	find its fixed(Invariant) points.			
25.	Find the bilinear transformation which maps the points $1, i, -1$ onto points $0, 1, \infty$, show that the transformation maps the interior of the circle of the z- plane onto the upper half of the w plane.	8	K3	CO3
26.	Find the bilinear transformation that transforms $-1, 0, 1$ of the z- plane onto $-1, -i, 1$ of the w- plane. Show that under this transformation the upper half of the z-plane maps on to the interior of the unit circle $\|w\| = 1$.	8	K3	CO3

UNIT - IV

Unit - IV / Part - A / 2 Marks				
S.No	**Questions**	**Mark Splitup**	**K – Level**	**CO**
1.	State Cauchy's Integral Theorem	2	K1	CO4
2.	Write Cauchy's Integral formula and its derivatives.	2	K1	CO4
3.	Define Taylor's Series	2	K1	CO4
4.	Expand $\frac{1}{z-2}$ at $z = 1$ in Taylor's series.	2	K2	CO4
5.	Define Laurent's Series Expansion.	2	K1	CO4
6.	Define pole and give an example.	2	K1	CO4
7.	Define an isolated singularity and give an example.	2	K1	CO4
8.	Define Essential singularity and give an example.	2	K1	CO4
9.	Define Removable singularity and give an example.	2	K1	CO4
10.	Define Residue.	2	K1	CO4
11.	Discuss the nature of the singularity of the function $\frac{\sin z - z}{z^3}$	2	K2	CO4
12.	Discuss the nature of the singularity of the function $\frac{\frac{1}{az}}{(z-a)^2}$	2	K2	CO4
13.	Discuss the nature of the singularity of the function $\frac{e^z}{z^2+4}$	2	K2	CO4
14.	Discuss the nature of the singularity of the function $\frac{\cot(\pi z)}{(z-a)^2}$	2	K2	CO4
15.	State Cauchy's Residue Theorem	2	K2	CO4
16.	Find the residue of $\frac{1-e^{2z}}{z^4}$ at $z = 0$	2	K2	CO4
17.	Evaluate $\int_C \frac{dz}{z+4}$, where C is the circle $\|z\| = 2$.	2	K2	CO4
18.	Find the residue of the function $f(z) = \frac{4}{z^2(z-2)}$.	2	K1	CO4

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COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF MATHEMATICS

Unit - IV / Part - B/ 16, 8 Marks				
S.No	Questions	Marks Splitup	K – Level	CO
1.	Evaluate $\int_C \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$, Where $C: \|z\| = 3$ by using Cauchy's integral formula.	8	K2	CO4
2.	Evaluate $\int_C \frac{\cos \pi z^2}{(z-1)(z-2)} dz$, where $C: \|z\| = \frac{3}{2}$	8	K2	CO4
3.	Evaluate $\int_C \frac{z}{(z-2)^2(z-1)} dz$, where C is the circle $\|z-2\| = \frac{1}{2}$ by using Cauchy's integral formula.	8	K2	CO4
4.	Using Cauchy's integral formula, evaluate $\int_C \frac{(z+4)}{(z^2+2z+5)} dz$, where C is the circle $\|z+1+i\| = 2$.	8	K2	CO4
5.	If $f(a) = \int_C \frac{3z^2+7z+1}{z-a} dz$, where $C: \|Z\| = 2$, find $f(3), f(1), f'(1-i)$ & $f''(1-i)$	8	K2	CO4
6.	Evaluate $\int_C \frac{dz}{(z+1)^2(z-2)}$, where $C$is the circle $\|z\| = \frac{3}{2}$	8	K2	CO4
7.	Find the Taylor's Series to represent the function $\frac{z^2-1}{z^2+5z+6}$ in the region (i) $2 < \|z\| < 3$ and (ii) $\|z\| < 2$	8	K2	CO4
8.	Expand $\frac{1}{z^2-3z+2}$ in the region (i) $1 < \|z\| < 2$ (ii) $\|z-1\| < 1$ and $(iii)\|z\| > 2$.	8	K2	CO4
9.	Expand $f(z) = \frac{1}{(z+1)(z+3)}$ as a Laurent's Series if $1 < \|z\| < 3$ and $\|z\| > 3$	8	K2	CO4
10.	Find the Laurent's series expansion of $f(z) = \frac{7z-2}{z(z-2)(z+1)}$ in $1 < \|z+1\| < 3$	8	K2	CO4
11.	Expand $f(z) = \frac{z}{(z+1)(z+2)}$ as Laurent's series valid in the following (i) $1 < \|z\| < 2$. (ii) $\|z-1\| < 1$ and (iii) $\|z\| > 2$	8	K2	CO4
12.	Evaluate $\int_C \frac{z^2}{(z-1)^2(z+2)} dz$, where C is the circle $\|z\| = 3$, using Cauchy's Residue Theorem.	8	K2	CO4
13.	Evaluate $\int_C \frac{z-1}{(z+1)^2(z-2)} dz$, where $C: \|z-i\| = 2$, using Cauchy's Residue Theorem.	8	K2	CO4

14.	Evaluate $\int_C \frac{dz}{(z^2+4)^2}$, where C is the circle $\|z-i\|=2$, using Cauchy's Residue Theorem.	8	K2	CO4
15.	Evaluate $\int_C \frac{z}{(z^2+1)^2}dz$, where C is the circle $\|z-i\|=1$, using Cauchy's Residue Theorem.	8	K2	CO4
16.	Using Cauchy's Residue Theorem to evaluate $\int_C \frac{3z^2+z+1}{(z^2-1)(z-3)}dz$, where C is the circle $\|z\|=2$	8	K2	CO4
17.	Evaluate $\int_0^{2\pi} \frac{d\theta}{a+b\cos\theta}$ by using contour integration.	8	K3	CO4
18.	Evaluate $\int_0^{2\pi} \frac{d\theta}{a+b\sin\theta}$ by using contour integration.	8	K3	CO4
19.	Evaluate $\int_0^{2\pi} \frac{d\theta}{2+\cos\theta}$ by using contour integration	8	K3	CO4
20.	Evaluate $\int_0^{2\pi} \frac{d\theta}{13+5\cos\theta}$ by using contour integration	8	K3	CO4
21.	Evaluate $\int_0^{2\pi} \frac{d\theta}{13+5\sin\theta}$ by using contour integration.	8	K3	CO4
22.	Evaluate $\int_0^{2\pi} \frac{d\theta}{5-4\sin\theta}$ by using contour integration	8	K3	CO4
23.	Evaluate $\int_0^{2\pi} \frac{\cos m\theta}{a+b\cos\theta}d\theta$ by using contour integration	8	K3	CO4
24.	Evaluate $\int_0^{2\pi} \frac{\cos 3\theta}{5-4\cos\theta}d\theta$ by using contour integration	8	K3	CO4
25.	Evaluate $\int_0^{\infty} \frac{x^2dx}{(x^2+a^2)(x^2+b^2)}$, $a>0, b>0$ using contour integration.	8	K3	CO4
26.	Evaluate $\int_0^{\infty} \frac{dx}{(x^2+a^2)(x^2+b^2)}$, $a>0, b>0$ using contour integration.	8	K3	CO4
27.	Evaluate $\int_0^{\infty} \frac{x^2dx}{(x^2+4)(x^2+9)}$, $a>0, b>0$ using contour integration.	8	K3	CO4
28.	Evaluate $\int_0^{\infty} \frac{dx}{(1+x^2)^2}$ using contour Integration.	8	K3	CO4
29.	Evaluate $\int_{-\infty}^{\infty} \frac{x^2dx}{(x^2+1)(x^2+4)}$ using contour integration	8	K3	CO4
30.	Evaluate $\int_0^{\infty} \frac{\cos ax}{x^2+1}dx, a>0$	8	K3	CO4
31.	Evaluate $\int_0^{\infty} \frac{x\sin mx}{x^2+a^2}dx, a>0, m>0$	8	K3	CO4