Roll No .....

B.E. - 401

B.E. IV Semester

Examination, June 2013

Engineering Mathematics - III

(Common for all Branches)

Time : Three Hours

Maximum Marks : 70/100

Note: Answer any five questions.
All the questions carry equal marks.

1. a) If $u = x^2-y^2$, find a corresponding analytic function by using Milne-Thomson method.

   b) Evaluate $\int_c \frac{e^z}{z-2} dz$, where C is the circle

   i) $|z| = 3$ and

   ii) $|z| = 1$

2. a) Find the residue of $f(z) = \frac{1-e^{2z}}{z^4}$ at its poles.

   b) Use calculus of residues to show that $\int_0^{2\pi} \frac{\cos 2\theta}{5+4\cos\theta} d\theta = \frac{\pi}{6}$

3. a) If $n = 10\, x^3 y^2 z^2$ and error in x, y, z are respectively 0.03, 0.01, 0.02 at $x = 3$, $y = 1$, $z = 2$. Calculate the absolute error and percent relative error in the calculation of it.

   b) Using Newton-Raphson method, find a root of the equation $f(x) = x \sin x + \cos x = 0$ correct to three decimal places, assuming that the root is near to $x = \pi$.

4. a) Solve by Gauss-Seidal method the equations:

   54x+y+z=110

   2x+15y+6z=72

   -x+6y+27z=85

   b) Express $f(x) = x^3 - 2x^2 + x - 1$ into factorial notation and show that $\Delta^4 f(x) = 0$.

5. a) Find a cubic polynomial in x for the following data :

x :	0	1	2	3	4	5
y :	-3	3	11	27	57	107

   b) Given that :

x :	1.0	1.1	1.2	1.3	1.4	1.5
y :	7.989	8.403	8.781	9.129	9.451	9.750

   Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.6$

6. a) Use Euler's modified form to obtain y (0.2), y (0.4) and y (0.6) correct to three decimal places, given that $\frac{dy}{dx} = y - x^2$ with initial condition y (0) = 1.

b) Find the least square fit $y = a + bx + cx^2$ for the data

x :	-3	-1	1	3
y :	15	5	1	3

7. a) The probability that a bomb dropped from a plane will strike the target is $\frac{1}{5}$. If six bombs are dropped, find the probability that

i) Exactly two will strike the target and

ii) At least two will strike the target.

b) Fit poisson distribution to the following data :

x :	0	1	2	3	4
f :	46	38	22	9	1

8. a) Calculate $\int_1^2 \frac{dx}{x}$ by,

i) Simpson's $\frac{1}{3}$ rule with h = 0.50

ii) Simpson's $\frac{1}{3}$ rule with h = 0.25

b) Find the equation of the lines of regression based on the following data :

x :	4	2	3	4	2
y :	2	3	2	4	4