PVP 12

Code: CE3T1

II B.Tech - I Semester – Regular Examinations - December 2014

MATHEMATICAL METHODS
(CIVIL ENGINEERING)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Find a positive root of $xe^x = 2$ by the method of False position. 7 M

   b) Find the positive root of $x=cosx$ using Newton Raphson method. 7 M

2. a) From the data given below, find the number of students whose weight is between 60 and 70.

Weight in lbs.:	0 – 40	40 – 60	60 – 80	80 – 100	100 – 120
No. of students:	250	120	100	70	50

7 M

   b) Find $f(x)$ from the following table: 7 M

x:	0	1	4	5
$f(x)$:	4	3	24	39

3. a) The following data gives the corresponding values for pressure and specific volume of a superheated steam.

Volume v:	2	4	6	8	10
Pressure p:	105	42.7	25.3	16.7	13.0

Find the rate of change of pressure w.r.t. volume when v=2. 7 M

b) A river is 80 metres wide. The depth 'd' in metres at a distance x metres from one bank is given by the following table. Calculate the area of cross-section of the river using Simpson's rule. 7 M

x:	0	10	20	30	40	50	60	70	80
d:	0	4	7	9	12	15	14	8	3

4. a) Solve $y' = \frac{y-x}{y+x}$ by Picard's method. Hence, find the value of $y(0.1)$, given $y(0)$=1. 7 M

b) Using Runge Kutta method of fourth order, find $y(0.7)$ correct to 4 decimal places if $y' = y - x^2$, $y(0.6) = 1.7379$. 7 M

5. a) The probabilities that students A, B, C, D solve a problem are $\frac{1}{3}$, $\frac{2}{5}$, $\frac{1}{5}$ and $\frac{1}{4}$. If all of them try to solve the problem, what is the probability that the problem is solved. 7 M

b) For the continuous probability function $f(x) = kx^2e^{-x}$ when $x \geq 0$, find k, mean and variance. 7 M

6. a) Six dice are thrown 729 times. How many times do you expect at least three dice to show a 5 or 6. 7 M

b) Given that the mean heights of students in a class is 158 cms with standard deviation of 20 cms. Find how many students heights lie between 150 cms and 170 cms, if there are 100 students in the class. 7 M

7. a) The mean height of students in a college is 155 cms and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157 cms. 7 M

b) A random sample of size 81 was taken whose variance is 20.25 and mean is 32, construct 98% confidence interval. 7 M

8. a) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same, at 5% level. 7 M

b) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has came from a population with mean 38. Also calculate 95% confidence interval for the population. 7 M