Unit III

6. (a) State and prove De Morgan's law in set theory. **7**

(b) In a survey of 100 persons, it was found that 28 read magazine A, 30 read magazine B, 42 read magazine C, 8 read magazine A and B, 10 read A and C, 5 read magazine B and C, 3 read all the three magazines :

(i) Find how many persons read none of these magazines.

(ii) Find how many persons read magazine C only. **7**

7. (a) Prove that : **7**

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc + bc + ca + ab$$

(b) Solve the following system of equations using matrix method : **7**

$$2x + 3y + 3z = 5$$
$$x - 2y + z = -4$$
$$3x - y - 2z = 3$$

Subject Code—0975

B. Com. (First Year) EXAMINATION

(For Batch 2018 Onwards)

BUSINESS MATHEMATICS

BCOM-105

Time : 3 *Hours* *Maximum Marks :* 70

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. Explain the following :

(a) Define the continuity of a function.

(b) Define skew symmetric matrix with suitable illustration.

(c) Construct an equation whose roots are $3+\sqrt{5}$ and $3-\sqrt{5}$.

(d) What is the power of a set ?

(e) What time will be required for a sum of money to double at 10% simple interest ?

(f) Differentiate $\sin^2 x + \cos^2 x$ w.r.t. x.

(g) Evaluate $\int \tan x . \sec^2 x \, dx$. **7×2=14**

Unit I

2. (a) If the difference between simple interest and compound interest is Rs. 200 at 4% rate of interest for 2 years on certain Principal amount, then find the principal amount. **7**

(b) Mahesh sells two items for Rs. 4,800 each. In one deal, he earns a profit of 25% and in the other, he suffers a loss of 20%. Find the profit or loss percentage in the whole deal. **7**

3. (a) What is the difference between perpetual annuity and deferred annuity ? Explain. **7**

(b) What amount should be deposited annually so that after 16 years, a person receives Rs. 1,67, 160, if the interest rate is 15% annually ?

Where $(1.1)^{16} = 9.358$. **7**

Unit II

4. (a) Prove that : **7**

$$7\log\left(\frac{16}{15}\right) + 5\log\left(\frac{25}{24}\right) + 3\log\left(\frac{81}{80}\right) = \log 2$$

(b) Find the sum of all three-digit numbers which leave the remainder two when divided by 5. **7**

5. (a) If $x^y = y^x$, find $\frac{dy}{dx}$. **7**

(b) Evaluate : **7**

$$\int \frac{x+2}{2x^2+6x+5} dx$$

Unit IV

8. (a) Define and differentiate probability and conditional probability with the help of relevant examples. **7**

(b) A husband and a wife appear in an interview for two vacancies for the same post. The probability of husband selection is 1/7 and that of wife selection is 1/5. What is the probability that : **7**

(i) Only one of them will be selected ?

(ii) None of them will be selected ?

9. (a) What is Bayes's theorem ? How is it used in business decision making ? **7**

(b) In a bolt factory machine 1, 2 and 3 manufacture respectively 25%, 35% and 40% of the total bolts. Of their total output, 5%, 4% and 2% are respectively defective bolts. A bolts is drawn at random from the product. If the bolt drawn is found to be defective, what is the probability that it is manufactured by machine number 2 ? **7**

Unit IV

8. (a) Define and differentiate probability and conditional probability with the help of relevant examples. **7**

(b) A husband and a wife appear in an interview for two vacancies for the same post. The probability of husband selection is 1/7 and that of wife selection is 1/5. What is the probability that : **7**

(i) Only one of them will be selected ?

(ii) None of them will be selected ?

9. (a) What is Bayes's theorem ? How is it used in business decision making ? **7**

(b) In a bolt factory machine 1, 2 and 3 manufacture respectively 25%, 35% and 40% of the total bolts. Of their total output, 5%, 4% and 2% are respectively defective bolts. A bolts is drawn at random from the product. If the bolt drawn is found to be defective, what is the probability that it is manufactured by machine number 2 ? **7**