(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FIRST SEMESTER [BBA] DECEMBER 2025-JANUARY 2026

Paper Code: BBA-103 **Subject: Business Mathematics**
BBA(CAM)-103
BBA(DM)-103
BBA(FS)-103
MBG-103

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt any five questions.

Q1 a) Use the principle of mathematical induction to prove that
$1+2+3+\ldots\ldots+n=\frac{n(n+1)}{2}$ **(6)**

b) Find the first term of an A.P. whose common difference is 3 and whose 7^{th} term is 11. **(6)**

Q2 a) In how many ways can 8 persons be seated at a round table? In how many cases will two particular persons sit together? **(6)**

b) In how many ways can the letters of the word 'ACCOUNTANT' be arranged? In how many of these, vowels are always together? **(6)**

Q3 a) If $y=\sqrt{u}$ and $u=5+7x+x^3$, find dy/dx. **(6)**

b) Find dy/dx when $x^3+y^3=xy$. **(6)**

Q4 a) The total cost C(x) of a firm is: $C(x)=1500+30x+x^2$, where x is the output. Determine: **(6)**
(i) The Average Cost
(ii) The Marginal Cost
(iii) The Marginal Cost when 20 units are produced
(iv) The actual cost of producing twenty first unit

b) Find the absolute maximum and minimum values of the function $f(x)=1-6x-x^2$ in the closed interval [0,4]. **(6)**

Q5 a) Solve the following system of linear equations by Cramer's rule: **(6)**
$X-4y-z=11$
$2X-5y+2z=39$
$-3x+2y+z=1$

b) Show that the matrix $A=\begin{matrix}5 & 3 & 1\\ 2 & -1 & 2\\ 4 & 1 & 3\end{matrix}$ satisfies the equation $A^3-7A^2-5A+13I=O$.
Hence obtain A^{-1}. **(6)**

Q6 a) The demand law for a commodity is given by $p=20-2x-x^2$. Find the consumer's surplus when the market demand is 3. **(6)**

b) Find the area of the region bounded by the curve $y=x^2$, the x-axis and the lines $x=2$ and $x=3$. **(6)**

Q7 a) Evaluate the following integrals **(6)**
(i) $\int x\log x\,dx$
(ii) $\int \frac{\log x}{\sqrt{x}}\,dx$

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P-1/2

b) If the marginal cost function is given by $MC=3(3x+4)^{1/2}$, and the fixed cost is 2, find the average cost for 7 units of output. **(6)**

Q8 a) A firm has two machines M_1 and M_2 costing Rs 45,000 and Rs. 30,000. Each has 5 years life with scrap value nil. Find depreciation of each machine for each year using matrix notation if both are depreciated by sum of the year's digit method. **(6)**

b) Find the sum of all natural numbers between 250 and 1000, which are exactly divisible by 3. **(6)**

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P-2/2

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