Printed Pages: 02 Sub Code: NMCA212/CA201

Paper Id: 214201 Roll No. | | | | | | | | | | |

MCA
(SEM. II) THEORY EXAMINATION 2018-19
COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES

Time: 3 Hours *Total Marks: 100*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Find the absolute and relative error if the number $x = .004997$ is rounded off to three decimal digits.
b. Describe Backward Differences with example.
c. Prove that $(1 + \Delta).(1 - \nabla) = 1$
d. Write an iterative formula using Newton-Raphson method to find the square root of a positive number.
e. Discuss fourth order Runge-Kutta method.
f. Write short notes on Trapezoidal rule.
g. Explain Chi-Square test.
h. Differentiate between Linear and Non-linear Regression.
i. Discuss Chebyshev Polynomials.
j. Write any four advantages of statistical quality control.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Find the root of $xe^x = 2$ correct to four significant digits using Regula-falsi method.
b. What do you mean by divided difference? Derive Newton's divided formula.
c. Apply Gauss's forward formula to find the value of u_9, if $u_0 = 14$, $u_4 = 24$, $u_8 = 32$, $u_{12} = 35$, $u_{16} = 40$
d. Solve the following equations by using Gauss-Seidal iteration method

$$27x + 6y - z = 85$$
$$6x + 15y + 2z = 72$$
$$x + y + 54z = 110$$

e. What is 214201forecasting? Explain all the steps involved in forecasting.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Find a root of the equation $8x^3 - 2x - 1 = 0$ using Bisection method is four stages.
(b) Derive an expression for rate of convergence of Secant method.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Derive the Newton's Backward Interpolation Formula.
(b) Find $\frac{dy}{dx}$ at $x = 6$ given that

x	4.5	5.0	5.5	6.0	6.5	7.0	7.5
y	9.69	12.90	16.71	21.18	26.37	32.34	39.15

www.aktuonline.com

http://www.aktuonline.com

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Solve $\frac{dy}{dx} = 1 + xy$ with $x_0 = 2$, $y_0 = 0$ using Picard's method of successive approximations.

(b) Use Simpson's 1/3rd rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking seven ordinates.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Obtain a relation of the form $y = ae^{bx}$ for the following data by the method of least squares:

x	1	2	3	4	5	6
y	1.6	4.5	13.8	40.2	125	300

(b) From the given data, obtain the two regression lines using method of least squares:

x	6	2	10	4	8
y	9	11	5	8	7

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Define Times Series and explain the utility of time series analysis.

(b) Describe Moving average method. From the following data, calculate 4 years moving average

Year	1	2	3	4	5	6	7	8	9	10
Output	20	21	23	22	25	24	27	26	28	30

www.aktuonline.com

http://www.aktuonline.com