

Padmabhushan Vasantdada Patil Pratishthan's College of Engineering

Sion, Chunabhatti - 400022

Mid term Examination SH 2015

Department of General Engineering

Sub: Applied Mathematics

SEM: I

Branch / Div :All

Time:9:30 to 11 am

Date:07/09/2015

Maximum marks:20

N.B:

1. Question No.1 is compulsory
2. Answer any **three** out of remaining **four** questions
- 3 Each question carries 05 marks
- 4 Assume any suitable data wherever required but justify the same

1 Using De Moivre's theorem solve $x^7 + x^4 + i(x^3 + 1) = 0$

2 Prove that $\cos^6 \theta - \sin^6 \theta = \frac{1}{16} (\cos 6\theta + 15 \cos 2\theta)$

3 Find the n^{th} derivative w.r.t. x of $\sin 2x \cdot \sin 3x \cdot \sin 4x$

4 Prove that $\sin^{-1} (\operatorname{cosec} \theta) = \frac{\pi}{2} + i \log \left[\cot \frac{\theta}{2} \right]$

5 If $y^{\frac{1}{m}} + y^{\frac{-1}{m}} = 2x$, show that $(x^2 - 1)y_{n+2} + (2n + 1)x y_{n+1} + (n^2 - m^2)y_n = 0$