Register Number :

Name of the Candidate :

**5 3 2 4**

**B.Sc. DEGREE EXAMINATION, 2012**

**( COMPUTER SCIENCE )**

( FIRST YEAR )

**( PART - III )**

( PAPER - II )

**130 / 140. SCIENTIFIC COMPUTING**

*( Common with B.Sc., [ Information Technology ]*

*and B.C.A. )*

May ] [ Time : 3 Hours

Maximum : 100 Marks

( 5 × 20 = 100)

*Answer any FIVE questions.*

*ALL questions carry equal marks.*

1. (a) Find a real root of x3 = 4x + 1 = 0 by

Regula Falsi Method, assuming that the root

lies between 0 and 1. (10)

**Turn Over**

(b) Solve 25Uxx = Utt for *u* at the pivotal

points given u(0, t) = u(5, t) = 0,

ut(x, 0) = 0

and u(x, 0) =

2x for 0 x 2

10 2x for 3 x 5

≤ ≤ 



 − ≤ ≤

for one half period of vibration. (10)

6

(b) Find a positive real root of 3x – 1 = cos x

by Newton’s method, correct to four

decimal places. (10)

2. (a) Solve the system of equations

2x + 3y – z = 5,

4x + 4y –3z = 3,

2x – 3y + 2z = 2

by Gauss Elimination Method. (10)

(b) Solve the system

10x – 5y – 2z = 3,

4x – 10y – 3z = –3,

x + 6y + 10z = –3

by Gauss-Seidel Method, correct three

decimal places. (10)

3. (a) Find the annual premium at the age of 30

given the data : (10)

Age 21 25 29 33

Premium 14 16 18 20

2

7. Solve

2 2

2 2

u u

x y

∂ ∂

+ =

∂ ∂ 0 over the square mesh of

side 4 units with boundary conditions

u(0, y) = 0 for 0 ≤y ≤4;

u(4, y) = 12 + y for 0 ≤y ≤4;

u(x, 0) = 3x for 0 ≤x ≤4;

u(x, 4) = x2 for 0 ≤x ≤4;

carryout iterations using two decimal places.

8. (a) Solve :

2

2

2 u u

t x

∂ ∂

=

∂ ∂

,

given u(0, t) = 0,

u(4, t) = 0 u(x, 0) = 3x(4 – x).

Assume *h* = 1 and *k* suitably, find the

values of *u* upto *t* = 5 using Bender-

Schmidt Recurrence Relation. (10)

5

**Turn Over**

(b) Find y(2) using Milne’s Predictor Corrector

method, given

dy

1

dx

2

=

(x + y), y(0) = 2,

y(0·5) = 2·636,

y (1) = 3.595

and y (1·5)= 4·968. (10)

6. (a) Using Euler’s method, solve numerically

= x + y,

y(0) = 1 for *x* = 0·0 (0·2) 1·0. (10)

(b) Obtain the values of *y* at *x* = 0·1, 0·2 using

Runge – Kutta fourth order method, given

= –y, y(0) = 1, correct to four decimal

places. (10)

4

(b) Use Lagrange’s Formula to fit a polynomial

to the data. (10)

X –1 0 2 3

Y –8 3 1 12

4. (a) Find

and

2

2

d y

dx

at x = 50 from the

following data : (10)

X 50 51 52 53

Y 3·6840 3·7084 3·7325 3·7563

(b) Evaluate

6

2

0

dx

1+ x ∫

by

(i) Trapezoidal Rule.

(ii) Simpson’s one-third rule, correct 4

decimal places. (10)

5. (a) Using Taylor Series Method, find

*y* at x = 0·1, 0·2,

given

dy

dx = x2 – y, y(0) = 1. (10)

3

**Turn Over**