

IMBA in BI/IB/APR Sem.-8 Examination

BI

A. M.

Time : 2-30 Hours]

May-2025

[Max. Marks : 70

- Instructions :** (1) This paper contains FIVE questions.
 (2) All questions are compulsory.
 (3) Question No.2, 3, 4 have internal options.
 (4) Figures in the right side in parenthesis indicate marks.

Q:1 Test the convergence of the series: (14)

(i) $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n^2+1}$ (ii) $\sum_{n=1}^{\infty} \frac{2n-1}{n(n+1)(n+2)}$

Q:2 Solve $xp + yq = 3z$. (14)

OR

Q:2 Solve $x^2p + y^2q = z^2$. (14)

Q:3 Find the eigenvalues and eigenvectors of the matrix: (14)

$$\begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$$

OR

Q:3 State and Prove that Green's theorem. (14)

Q:4 Find the real and imaginary parts of $f(z) = z^3$ and Show that $f(z) = z^3$ is analytic everywhere. (14)

OR

Q:4 State and Prove that Cauchy-Riemann equations in cartesian coordinate theorem. (14)

Q:5 Do as the directed. (14)

- (1) Define : Complex number
- (2) Write the equations of C-R equatins.
- (3) Find a.b where $a = (1,0,0)$, $b = (2,0,0)$
- (4) Define :Matrix
- (5) Write down the heat equations.
- (6) Define Cauchy's root test.
- (7) If $a = (1,2,4)$, $b = (2, 0,2)$ then find $a+b$.
- (8) Define vector space .
- (9) If $A = \begin{bmatrix} 1 & 5 \\ 3 & 2 \end{bmatrix}$ then find $3A$.
- (10) Write the identity matrix 3 by 3.
- (11) Test of the convergence of the series 2^n
- (12) If $a = (1,2,3)$, $b = (0,1,0)$, $c = (4,1,2)$ then find $3a+b+2c$.
- (13) Write the real part of the function $f(z) = 3a+i4b$.
- (14) Write the value of i^4 .
- (15) If $c = (2,2,2)$ then find $|c|$.