

Roll No

MVCT/MBCT/MVCP-101(New)**M.E./M.Tech., I Semester**

Examination, December 2017

Advance Mathematics**Time : Three Hours****Maximum Marks : 70**

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.

1. Use simplex method to solve following LPP

$$\text{Max. } Z = 4x_1 + 10x_2$$

$$\text{STC } 2x_1 + x_2 \leq 50$$

$$2x_1 + 5x_2 \leq 100$$

$$2x_1 + 3x_2 \leq 90$$

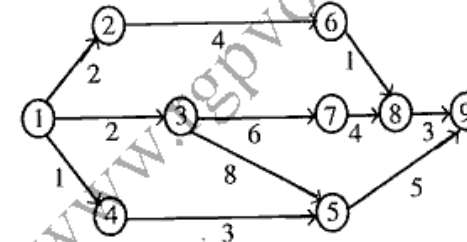
$$\text{with } x_1, x_2 \geq 0$$

2. Describe the HUNGARIAN method of solving as assignment problem and four employees with four jobs to be performed. The time (in hours) each man will take to perform each job is given in the effectiveness matrix.

5	7	11	6
8	5	9	6
4	7	10	7
10	4	8	3

How should the jobs be allocated, one per employees, so as to minimize the total man-hours?

3. Find the critical path and calculate the slack time for each event for the following PERT diagram.



4. A supermarket has two girls ringing up sales at the counters. If the service time for each customer is exponential with mean 4 minutes, and if people arrive in a Poisson fashion at the counter at the rate of 10 per hour.
- Calculate the probability that an arrival will have to wait for service,
 - Find the expected percentage of idle time for each girl?
 - If a customer has to wait, find the expected length of his waiting time.

[3]

5. Describe the Evolutionary algorithms.
6. In a normal distribution, 31% of the items are under 45 and 8% are above 64. Find the mean and standard deviation. Given that if

$$f(t) = \frac{1}{\sqrt{2\pi}} \int_0^t e^{-x^2/2} dx, \text{ then } f(0.5) = 0.19, f(1.4) = 0.42.$$

7. Calculate the mean and variation of binomial distribution.
8. a) Explain linear hazard model of reliability.
b) Calculate the reliability of a 2 out of 4 configuration having an identical constant failure rate of component $\lambda = 0.01/\text{hr}$ for 10 hr.
