Roll No……..….. **Total No. of Printed Pages: 2**
Total No. of Questions: [09]

B. Sc. (HONS.) (Semester –6th)
FINANCIAL MATHEMATICS
Subject Code: BMATS1-605
Paper ID: [19131230]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Define compound interest and explain its difference from simple interest. Calculate the amount at 5% simple interest of Rs. 1500 in 10 months.
b) Explain the difference between nominal and effective interest rates.
c) Find the present value of Rs. 1800 in 8 years having a discount rate of 15%.
d) Derive the formula for calculating the accumulated sum of an annuity.
e) How does the frequency of interest calculation affect the accumulated sum of an annuity?
f) Explain the relationship between the rate of discount and the rate of interest.
g) Explain how the average annual and transaction yield is calculated and its significance.
h) Explain the relation between the accumulated and present value of an annuity.
i) What is the primary purpose of tax accounting? How does inflation impact the calculation of taxable income?
j) Write down the key factors that contribute to the calculation of instant profit in a business.

Section – B **(5 marks each)**

Q2. If an investment grows to Rs. 14000 after 5 years at an annual interest rate of 10% compounded annually, what was the initial investment amount?

Q3. Find the effective rate of interest equivalent to the nominal rate of 9% converted: i) Monthly, (ii) Semi-annually.

Q4. Calculate the accumulated sum of an annuity due with an annual payment of Rs. 40, 000 for 8 years at an annual interest rate of 5%, compounded semi-annually.

Q5. Show the relation between the accumulated sum and the present value of an annuity using mathematical formulas and provide an example calculation demonstrating the relationship.

Q6. Calculate the instant profit on a credit transaction where Rs. 40, 000 is lent for 6 months at an interest rate of 10% per annum.

Section – C **(10 marks each)**

Q7. (a) Divide Rs. 43,500 into two parts, so that the simple interest in the first when deposited for one year at 9% per annum and that on the second when deposited for 2 years at 10% per annum in a bank are the same.

(b) Suresh borrows Rs. 500, 000 from a bank to purchase a car. He agrees to make a monthly payment of 4000. How long will it take him to pay off the loan?

Q8. (a) Describe a scenario where choosing an ordinary annuity and annuity due can significantly impact financial outcomes?

(b) Find the present value of a Rs. 80,000 monthly annuity for 10 years with an annual interest rate of 4% compounded monthly.

Q9. (a) Reena earns a salary of Rs. 50, 000 per year. If the income tax rate is 20%, how much tax will she owe? Additionally, if the inflation rate is 3%, what will her salary be worth in real terms after one year?

(b) What factors should be considered when calculating basic credit?