

(20115)

Roll No. ....

BBA-I Sem.

# NP-3040

**B. B. A. Examination, Dec. 2014**

**Mathematical Foundation for Business Administration**

**(BBA-103)**

**(Old Course-I)**

*Time : Three Hours*      *[Maximum Marks : 75]*

**Note :** Attempt questions from all Sections as per instructions.

### **Section-A**

**(Very Short Answer Questions)**

Attempt all the *five* questions of this Section. Each question carries 3 marks. Very short answer is required.       $3 \times 5 = 15$

1. Find the present value of an annuity due to Rs. 1,000 for five years at the rate of 10% per annum at compound interest.

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2. If  $P$  and  $Q$  are two sets such that  $n(P \cup Q) = 75$ ,  $n(P \cap Q) = 17$  and  $n(P) = 49$ , find  $n(Q)$ .

3. Integrate  $\int \frac{dx}{1 + \cos x}$ .

4. Test for the following function for existence of limit :

$$\lim_{x \rightarrow 0} \frac{1}{1 + e^{1/x}}$$

5. Prove that the matrix  $\begin{bmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{bmatrix}$  is orthogonal.

### **Section-B**

**(Short Answer Questions)**

This Section contains three questions, attempt any *two* questions. Each question carries  $7\frac{1}{2}$  marks. Short answer is required.       $7\frac{1}{2} \times 2 = 15$

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6. Prove that :

$$\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix} = 0,$$

where  $\omega$  is one of the imaginary cube roots of unity.

7. Evaluate  $I = \int \frac{\cos(x-\theta)}{\cos x} dx$ .

8. Find the third divided difference with arguments 2, 4, 9, 10 of the function  $f(x) = x^3 - 2x$ .

**Section-C**

**(Detailed Answer Questions)**

This Section contains five questions, attempt any *three* questions. Each question carries 15 marks. Answer is required in detail.  $15 \times 3 = 45$

9. (a) If Ram deposit Rs. 1,000 in his Saving Bank Account at 5% interest compounded annually, what future value at the end of 4 years will get ?

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(b) If  $y^x = x^{\sin y}$ , find  $\frac{dy}{dx}$ .

10. (a) Evaluate  $\int \frac{dx}{a+b \cos x}$ .

(b) Show that  $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0$ .

11. (a) Show that  $\Delta_{yz}^2 x^3 = x + y + z$ .

(b) Evaluate  $\lim_{x \rightarrow 0} \frac{x - |x|}{x}$ .

12. Find the inverse of the matrix  $A = \begin{bmatrix} 2 & 1 & -1 \\ 0 & 2 & 1 \\ 5 & 2 & 2 \end{bmatrix}$ .

13. (a) If from a bag of 6 red, 5 white and 4 black balls, two balls are drawn, find probability that none of them is white.

(b) Find the maximum and minimum values of the function  $f(x) = x^3 - 2x^2 + x + 6$ .

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