12 Applied Maths

SEAT NO. :_____

DURATION: - 2½ hrs **735181024** **MARKS:- 75**

Note: - (1) All questions are compulsory.
(2) Figures to the right indicate full marks
(3) Answer to each question must being on a new page

Q.1 Solve any 3: - **CO1 (AP)** **(15)**

1. Express the matrix A as sum of symmetric and skew symmetric matrix, where A = $\begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}$
2. Show that A = $\begin{bmatrix} 2 & 3+4i \\ 3-4i & 5 \end{bmatrix}$ is Hermitian
3. Express $\frac{2+i}{2-i}$ in the form a+ib
4. Express $\frac{2-i}{5+3i}$ in the form a+ib
5. Express in polar form $1 - \sqrt{3}$ i.
6. Express in polar form $-1 + i$

Q.2 Solve any 3: - **CO2 (AP)** **(15)**

1. Solve $\frac{dy}{dx}$ = xy+x+y+1.
2. Solve $(x^2 - yx^2) + (y^2+xy^2)\,dx=0$
3. Solve:$(xy^2 + 2x^2y^3)y\,dx +(x^2y + x^3y + x^3y^2)\,x\,dy =0$
4. Solve: $(x^2y^2 + xy + 1)\,y\,dx+ (x^2y^2 - xy + 1)x\,dy=0$
5. Solve:sec^2.tan y dx +sec^2 y. tan x dy =0
6. $\frac{dy}{dx} = x\sqrt{25 - x^2}$

Q.3 Solve any 3: - **CO3 (AP)** **(15)**

1. Find laplace transform of f(t) = $sin^2 t$
2. Find laplace transform of f(t) = $cos^3 t$
3. Find laplace transform of e^{3t}
4. Find laplace transform of f(t)=$\int_0^1 sin3t\,dt$
5. Find laplace transform 0f f(t)=e^{2t}sinh 3t
6. Find inverse laplace transform of $\frac{1}{s(s^2+4)}$

Q.4 Solve any 3: - **CO4 (AP)** **(15)**

1. Evaluate $\int_0^1 \int_0^1 \frac{dx\,dy}{\sqrt{(1-x^2)(1-y^2)}}$
2. Evaluate $\int_0^1 \int_0^x x(x^2+y^2)\,dx\,dy$
3. Evaluate $\int_0^1 \int_0^y xy\,e^{-x^2}\,dx\,dy$
4. $\int_0^2 \int_0^x \int_0^{2x+2y} e^{x+y+z}$ .dx. dy. dz.
5. Evaluate $\iiint (x + y + Z)dx\,dy\,dx$ over the tetrahedron bounded by the planes. x = 0 , y = 0 , z = 0 and x+y+z = 1
6. Evaluate $\iiint_V \frac{dx\,dy\,dz}{(x+y+z+1)^3}$ where v is the volume bounded by the planes , x = 0, y = 0 , z = 0 , and x + y + z = 1.

Q.5 Solve any 3: - **CO5 (AP)** **(15)**

1. Evaluate $\int_0^\infty \sqrt{x}\,e^{-x^3}\,dx$

2. Evaluate $\int_0^\infty x^{-4}e^{-1/x}\,dx$

3. Evaluate $\int_0^\infty x^7 e^{-2x^4}\,dx$

4. Evaluate $\int_0^\infty \frac{x^a}{a^x}\,dx$

5. Evaluate $\int_0^\infty \frac{1-e^{-ax}}{x}.e^{-x}.dx = \log(a+1)$

6. Write a short note on Beta and Gamma Functions.

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