H-003-001541 Seat No. _____

B. Sc. (Sem. V) (CBCS) Examination

May/June – 2017

Statistics : S-501

(Comp. Tech. & Stat. Tools Using Matlab)

(New Course)

Faculty Code : 003

Subject Code : 001541

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions :

(1) All the questions are compulsory.

(2) Students can use their own scientific calculator.

(3) Students can demand logtable on request.

1 Filling the blanks and short questions : (Each 1 mark) **20**

(1) Interpolation and extrapolation approaches are _____.

(2) Interpolation and extrapolation formulae assume no _____ in the data of the series.

(3) If n values of dependent variable y are known, we take _____ finite difference zero.

(4) The finite differences $\left(\Delta^2_{y_2} - \Delta^2_{y_1}\right)$ is called _____ order finite difference.

(5) In a central difference table, the origin lies in the _____ of the series.

(6) Newton's formula for advancing differences utilizes _____ finite difference of each column of the difference table.

(7) In Newton's backward formula, the origin is the _____ value of the argument in the series.

(8) The origin x_0 in difference table in the Newton's-Gauss backward formula is the _____ value of x to the given value of x.

(9) Newton's method of divided differences takes care of the _____ spaced arguments.

(10) Appropriate formulae for interpolating values near the middle of the series were originated by _____ and _____.

(11) If the interpolating values lies near the beginning or the end of the central interval, _____ formula yields better results.

(12) In Simpson's $\frac{3}{8}$ rule is applicable when the number of intervals n must be a _____.

(13) Usual notations prove that $\delta = E^{-\frac{1}{2}}\Delta$.

(14) Usual notations prove that $E\Delta = \nabla E$.

(15) Usual notations prove that $(1+\Delta)(1-\nabla) = 1$.

(16) Usual notations prove that $E^{-1} = 1-\nabla$.

(17) Write Relation Operators of MATLAB ?

(18) If $x = [3\ 3\ 5;\ 3\ 6\ 3]$ then using MATLAB function $mode(x, 2)$ write is correct output ?

(19) If $x = [0\ 1\ 2;\ 3\ 4\ 5]$ then using MATLAB function $cumsum(x, 1)$ write is correct output ?

(20) If $x = [3\ 7\ 5;\ 0\ 4\ 2]$ then using MATLAB function $sort(x, 2, 2)$ write is correct output ?

2 (a) Write thed answer any three : (Each 2 marks) **6**

(1) If $y = x^{-2}$ then find $f(a, b, c, d)$ and prepare the divided difference table.

(2) Obtain Newton's formula for obtaining inverse square root.

(3) Usual notation prove that $\mu\delta = \frac{1}{2}\Delta E^{-1} + \frac{1}{2}\Delta$.

(4) Usual notation prove that $\mu\delta = \frac{1}{2}(\Delta + \nabla) = \frac{1}{2}\left(\Delta + \nabla E^{-1}\right)$.

(5) Explain MATLAB function poisspdf.

(6) Explain MATLAB function std.

(b) Write the answer any three : **9**

(1) Usual notation prove that $\sqrt{1+\mu^2\delta^2} = 1+\frac{\delta^2}{2}$.

(2) Obtain Gregory-Newton's Backward Interpolation formula.

(3) Obtain Simpson's $\frac{1}{3}$ rule for numerical integration.

(4) Explain Taylor's series method.

(5) Find by the iteration method, the root near 2.1, of equation $3x-6=\log_{10} x$ correct to three decimal places.

(6) Explain MATLAB function prod and cumprod.

(c) Write the answer any two : **10**

(1) Obtain Bessel's formula for central difference interpolation.

(2) Obtain Gauss forward interpolation formula.

(3) Obtain Simpson's $\frac{3}{8}$ rule for numerical integration.

(4) Use Taylor's series method to solve $\frac{dy}{dx} = xy + y^2$ with $y(0)=1$ at $x = 0.1, 0.2, 0.3$.

(5) Explain If-Else-End structure of MATLAB with example.

3 (a) Write the answer any three : **6**

(1) If $y = x^3$ then find $f\left(a^3, b^3, c^3, d^3\right)$ and prepare the divided difference table.

(2) Usual notation prove that $\Delta + \nabla = \frac{\Delta}{\nabla} - \frac{\nabla}{\Delta}$.

(3) Usual notation prove that $\mu^2 = 1+\frac{\delta^2}{4}$.

(4) Evaluate $\sqrt{26}$ by using Newton's formula. Correct upto seven decimal.

(5) Explain MATLAB function binopdf.

(6) Explain MATLAB function diff.

(b) Write the answer any three : **9**

(1) Usual notation prove that $\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{1+\frac{\delta^2}{4}}$.

(2) Obtain Gregory-Newton's Forward Interpolation formula.

(3) Obtain Trapezoidal rule for numerical integration.

(4) Apply Euler's Maclurin sum formula to find the sums $\frac{1}{11^3} + \frac{1}{12^3} + \cdots + \frac{1}{50^3}$ correct to 5 significant figures.

(5) Explain False position method.

(6) Explain MATLAB function sum and cumsum.

(c) Write the answer any two : **10**

(1) Obtain Stirling formula for central difference interpolation.

(2) Obtain Gauss backward interpolation formula.

(3) Given the differential equation $\frac{dy}{dx} = 3x + y^2$, with the initial condition $y = 1$ when $x = 0$, use Picard's method to obtain y for $x = 0.1$ correct to three decimal places.

(4) Explain For-Loop and While-Loop structure of MATLAB with Example.

(5) Explain number display format of MATLAB.
