Seat No. : _____

DR-105

December-2025

Int. MBA, Sem.-III

KS-MBA-DSC-C-234 : Business Mathematics

Time : 2:00 Hours] **[Max. Marks : 50**

Notes : (1) **All** questions are compulsory.
(2) Attempt new question on new page.
(3) Non-Programmable scientific calculator can be used.

1. Attempt any **TWO** of the following : **10**
   (a) How many ways an arrangement of 3 letters can be made using the letters of the word "CONTRACTS" ?
   (b) 12 people sit around a round table. They form 3 families of 4 persons each. Each family wants to sit together. How many circular arrangements are possible ?
   (c) A company manufactures electronic components using three different machines. Machine X produces 50% of all components and 1.5% of its output is defective. Machine Y produces 30% of all components and 4% of its output is defective. Machine Z produces 20% of all components and 6% of its output is defective. A component is selected at random from the total production and is found to be defective. What is the probability that this defective component was produced by Machine Z ?

2. Attempt any **TWO** of the following : **10**
   (a) Use the method of induction to prove that, $f(n) = 3^{4n} + 2^{4n+2}$ is divisible by 4.
   (b) Find the sum of n terms of the series whose n^{th} terms is $3k^2 - 2k + 4$.
   (c) In the expansion of $(kx + 1)^{14}$, the co-efficients of x^6 and x^8 are equal. Find the value of k.

3. Attempt any **TWO** of the following : **10**
   (a) A machine depreciates in value at the rate of 20% per year. If its current value is ₹ 5,000, what will be its estimated value after 7 years ?
   (b) Eight years ago, the sum of three sisters' ages was 39 years. Eight years from now, the middle sister will be 4 years older than the youngest. Given that the youngest sister is currently 13 years old, find the present ages of all three sisters.
   (c) In an AP, the 50^{th} term is 120. Find the sum of the first 100 terms.

4. Attempt any **TWO** of the following : **10**

(a) The area A of a circle of diameter d is given for the following values :

d	80	85	90	95	100
A	5026	5674	6362	7088	7854

Calculate the area of a circle of diameter 105.

(b) A curve passes through the points (0, 18), (1, 10), (3, –18) and (6, 90). Find the slope of the curve at $x = 2$ using Lagrange's Interpolation formula.

(c) Find the sales value for the year 2017 from the data given below :

Year	2014	2015	2016	2017	2018	2019
Sales in units	150	235	365	?	525	780

5. Attempt the following with appropriate option. **10**

(Attempt the question in given order and mentioned correct option for the answer with the question number, for example like :

(1) – a,

(2) – b,... and so on.)

(1) If $\binom{n}{2} = 45$, then what is the value of n ?

(a) 9 (b) 10

(c) 15 (d) 12

(2) How many 3 digit numbers can be formed using the digits 0, 1, 2, 3, 4 without repetition ?

(a) 24 (b) 48

(c) 12 (d) 6

(3) Which of the following events are mutually exclusive ?

(a) Rolling an even number and rolling a number greater than 3

(b) Drawing a king and drawing a spade from a deck

(c) Selecting a vowel and selecting a consonant from the alphabet

(d) Getting heads and getting tails on a coin toss

(4) Which of the following is the middle term in the expansion $(x + y)^6$?

(a) 3^{rd} (b) 4^{th}

(c) 5^{th} (d) 6^{th}

(5) What is the sum of the series 3, 6, 12, ... up to 5 terms ?

(a) 96 (b) 99

(c) 105 (d) 93

(6) If the sum of an AP is 100, a = 5, d = 3, find the number of terms.

(a) 5 (b) 6

(c) 7 (d) 8

(7) Which of the following is a GP ?

(a) 2, 5, 8, 11 (b) 3, 6, 12, 24

(c) 10, 9, 8, 7 (d) 1, 4, 7, 10

(8) In an AP, if the common difference is zero, then the series is:

(a) Increasing (b) Decreasing

(c) Constant (d) None of the above

(9) Interpolation is used to estimate values :

(a) Outside the given data range

(b) Within the given data range

(c) For large datasets only

(d) Only for evenly spaced data

(10) Extrapolation is used to estimate values :

(a) Between known data points

(b) Outside the known data points

(c) Only higher values

(d) Only lower values