

SARDAR PATEL UNIVERSITY

BCA Sem-IV EXAMINATION, 2018

Sub.: US04FBCA01 (COMPUTER BASED NUMERICAL & STATISTICAL METHOD)

Date: 04/04/2018 (2.00 pm to 5.00 pm)

Wednesday

Maximum Marks: 70

Q-1 Write the correct option in the answer book.

[10]

(1) For the function $f(x): x^3 - 2x - 5 = 0$ if the root of equation lies between (2,3) and if at i^{th} iteration $c=2.5$ then next approximation by bisection method is given $c=$

- (a) $\frac{3+2.75}{2}$
- (b) $\frac{2+2.5}{2}$
- (c) $\frac{3+2.5}{2}$
- (d) none

(2) The number 0.01850×10^3 has _____ significant digits

- (a) 3
- (b) 4
- (c) 5
- (d) 6

(3) _____ method of interpolation is used for unequally spaced functions.

- (a) Forward difference
- (b) backward difference
- (c) Newton's divided difference
- (d) None

(4) _____ Method is used if the estimated value lies towards the end of the difference table.

- (a) Divided difference
- (b) Forward difference
- (c) Backward difference
- (d) None

(5) y depends on x can be written as _____

- (a) $f(x)$ or y_x
- (b) $f(xy)$
- (c) $f(yx)$
- (d) none

(6) _____ is called the forward difference operator.

- (a) Δ
- (b) ∇
- (c) \emptyset
- (d) u

(7) We can find solution of system of linear, algebraic equations using _____

- (a) Newton-Raphson method
- (b) Bisection method
- (c) Gauss-Seidel method
- (d) None of these

(8) The system of linear equation $AX = B$ is said to be homogeneous if...

- (a) $A \neq 0$
- (b) $B = 0$
- (c) $A = 0$
- (d) A is symmetric

(9) Forecasts _____

- (a) become more accurate with longer time horizons
- (b) are rarely perfect
- (c) are more accurate for individual items than for groups of items
- (d) all of the above

(10) Irregular variations in a time series are caused by:

- (a) lockouts and strikes
- (b) epidemics
- (c) floods
- (d) all the above

Q:2 Answer the following in short. (Any Ten)

[20]

(1) Write algorithm for Secant method.

(1)

(P.T.O)

- (2) Define Relative error and absolute error.
- (3) Describe the stopping rules to obtain approximate solution for given non-linear equations.
- (4) Use the secant method to obtain approximate solution of the equation $X^3 - 5x - 3 = 0$. [Initial approx. 2 & 3]
- (5) Define Interpolation.
- (6) List the utilities of time series.
- (7) Solve the following system of equations
$$\begin{aligned} 2x + 3y &= -10 \\ -x + 4y &= -4 \end{aligned}$$
- (8) List only various direct and iterative methods.
- (9) If x lies in the upper half of the table and if $x_k < x < x_{k+1}$, then what is $\frac{dy(x)}{dx}$ and $\frac{d^2y(x)}{dx^2}$?
- (10) Write a note on Forecasting by the use of Time Series Analysis.
- (11) Differentiate between linear and non-linear trend.
- (12) Write different methods of Interpolation.

- Q-3 Find the root of equation $x^3 - 4x - 9 = 0$ correct up to four decimal places
- (a) using Bisection Method. [05]
- (b) Find the root of equation $x^3 - x^2 - 1 = 0$ correct up to four decimal places using Secant method. [05]

OR

- Q-3 Find the root of equation $x^3 - x - 1 = 0$ correct up to four decimal places using
- (c) Regular falsie method. [05]
- (d) Find the root of equation $xe^x - 1 = 0$ correct up to four decimal places using Iterative method. (a=0.4) [05]

- Q-4 If $y = 2x^3 - x^2 + 3x + 1$, calculate the value of y corresponding to $x = 0, 1, 2,$
- (a) 3, 4, 5 and form the table of differences. [05]

- (b) Given the table of values as

X	2.5	3.0	3.5	4.0	4.5
y(x)	9.75	12.45	15.70	19.52	23.75

Find $y(2.35)$. [05]

OR

(2)

- Q-4 If L_x represents the numbers living at age x in a life table interpolate, by using Newton's method find L_x for $x=49$, where [05]
- (c) $L_{20} = 512, L_{30} = 439, L_{40} = 346, L_{50} = 243$.
- (d) Using Newton's divided difference formula obtain $y(2)$, when $y(1) = -3, y(3) = 9, y(4) = 30$ and $y(6) = 132$. [05]

Q-5 Solve the following system of equations using Gauss-Seidel method.

(a)
$$\begin{aligned} 5x_1 + 2x_2 + x_3 &= 12 \\ x_1 + 4x_2 + 2x_3 &= 15 \\ x_1 + 2x_2 + 5x_3 &= 20 \end{aligned}$$
 [05]

- (b) Write the comparison between direct and iterative methods for solution of system of linear equations. [05]

OR

Q-5 Given the following table

(c)

x	0.50	0.75	1.00	1.25	1.50
$y = f(x)$	0.13	0.42	1.00	1.95	2.35

 [10]

Find $f'(0.75)$ and $f'(0.85)$.

Q.6 Calculate three yearly moving averages for the following data

(a)

YEAR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Y	242	250	252	249	253	255	251	257	260	265	262

 [06]

(b) Obtain seasonal indices using simple average method.

Year	Q-I	Q-II	Q-III	Q-IV
1974	30	81	62	119
1975	33	104	86	171
1976	42	153	99	221
1977	56	172	129	235

[04]

OR

Q.6 Calculate seasonal indices by 'ratio to moving average method' for the following data.

YEAR	I Quarter	II Quarter	III Quarter	IV Quarter
1971	68	61	61	63
1972	65	58	66	61
1973	68	63	63	67

[06]

(d) Explain Exponential smoothing model in forecasting. [04]

③

