2012N1048

Candidate's Seat No:____

IMBA (Old) Sem.3 Examination
Business Mathematics
December-2025

Time : 2.30 Hours] **[Max.Marks : 70**

Note:

1) All questions are compulsory.
2) Attempt new question on new page.
3) Non – Programmable scientific calculator can be used.

Q-1. Attempt any TWO of the Following: **[14]**

a) A committee of 5 members is to be formed from 6 men and 5 women. How many committees can be formed,
   (i) if at least 2 women must be included?
   (ii) if at least 4 men must be included?

b) How many different ways can the letters of the word MANAGEMENT be arranged? In how many different ways can the letters be arranged so that all E's are together?

c) How many different 5-digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6.
   (i) if repetition allowed?
   (ii) if repetition is not allowed?

Q-2. Attempt any TWO of the Following: **[14]**

a) A bag contains 5 red, 4 blue and 3 green balls. Two balls are drawn one after another without replacement.
   (i) Find the probability that both balls are of different colours.
   (ii) Find the probability that one ball is of blue colour and another is of green colour.

b) A discrete random variable X has the following probability distribution:

X	0	1	2	3
P(X)	0.2	0.3	0.4	0.1

Find the mean, variance and standard deviation of X.

c) A factory has three machines A, B and C. They produce 20%, 30% and 50% of total items respectively. The defect rates are 2%, 3% and 4% respectively. If an item is selected at random and found defective, find the probability that it was produced by machine C.

Q-3. Attempt any TWO of the Following: **[14]**

a) Use mathematical induction to prove,
$$2^2 + 4^2 + 6^2 + \cdots + (2n)^2 = \frac{2n\,(n+1)\,(2n+1)}{3}$$

b) Using the Binomial expansion, expand $(1 - 2x)^6$ upto the term containing x^3.

c) Find the sum of the series $1 + 2 + 2^2 + 2^3 + \cdots + 2^{10}$.

P.T.O

Q-4. Attempt any **TWO** of the Following: **[14]**

a) The 5th term of an A.P. is 18 and the 12th term is 46. Find the first term, common difference and the sum of first 25 terms.

b) A machine costs ₹50,000 and depreciates at 12% per year. Find its value after 8 years, assuming geometric decay.

c) If the A.M. between two numbers is 20 and their G.M. is 16, find the numbers.

Q-5. Attempt any **TWO** of the Following: **[14]**

a) Using Newton's forward difference formula to estimate the value of $f(7)$ from the following table:

x	5	6	7	8
$f(x)$	150	180	220	300

b) Using Lagrange's interpolation method to find $f(3)$ for the following data:

x	1	2	4
$f(x)$	3	6	24

c) The following table gives the values of a function $f(x)$. Find the missing value of the following data:

x	2	4	6	8
$f(x)$	10	40	?	160

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