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ET-302(A)

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)

01661

Term-End Examination

December, 2012

ET-302(A) : COMPUTER PROGRAMMING AND NUMERICAL ANALYSIS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions. All questions carry **equal** marks. Use of calculator is permitted.*

1. (a) Write a flow chart and a program to read 10 numbers and find out largest and smallest numbers. **7+7**

   (b) Write a program to read two matrices A and B, check whether multiplication is possible or not ? If possible out put of the multiplication is to be printed.

2. (a) Explain the difference between : **7+7**
   (i) constant and variable
   (ii) function and subroutine
   (iii) 'If then' statement and 'If then else' statement

   (b) Write a program to calculate the number of combinations of n objects taken i at a time. This number is obtained from the relation $n!/i!\,(n-i)!$ where $n! = 1.2.3..n$

3. (a) Write format command for : 7+7

(i) Integer data

(ii) Real numerical data

(iii) Literal data

(iv) Double precision data

(b) Define Round off error and truncation error. Calculate a bound for the truncation error in approximating e^{x^2} by

$$1+x^2+\frac{x^4}{2!}+\frac{x^6}{3!}+\frac{x^8}{4!} \text{ for } x \in]-1, 1[.$$

4. (a) Find a real root of $x^3-x=1$ between 1 and 2 by Bisection method. Compute five iterations. 7+7

(b) Find a positive value of $(17)^{1/3}$ correct to four decimal places by Newton-Raphson method.

5. (a) Assuming that the following values of y belong to a polynomial of degree 4, compute the next three values : 7+7

x :	0	1	2	3	4	5	6	7
y :	1	-1	1	-1	1	-	-	-

(b) Prove that :

$$\Delta+\nabla=\frac{\Delta}{\nabla}-\frac{\nabla}{\Delta}$$

6. (a) Obtain the LV decomposition of the matrix **7+7**

$$\begin{bmatrix} 2 & -6 & 10 \\ 1 & 5 & 1 \\ -1 & 15 & -5 \end{bmatrix}$$

(b) Find $\frac{dy}{dx}$ at $x = 0.1$ from the table :

x :	0.1	0.2	0.3	0.4
y :	0.9975	0.9900	0.9776	0.9604

7. (a) Find from the following table, the area bounded by the curve and the $x-$axis from $x = 7.47$ to $x = 7.52$ **7+7**

x :	7.47	7.48	7.49	7.50	7.51	7.52
y :	1.93	1.95	1.98	2.01	2.03	2.06

(b) Use the Runge Kutta method of fourth order to approximate y when $x = 0.1$ given that $y = 1$ at $x = 0$

and $\frac{dy}{dx} = 3x + y^2$

8. Explain the following : **4x3½=14**

(a) Convergence of Newton Raphson method

(b) Eigen values and eigen vectors of a matrix

(c) Difference between algebraic and Transcendental equations

(d) Rolle's theorem and Taylors theorem.
