PARUL UNIVERSITY
Faculty of Engineering & Technology
B Tech Examination

Subject Name: PSNM Subject Code:203191251
Branch: CSE/IT/AERO Semester : 4
Date: 12/02/2021 Total Marks: 40

Q.1 **(A) Choose the correct option** **05**

(1) If $y_0 = 1, y_1 = 5, y_2 = 8, y_3 = 3, y_4 = 7, y_5 = 0$ then $\Delta^5 y_6 =$ _____.

a) 61 b) 62 c) -61 d) -62

(2) Which of the following coefficients are independent of origin but not of scale .

(a) Correlation coefficient (b) Regression Coefficient

(c) (a) and (b) both (d) None of these

(3) Newton's first divided difference $[x_0, x_1] =$ _____ .

(a) $y_1 - y_0$ (b) $\frac{y_1 - y_0}{x_0 - x_1}$ (c) $\frac{y_1 - y_0}{x_1 - x_0}$ (d) None of these

(4) The two lines of regression become identical when:

(a) r=1 (b) r = –1 (c) r=0 (d) a or b

(5) By taking n=2 subintervals in newton-cotes quadrature formula we can derive

(a) Trapezoidal rule

(b) Simpson's $\frac{1}{3}$rule

(c) Simpson's $\frac{3}{8}$ rule

(d) Euler's rule

(B) Fill in the blanks **05**

(1) If X and Y are independent, then the correlation coefficient between X and Y is_____

(2) Newton Raphson method fails when_____

(3) $(1+\Delta)(1-\nabla) =$ _____

(4) The relationship between correlation coefficient and regression coefficient is _____

_____

(5) Given n+1 data pairs, a unique polynomial of degree_____ passes through n+1 data points.

Q.2 **Attempt any four** **12**

1) Find the iterative formula for $\sqrt[k]{N}$, Where N is positive number. and hence Evaluate $\sqrt[3]{58}$.

2) Which of the following is value of $\int_{10}^{16} y\,dx$ by Simpson's 1/3 rule.

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x	10	11	12	13	14	15	16
y	1.02	0.94	0.89	0.79	0.71	0.62	0.55

3) Using Lagrange's method obtain the cubic polynomial which takes the value

X	0	1	2	3
Y	1	2	1	0

4) Find the following information obtain two regression lines. Also estimate y when x=10.

	x	y
Mean	7.5	12.5
Standard deviation	4.5	9
Coefficient of correlation	0.9	

5) Given that, $\sin 45^o = 0.7071, \sin 50^o = 0.7660, \sin 55^o = 0.8192, \sin 60^o = 0.8660$. Find $\sin 52^o$ using Newton's forward formula.

Q.3 Attempt any two 08

1) Given the values

x	5	7	11	13	17
$f(x)$	150	392	1452	2366	5202

Evaluate $f(9)$, using Newton's divided difference formula.

2) Find the root of the equation $x - cosx = 0$, using the Bisection method correct to three decimal places.

3) Evaluate $\int_0^3 \frac{dx}{1+x}$ with n=6 by using Simpson's $\frac{3}{8}$ rule and hence calculate log2.

Q.4 1) Solve the following system of linear equations by Gauss Jacobi method, correct up to 3 decimal places 05

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

2)Find the equation of regression lines from the following data and also estimate y for x=1 and x for y=4. 05

x	3	2	-1	6	4	-2	5	7
y	5	13	12	-1	2	20	0	-3

OR

2)Find the coefficient of rank correlation. 05

X	52	53	42	60	45	41	37	38	25	27
Y	65	68	43	38	77	48	30	32	25	50