8. Write a short note on any four.
   i) Reliability
   ii) Decision theory
   iii) Sampling distribution
   iv) Fault tolerant analysis
   v) Discrete Fourier transform.

******

Roll No .....

MEDC/MEIC/MEHP/MEPS/MEMT/ MEPE/MEVD/MTPA-101

M.E/M.Tech., I Semester

Examination, December 2013

Advanced Mathematics

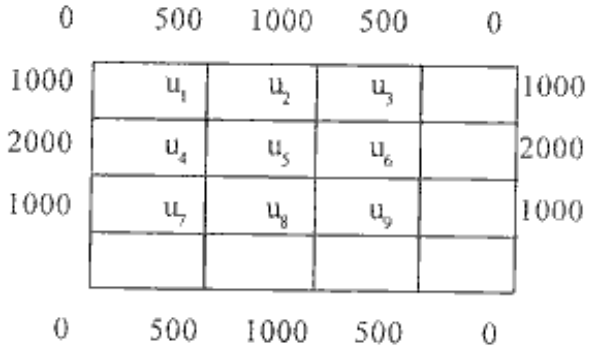
Time : Three Hours

Maximum Marks : 70

Note: Solve any five questions. All questions carry equal marks.

1. a) Find the solution of one-dimensional heat equation by variable separable method.

   b) Solve the elliptic equation $u_{xx}+u_{yy}=0$ for the ahead square mesh with boundary values as shown



2. a) Find mean and standard deviation of binomial distribution.

b) Explain the following with example.

i) Hypothesis

ii) Discrete random variable

iii) Testing of Hypothesis

iv) Theory of estimation

3. a) Derive the differential-difference equation for the queuing model (M/M/1) : (∞/FCFS)

b) Define stochastic process and Markov process with examples.

4. a) Define the following with examples

i) Complement of a fuzzy set

ii) Union of two fuzzy set

iii) Intersection of two fuzzy set

iv) Difference of two fuzzy set

b) Solve the matrix equation in MATLAB taking any example write down the steps.

5. a) Show that the probability density function uniquely determines the failure rate.

b) Explain Goal programming model formulation and state the difference between linear programming and Goal programming.

6. a)* Find the Fourier transform of

$$f(x)=\begin{cases}1 & for\ |x|<1\\ 0 & for\ |x|>1\end{cases}$$

Hence evaluate $\int_0^{\infty}\frac{\sin x}{x}dx$.

b) The mean height of 500 students is 151cm and standard deviation 15 cm. Assuming that the height is normally distributed find the number of students whose height lies between 120 and 155 cm.

Given that area between

z = 0 to z = 2.07 is 0.4808

and z = 0 to z = 0.27 is 0.1064

7. a) In a railway Marshalling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter arrival time follows an exponential distribution and the service time distribution is also exponential with an average of 36 minutes. Calculate

1) expected queue size (line length)

2) Probability that the queue size exceed 10.

b) Write the MATLAB statements required to calculate y(t) from the equation?

$$y(t)=\begin{cases}-3t^2+5 & t>=0\\ 5t+2 & t<0\end{cases}$$

for values of t between –g and +g in step of 0.5