

MODEL QUESTION PAPER

MFC1

I Semester M.TECH Examination, August 2011 NUMERICAL METHODS IN CIVIL ENGINEERING

Time: 3 Hours

Max. Marks: 75

GROUP A : Answer any three questions.

- Q.1 What are personal computers? How are they different from microcomputer? Explain development in computing technology.
- Q.2 Determine the maximum error in evaluating the integral by both the
$$\int_0^{\pi/2} \cos x dx$$
trapezoidal and Simpson's rules using four subintervals.
- Q.3 Solve the poisson equation $\nabla^2 f = 2x^2y^2$ over the square obtain $0 \leq x \leq 3$ & $0 \leq y \leq 3$ with $f = 0$ on the boundary & $h = 1$.
- Q.4 Write a note on
(a) Error Estimation (b) Minimization of the fatal error.
- Q.5 What is Numerical computing? Distinguish between analog & digital computing.

GROUP B : Answer any three questions.

- Q.6 Estimate the absolute and relative errors for $f(x) = \sqrt{x} + x$ for $x_a = 4.000$.
- Q.7 What are the essential components of a computer? Draw the schematic block diagram of a computer showing its essential components. Discuss the functions of each component?
- Q.8 Explain picard's method of successive approximations & hence solve the equation $y^1 = x + y^2$ subject to the condition $y = 1$ when $x = 0$.
- Q.9 Discuss important features of all generations of computer, with examples?
- Q.10 Solve the poisson equation $\nabla^2 f = 2x^2y^2$ over the square obtain $0 \leq x \leq 3$ & $0 \leq y \leq 3$ with $f = 0$ on the boundary & $h = 1$.

GROUP C: All Questions are Compulsory.

Q.11 Fill in the blanks

- (i) Different sizes of computers are _____.
- (ii) The process of correcting errors in computer code is called as _____.
- (iii) Most Reliable iterative method is _____.
- (iv) The partial differential equation obtained from $z = ax + by + ab$ by eliminating a and b is _____.
- (v) Relative error is given by _____.

Q.12 Multiple choice question.

- (i) Truncation error increases when h is _____.
 - (a) Increased
 - (b) Decreased
 - (c) Neither increase nor decrease
 - (d) Both a & b.
- (ii) A read only memory _____.
 - (a) is of random-access type.
 - (b) is non volatile.
 - (c) is programmable.
 - (d) has all the above characteristics.
- (iii) Solution of the equation $Ax = b$ is _____.
 - (a) Ab
 - (b) $A^{-1}b$
 - (c) Ab^{-1}
 - (d) AAb
- (iv) The process of numerical computing has how many phases?
 - (a) 1
 - (b) 2
 - (c) 3
 - (d) 4
- (v) Between forward, backward & central difference formula _____ is more accurate.
 - (a) Forward
 - (b) Backward.
 - (c) Central
 - (d) None.

Q.13 True or false

- (i) Truncation error is increase when h increases.
- (ii) Gauss sudil method is an improved version of gacobi iteration method.
- (iii) Central difference formula is more accurate.
- (iv) IBM 7094II is an example of third generation computer.
- (v) Back substitution method operates on reduced upper – triangular system.
