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St. Francis Institute of Technology (Engg. College)

Internal Assessment Test-II

Academic Year: 2017-2018

Branch: FE Division: ALL | Year: F.E Semester: I

Subject: Applied Mathematics - I | Time: 11.00am -12.00

Date: 16/10/2017 | No. of Pages: 01

Marks: 20 Marks

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

Note the following instructions.

1. All questions are compulsory.
2. Draw neat diagrams wherever necessary.
3. Write everything in ink (no pencil) only.
4. Assume data, if missing, with justification.

Q.1. Attempt any five.

a. Find all the values of $(i)^{1/3}$ 2M

b. Expand $(\cos\theta + i\sin\theta)^5$ by Binomial expansion and by De Moivre's Theorem 2M

c. Find the principal argument of $\left(\sqrt{3}+i\right)^{17}$ 2M

d. Express $\mathbf{Log}(1+\mathrm{i})$ in the form a+ib 2M

e. If $\tan(\alpha+i\beta) = x+iy$ then prove that $\alpha = \frac{1}{2}tan^{-1}\left[\frac{2x}{1-x^2-y^2}\right]$ 2M

f. Find the stationary points of $f(x,y) = y^2+4xy+3x^2+x^3$ 2M

Q.2. Attempt any one.

a. If $sin^4\theta cos^3\theta = a_1\cos\theta + a_3\cos 3\theta + a_5\cos 5\theta + a_7\cos 7\theta$ then find a_1, a_3, a_5, a_7 5M

b. Find the extreme values of $x^3+3xy^2-3x^2-3y^2+4$ 5M

Q.3. Attempt any one.

a. Expand $f(x) = (x+2)^4+5(x+2)^3+6(x+2)^2+7(x+2)+8$ in ascending powers of $(x+1)$ 5M

b. If $\sin(\theta+i\emptyset) = re^{i\alpha}$ then prove that $r^2 = \frac{1}{2}[\cosh 2\emptyset - \cos 2\theta]$ and $\tan\alpha = \tanh\emptyset\cot\theta$ 5M

ALL THE BEST