B. Tech. (Civil Engineering)
BTCLEVI
Term-End Examination
December, 2013

BICE-022 : BACHELOR OF TECHNOLOGY (CE)

Time : 3 Hours   *Maximum Marks : 70*

Note :   *(i)*   *All answers are to be written in **English** only.*
      (ii)   *Attempt **any seven** questions.*
      (iii)   *Non programmable calculators are **allowed**.*

1.   (a)   Using Newton's Raphson method, find the   5
      real root of $x.\log_{10}x = 1.2$ correct to the five
      decimal places.

    (b)   Explain the method of false position of   5
      finding the real root of equation $f(x) = 0$.

2.   (a)   Develope a computer algorithm for finding   5
      roots of $f(x) = 0$, using Newton-Raphson
      method.

    (b)   Explain determination of eigen values and   5
      eigen vector's by power method.

3.   Solve $10x - 7y + 3z + 5u = 6$, $-6x + 8y - z - 4u = 5$ 10
    $3x + y + 4z + 11u = 2$, $5x - 9y - 2z + 4u = 7$ by
    using Gauss elimination method.

4.   (a)   Explain Lagrange's interpolation method   5
      for any function $y = f(x)$

    (b)   The following values of x and y are given :   5
      x :   1   2   3   4
      y :   1   2   5   11
      Find the cubic splines and evaluate :
      $y(1.5)$ and $y(3)$.

5. Evaluate : $\int_0^6 \frac{dx}{1 + x^2}$ by using   **10**

   (a)   Trapezoidal rule
   (b)   Simpson's 1/3 rule.
   (c)   Simpson's 3/8 rule.

6. (a) Explain maxima and minima of a tabulated   **5**
         function.

   (b) What is numerical integration ? Explain by   **5**
         means of diagram.

7. (a) Find by Taylor's series method, the values   **5**
         of y at $x = 0.1$ and $x = 0.2$ to five places of

         decimals from $\frac{dy}{dx} = x^2 y - 1$, $y(0) = 1$.

   (b) Using Euler's method, find an approximate   **5**
         value of y corresponding to $x = 1$, given that

         $\frac{dy}{dx} = x + y$ and $y = 1$, when $x = 0$.

8. The manufacturer produces two types of models   **10**
M_1 and M_2. Each M_1 model requires 4 hours of
grinding and 2 hours of polishing, whereas each
M_2 model requires 2 hours of grinding and 5 hours
of polishing. Each grinder work for 40 hours a
week and each polisher works for 60 hours of a
week. Profit on an M_1 model is Rs. 3 and on an
M_2 model is Rs.4. Whatever is produced in a week
is sold in the market. How should the
manufacturer allocate his production capacity to
the two types of models so that he may make the
maximum profit in a week.

9. Explain Fibonacci search method.   **10**

10. Explain Unimodal function of one dimensional   **10**
minimization.

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