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## CS/M.Tech (MCNT-OLD)/SEM-1/MC-101/2011-12 2011

## ADVANCED ENGINEERING MATHEMATICS

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

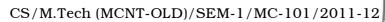
Candidates are required to give their answers in their own words as far as practicable.

Answer any five questions.

1.	a)	State the Cauchy integral theorem 4
	b)	Evaluate the contour integral $\oint_c \frac{dz}{(z-3)}$ where C is a
		simple closed curve and $z = 3$ is (i) outside C
		(ii) inside C 10
2.	a)	State Baye's theorem. 4
	b)	Distinguish between uncorrelated and independent
		random variables. 3
	c)	For a stationary random process relate mean square

- value to dc and ac power. 4
- d) Interpret joint *pdf* of two random variables. 3
- 3. Show the procedure of the finite element method.

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- 4. a) State the eigenvalue problem.
  - b) What are the assumptions concerning arrivals process for a queuing system?
  - c) Define autocorrection function of a stationary random signal.
  - d) What is the binomial series expansion  $(1 + z)^n$ , |z| < 1?

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- 5. Show one procedure to numerically solve an ordinary differential equation with boundary conditions.
- 6. a) What is the method of Lagrange multipliers?
  - b) Define sample average and mean value of a random variable.
- 7. a) Show the procedure of Linear Regression.
  - b) Show a method to numerically determine zeros of a function.
- 8. How are eigenvalues and eigenvectors of a matrix numerically determined ?