[114/A-34] SEAT No. _____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY, VALLABH VIDYANAGAR

BCA (4th Semester) External Examination

Monday, 1st April 2019

Subject: US04FBCA01 (Computer Based Numerical & Statistical Method)

Time: 02:00 to 05:00 p.m. **Total Marks: 70**

Remark: Scientific Calculator is allowed

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) A is to be replaced by c (B) x_0 is to be replaced by a
   (C) B is to be replaced by x_0 (D) x_0 is to be replaced by b
2. From the following _____ method is not iterative method.
   (A) False Position Method (B) Bisection (C) Lagranges Method (D) None
3. From the following _____ method is the best method to obtain root of equation f(x)=0
   (A) Newton Raphson (B) Bisection Method (C) False Position Method (D) None
4. The main disadvantage of Lagrangian interpolation is that it is difficult to find the order of the _____ to be fitted.
   (A) Equation (B) Algorithm (C) Polynomial (D) None
5. _____ is not a type of interpoiation method.
   (A) Moving Average Method (B) Divide Difference
   (C) Forward Difference (D) Backward Difference
6. The system of linear equation AX = B can be solved by Gauss-Seidel method only if...
   (A) All diagonal elements of A are non zero (B) A is skew symmetric
   (C) All diagonal elements of A are dominant (D) All diagonal elements of A are zero
7. We can find solution of system of linear, algebraic equations using.....
   (A) Gauss Seidel Method (B) Bisection Method
   (C) Newton Raphson 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) $|A| = 0$
   (C) $|A| \neq 0$ (D) A is symmetric
9. Gradual, long-term movement in time-series data is called _____.
   (A) trends (B) Seasonal variation
   (C) Cycle (D) Exponential variation
10. In ratio to moving average method for seasonal indices, the ratio of an observed value to the moving average remove the influence of_____
    (A) Trend (B) Cyclic variation
    (C) Trend and cyclic both (D) None

Q.2 Short Questions (Attempt any 10) **[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 secant method to obtain approximate solution of the equation $X^3-5x-3=0$. [initial approx. 2 & 3]
4. Draw backward difference Table.
5. Draw divided difference table.
6. Define Interpolation.
7. If x lies in the uppar half of the table and if $x = x_k$, then what is $\frac{dy(x)}{dx}$ and $\frac{d^2y(x)}{dx^2}$?
8. If x lies in the lower half of the table and if $x = x_k$, then what is $\frac{dy(x)}{dx}$ and $\frac{d^2y(x)}{dx^2}$?
9. List only various direct and iterative methods.
10. Define Time Series.
11. List out the merits and de-merits of Ration to moving average method.
12. List out the components of Time Series.

(P.T.O.)

Q.3 (A) Write an algorithm for False Position Method [03]

(B) Obtain the root of equation $X^3 - 2X - 5 = 0$ up to 3 decimal points .(Using Bisection Method) where $X_1=2$ and $X_2=3$ [07]

OR

Q.3 (A) Write an algorithm for Bisection Method. [03]

(B) Find root of equation X3-X-4=0 up to 3 decimal points (using false position method) where $X_1=1$ and $X_2=2$ [07]

Q.4 (A) If $Y = 2X^3 - X^2 + 3X + 1$ Calculate the value of Y corresponding to X = 0,1,2,3,4,5 and form a table of central difference. [04]

(B) Estimate the expectation of life at the age of 16 years by using following table. [06]

Age in Year	10	15	20	25	30	35
Expec. of life	35.4	32.3	29.2	26	23.2	20.4

OR

Q.4 (A) From the following table find the number of workers falling in the earning group of Rs. 25 and Rs. 35. [06]

Earning	10	20	30	40	50	60
No of Workers	50	150	300	500	700	800

(B) following table gives the census popuiation of town for the years 1931 to 1971. Estimate the population for the year 1965. Using Interpolation. [04]

Year	1931	1941	1951	1961	1971
Population	46	66	81	93	101

Q.5 (A) Solve the following system of equation using matrix inversion method [05]

$2X_1 - 2X_2 + 5X_3 = 13$, $2X_1 + 3X_2 + 4X_3 = 20$, $3X_1 - X_2 + 3X_3 = 10$

(B) Solve the equation by Gauss Seidel Method accurate to 4 significant digit. [05]

$10X_1 + X_2 + 2X_3 = 44$, $2X_1 + 10X_2 + X_3 = 51$, $X_1 + 2X_2 + 10X_3 = 61$

OR

Q.5 (A) From the given table find f'(0.75) and f'(0.85) [05]

X	0.50	0.75	1.0	1.25	1.50
Y = f(x)	0.13	0.42	1.0	1.95	2.35

(B) Solve the following system of equation using matrix inversion method [05]

$3X_1 + X_2 + X_3 = 8$, $2X_1 - 3X_2 - 2X_3 = -5$, $7X_1 + 2X_2 - 5X_3 = 0$

Q.6 (A) Calculate the seasonal indices by ratio to moving average method [05]

Year	Qtr-1	Qtr-2	QTR-3	Qtr-4
1972	75	60	54	59
1973	86	65	63	80
1974	90	72	66	85
1975	100	78	72	93

(B) Calculate the trend values by method of moving average – assuming a four yearly cycle from following data. [05]

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Sugar	37.4	31.1	38.7	39.5	47.9	42.6	48.4	64.4	58.4	38.6	51.4	84.4

OR

Q.6 (A) Calculate the seasonal indices by ratio to moving average method [05]

Year	Qtr-1	Qtr-2	QTR-3	Qtr-4
1970	25	30	21	32
1971	27	28	25	34
1972	22	27	21	30
1973	24	25	20	33

(B) Calculate the trend values by method of moving average – assuming a 3 yearly and 5 yearly from following data. [05]

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Y	500	540	550	530	520	560	600	640	620	640

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