Assignment No.-III (Unit-III)

Course: M.Sc. (Mathematics) **Session MAY-2017**
Subject Complex Analysis **Subject Code-MMAT1-207**
Semester- 2nd **Date of submission 31/03/2017**

1. Using Cauchy residue theorem: $\oint_C \frac{1-2z}{z(z-1)(z-2)}dz,$ Where C is circle $|Z|=1.5.$
2. Obtain the Laurent's expansion for the function $f(z)=\frac{1}{z^2\sinh z}$ at the isolated singularity and solve $\int_C f(z)dz;$ where C is the circle $|Z-1|=2.$
3. Solve $\int_0^{2\pi}\frac{d\theta}{a+b\sin\theta}, \quad a>|b|$
4. Solve $\int_0^{\pi}\frac{1+2\cos\theta}{5+4\cos\theta}d\theta,$
5. Evaluate $\int_0^{\infty}\frac{x^2}{(x^2+1)^3}dx, \quad a>|b|$
6. Using Cauchy residue theorem: $\oint_C \frac{2z-1}{z(z+1)(z+3)}dz,$ Where C is circle $|Z|=2.$
7. Find the sum of the residues of the function $f(z)=\frac{\sin z}{z\cos z}$ at its poles inside the circle $|Z|=2.$

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Course M.Sc.(Mathematics) **Session MAY-2017**
Subject Complex Analysis **Subject Code-MMAT1-207**
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Assignment No.-IV (Unit-IV)

1. Show that the transformation $w = \frac{1}{z}$ maps a circle in z – plane to a circle in w-plane or to a straight line if the circle in z-plane passes through the origin.
2. Find the image $|z-3i| = 3$ of under the mapping $w = \frac{1}{z}$.
3. Show that under the transformation $w = \frac{z-i}{z+i}$, the real axis in z-plane is mapped into the circle $|w| = 1$. what portion of the z-plane corresponds to the interior of the circle?
4. Show that $w = \frac{i-z}{z+i}$, maps the real axis in z-plane into the circle $|w| = 1$. and the half-plane y>0 into the interior of the unit circle $|w| = 1$ in the w-plane.
5. Find the fixed points and the normal form of the bilinear transformations $w = \frac{z}{z-2}$.
6. Find the bilinear transformation which maps the points z = 1, -i, -1 into the points w=i, 0, -i

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