SEAT No._____ No. of Printed Pages: 3

[A-21] **Sardar Patel University, Vallabh Vidyanagar**

External Examination, BCA (OLD Batch) - IV Sem.

Subject Code: US04FBCA01

Subject Title: Computer Oriented Numerical & Statistical Method

Date: 26-09-2022 Time: 12:30 to 02:30pm Marks:70

Q.1 Multiple Choice Questions **[10]**

1 f(a) < 0, f(b) > 0 and if $x_0 \in$ (a,b)is first approximation with $f(x_0) < 0$ then in bisection method,
(a) x_0 is to be replaced by a (b) ais to be replaced by c
(c) bis to be replaced by x_0 (d) x_0 is to be replaced by b

2 For real root of an equation $x^3-2x-5=0$, the root lies between
(a) 0 and 1 (b) 2 and 3 (c) 1 and 2 (d)none

3 From the following _____ method is not iterative method.
(a) False position (b) Bisection (c) Lagranges (d)none

4 Theile defines _____as "*the art of reading between the lines of a table.*"
(a) Extrapolation (b) Divided difference (c) Lagrange's (d) Interpolation

5 All the formulae of interpolation are based on the fundamental assumption that the given data can be expressed as a _____.
(a) Polynomial (b) Equation (c) Algorithm (d) None

6 _____ method is used if the estimated value lies towards the end of the difference table.
Divided difference (b) Forward difference (c) Backward difference (d) None

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

8 The system of linear equation AX = B can be solved by matrix inversion method only if...
(a) $A \neq 0$ (b) $|A| \neq 0$ (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

10 One purpose of short-range forecasts is to determine _____.
a. production planning
b. inventory budgets
c. facility location
d. job assignments

Q.2 True or False and Fill in the blanks **[08]**

1 If for a real continuous function *f(x)*, *f(a)f(b)<0*, then in the range of [a,b] for *f(x)=0*, there is at least one root. State true or false

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

3 The second order differences are denoted by _____.

4 The estimate obtained by interpolation method is always accurate or reliable. State True or False

(P.T.O.)

5 The system of linear equation AX = B is said to be homogeneous if.....
6 Rate of change of distance with respect to time represents.....
7 A time series consists of_____ Components.
8 The component of a time series attached to long-term variations is term as_____.

Q.3 Short Questions (Attempt Any 10 out of 12) **[20]**

1 Define Relative error and absolute error
2 Describe the stopping rules to obtain approximate solution for given non-linear equations
3 Use the False Position method to obtain approximate solution of the equation $X^3-9x+1=0$
4 Define Interpolation.
5 Define Extrapolation.
6 Draw forward difference table.
7 Draw backward difference table.
8 If x lies in the upper half of the table and if $x = x_k$, then what is $\frac{dy(x)}{dx}$ and $\frac{d^2y(x)}{dx^2}$?
9 If x lies in the lower half of the table and if $x_{k-1} < x < x_k$, then what is $\frac{dy(x)}{dx}$ and $\frac{d^2y(x)}{dx^2}$?
10 If x lies in the lower half of the table and if $x = x_k$, then what is $\frac{dy(x)}{dx}$ and $\frac{d^2y(x)}{dx^2}$?
11 What is Time Series?
12 What do you mean by Secular trend?

Q.4 Long Questions (Attempt Any four from eight) **[32]**

1 Write algorithm for bisection method
2 $X^3-X^2-1=0$ find root up to 3 significant digit using bisection method.
3 Estimate the expectation of life at the age of 16 years by using the following data:
Using Forward Interpolation Method

Age (In Years)	10	15	20	25	30	35
Expectation of life (In Year)	35.4	32.3	29.2	26.0	23.2	20.4

4 Using an appropriate formula for interpolation estimate the no. of students who obtained < 45 marks from the following.

Marks	0-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

5 Given the following table

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

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

6 The distance (s) covered as a function of time (t) by an athlete during his/her run for the 50 meter race is given in the following table

Time(Secs.)	0	1	2	3	4	5	6
Distance(Mts.)	0	2.5	8.5	15.5	24.5	36.5	50

Determine the speed of the athlete at t = 5 and t = 4.5 seconds

7 Calculate three yearly moving averages for the following data

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

8 Calculate the trend values by the method of moving average, assuming a four-yearly cycle from the following data relating to sugar production in India.

YEAR	SUGAR PRODUCTION (lakh tones)	YEAR	SUGAR PRODUCTION (lakh tones)
1971	37.4	1977	48.4
1972	31.1	1978	64.4
1973	38.7	1979	58.4
1974	39.5	1980	38.6
1975	47.9	1981	51.4
1976	42.6	1982	84.4

—X—