

Date: 10/09/2015

Div: FE1,FE2,FE3

ODD ROLL NUMBERS

VES Institute of Technology, Chembur, Mumbai

Internal Test-I

APPLIED MATHEMATICS (SEM I) (September-2015)

Time : 1 hour

Total Marks : 20

Q-1	Attempt any Five	[10]
(1)	Evaluate $(1 + i)^{100} + (1 - i)^{100}$	
(2)	Find principal value of $i^{2i}$	
(3)	Express in standard form $\frac{(3+2i)^2}{1+2i}$	
(4)	If $x_r = \cos\left(\frac{\pi}{3^r}\right) + i\sin\left(\frac{\pi}{3^r}\right)$ . Prove that $\lim_{n \rightarrow \infty} (x_1 x_2 \dots x_n) = i$	
(5)	If $\alpha$ & $\beta$ are roots of $x^2 - 2x + 4 = 0$ . Prove that $\alpha^6 + \beta^6 = 128$	
(6)	Find values of $(-1)^{1/4}$	
Q-2 (a)	Expand $\sin^5 \theta \cdot \cos^3 \theta$	[5]
	OR	
Q-2 (a)	Expand $\cos(7\theta)$ in terms of $\sin \theta$ & $\cos \theta$	
Q-3 (a)	Find Real part of $(1 - i)^{\log(1-i)}$	[5]
	OR	
Q-3 (b)	Prove that $\log\left(\tan\left(\frac{\pi}{4} + i\frac{x}{2}\right)\right) = i \tan^{-1}(\sinh x)$	[5]