DMCE- DEC-15

TIME:1 HOUR **MARKS:20**

N.B.:1.Attempt any four questions.

2.Each question carry equal marks.

Q.1 Simplify $\dfrac{(1+i)^8\left(\sqrt{3}-i\right)^4}{(1-i)^4\left(\sqrt{3}+i\right)^8}$

Q.2 If $x-\dfrac{1}{x}=2i\sin\theta,\ y-\dfrac{1}{y}=2i\sin\phi$ then prove that $\dfrac{\sqrt[m]{x}}{\sqrt[n]{y}}+\dfrac{\sqrt[n]{y}}{\sqrt[m]{x}}=2\cos\left(\dfrac{\theta}{m}-\dfrac{\phi}{n}\right)$

Q.3If α and β are the roots of the equation $x^2-\sqrt{3}x+1=0$, prove that $\alpha^n+\beta^n=2\cos\dfrac{n\pi}{6}$. Hence show that $\alpha^{12}+\beta^{12}=2$

Q.4 If $\alpha,\beta,\gamma,\delta$ are the roots of $x^5-1=0$, find their values and then show that $(1-\alpha)(1-\beta)(1-\gamma)(1-\delta)=5$

Q.5 If $1+i$ is one root of the equation $x^4-6x^3+15x^2-18x+10=0$ find all the other roots.

Q.6 Find all the values of $(1+i)^{1/5}$ and show that their continuous product is $(1+i)$

Q.7 Prove that $\dfrac{1+\cos 6\theta}{1+\cos 2\theta}=16\cos^4\theta-24\cos^2\theta+9$

Q.8 Prove that $\cos^4\theta\sin^3\theta=\dfrac{-1}{64}(\sin 7\theta+\sin 5\theta-3\sin 3\theta-3\sin\theta)$

$x = (1+i)$

1026.80

$\frac{4\pi}{3}-\frac{\pi}{3}i$

$\frac{4\pi-\pi i}{3}$

e

$e^{i\pi}$