as well as those who have just studied politics.
2. (a) Define indices with example. 2 UN CLO2  
 (b) Justify the properties of indices. 4 AN CLO2  
 (c) i) If  $\frac{p^m}{a^n} = \frac{q^m}{b^n} = \frac{r^m}{c^n} = a+b+c$ , show that  $p^{\frac{m}{n}} + q^{\frac{m}{n}} + r^{\frac{m}{n}} = [a+b+c]^{\frac{n}{m}}$  4 E CLO2  
 ii)  $a^x = \left(\frac{a}{b}\right)^y = b^z$ , where,  $a \neq 1$ , Prove that,  $\frac{1}{x} - \frac{1}{y} = \frac{1}{z}$
- OR**
- (a) Write down the transformation of indices to logarithm. 2 UN CLO2  
 (b) Find the value of a machine after a period of 15 years if purchase price of the machine is tk. 225600. It is required to follow that, the depreciation of the machine is 10% for the first 4 years, 8% for the next 7 years and 5% for the rest years. 4 APP CLO2  
 (c) If  $\frac{b}{a} + \frac{a}{b} = 23$ , show that 4 E CLO2  
 $\log\left(\frac{a+b}{5}\right) = \frac{1}{2}(\log a + \log b)$ .
3. (a) "Real number has some characteristics"- Explain with example. 2 UN CLO2  
 (b) A man saved Tk. 16500 in ten years. In each year the first he saved Tk. 100 more than he did in the preceding year. How much did he save in the first year? 4 APP CLO2  
 (c) For 3 consecutive months, a person deposits some amount on the first day of each month in a small savings fund. These 3 successive amounts in the deposit, the total value of which is 65 from a G.P. If the two extreme amounts be multiplied each by 3 and the mean by 5, the product forms an A.P. Find the amount in the first and second deposit. 4 APP CLO2