MAY 2014

B.Tech.-
STATISTICAL AND NUMERICAL METHODS
SUBJECT CODE: BTME-604
Paper ID: A-2364

Time: 03 Hours

Maximum Marks: 60

Instruction to candidates:

1. Section A is compulsory of ten questions carrying two marks each.
2. Section-B contains five questions carrying five marks each and students have to attempt any four questions.
3. Section-C contains three questions carrying ten marks each and students have to attempt any two questions.

Section-A

Q1)

a) What is the sample space with suitable example?
b) State the Prediction-Correction method.
c) Define round off error and truncation error?
d) Define data array with suitable example?
e) What is the difference between M.D. and S.D?
f) What is the chi-square distribution?
g) What is the pdf of normal distribution?

h) Evaluate $\frac{\Delta^2}{E} x^3$
i) Show that $(1+\Delta)(1-\nabla)=1$ with usual notation.
j) What is Newton Raphson's iterative method with suitable example?

Section-B

Q2) If A and B any two events in a sample space S. Show that $P(A\cup B) = P(A) + P(B) - P(A\cap B)$, also extend this result for n events in a sample space.

Q3) Using Gauss elimination method, solve

$$28x+4y-z = 35$$
$$x+3y+10z = 24$$
$$2x+17y+4z = 35$$

Q4) After correcting 50 pages of the proof of a book, the proof reader finds that there are, on the average, 2 error per 5 pages. How many pages would one expect to find with 0,1,2,3 and 4 error, in 1000 pages of the print of the book? Given that exp (-0.4) is 0.6703.

Q5) Obtain the approximate value of x(0.25) for the initial value problem dy/dx = 2xy, y(0)=1. Using Modified Euler method.

Q6) Using Gauss-Seidel method, solve

$$4x+2y+z = 14$$
$$x+5y-z = 10$$
$$x+y+8z = 20$$

Section-C

Q7) a) Solve the dy/dx = $(3x+y)/(x+2y)$, y(1) = 1 at x = 1.1 using Runge-Kutta fourth order method.

b) The means of two single large samples of 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation 2.5

inches? (Test at 5% level of significance).

Q8) a) Express $f(x) = 2x^3 - 3x^2 + 3x - 10$ in factorial notation and hence find $\Delta^3 f(x)$.

b) If 20 are subtracted from every observation in a data set, then the coefficient of variation of the resulting set is 20%. If 40 is added to every observation of the same data, then the coefficient of variation of the resulting set of data is 10%. Find the mean and standard deviation of the original data.

Q9) a) Find the mean and variance of Binomial distribution with parameter n and p.

b) Find the value of $\log 2^{1/3}$ from $\int_0^1 \frac{x^2}{1 + x^3} dx$, using Simpson's one-third rule with $h = 0.25$.

———— End ————