PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2019
(Second Semester)

Branch - BIOCHEMISTRY

MATHEMATICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (IQ Marks')
Answer ALL questions
ALL questions carry EQUAL marks (10x1 = 10)

1 The co-efficient of cos"'[1]© in the expansion of —— is sinG
(i) 2^n (ii) 2^{n}-' (iii) 2^{n+1} (iv) 3^n

2 If n is odd, then the co-efficient of cos 9 in the expansion of 2^{n-1} cos" 0 is
(0 nc*y* (ii) $nc_{n\_}$] (iii) nc_{n_2} (iv) nc_{n+1}

[2] 2 2 2

3 If the characteristic roots are_____ it may not be possible to diagonalise the matrix.
(i) equal (ii) distinct (iii) not equal (iv) not distinct

4 Corresponding to a characteristic vector of a matrix there exists___ _____ characteristic root.
(i) Two (ii) Three (iii) One and only one (iv) Many

5 The rate of convergence of Gauss-Seidal method is_____ that of Gauss-Jacobi method.
(i) thrice (ii) twice (iii) four times (iv) none of the above

6 As soon as a new value for a variable is found by iteration, it is used immediately in the following equations. This method is called_____.
(i) Gauss-Jordan (ii) Relaxation
(iii) Gauss-Seidal (iv) Jacobi's

The process of computing the values of a function for any value of the independent variable within an interval for which some values are given is
(i) interpolation (ii) extrapolation
(iii) Lagrange's method (iv) none

8 The differences taking into consideration the changes in the values of the argument are called
(i) forward differences (ii) backward differences
(iii) divided differences (iv) central differences

9 The order of error in Trapezoidal formula is
(i) h^3 (ii) h^4 (iii) h^2 (iv) h^5

10 If a set of numerical values of the integral f(x), a single valued function, is applied to $\int_a^6 f(x)dx$, then that process is known as
(i) a numerical integration (ii) quadranture
(iii) interpolation (iv) none

SECTION - B (25 Marks)

Answer ALL questions
ALL questions carry EQUAL Marks (5x5=25)

11 a Express $\frac{1+\sin\theta}{\sin\theta}$ in term of cos 0.

OR

b Evaluate $\lim \frac{\sin x + \cos 2x}{\cos^2 x}$

12 a Calculate A^4 when $A = \begin{matrix} -1 & 3 \\ -1 & 4 \end{matrix}$

OR

b If the matrix B is similar to the matrix A, then show that A and B have the same characteristic equation.

13 a Solve the equations

2x+y+4z=12
8x-3y+2z=20
4x+lly-z=33
by Gauss-elimination method.

OR

b Describe the comparison of Gauss elimination and Gauss-Seidal iteration methods.

14 a The following are data from the steam table:

Temperature C	140	150	160	170	180
Pressure kg/cm²	3.685	4.854	6.302	8.076	10.225

Using Newton's formula, find the pressure of the stream for a temperature of 142,

OR

i	2	4	7	12
y_x.... 22	30	82	106	206

15 a Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=1.25 from the table of values given in

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
y	1.00000	1.02470	1.04881	1.07238	1.09544	1.11803	1.14017

OR

b Evaluate $\int_0^1 \frac{dx}{1+x}$ by Trapezoidal rule, dividing the range into 4 equal parts.

SECTION -C (40 Marks)

Answer ALL questions
ALL questions carry EQUAL Marks (5x8 = 40)

16 a (i) Expand $\sin^7 0$ in a series of sines of multiples of 0.
(ii) Expand $\sin^6 0$ in a series of cosines of multiples of 0.

OR

b Prove that the equation $\frac{\text{£th foie 9}}{\cos 0 \sin 0} = a - b^{9}$ has fur roots and that the sum of the four values of 0 which satisfy it is equal to an odd multiple of *n* radians.

17 a Find the characteristic equation of the matrix $\begin{vmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{vmatrix}$ and hence obtain its inverse.

OR

b Find the eigen values and eigen vectors of $\begin{vmatrix} 2 & 0 \\ 1 & 1 \\ 2 & -3 \end{vmatrix}$.

18 a Solve, by Gauss-Jacobi method of iteration, the equations
27x+6y-z=85
6x+15y+2z=72
X+y-f54z=l 10

OR

b Describe the procedure of Gauss-Seidal method of iteration.

19 a Derive the Gregory-Newton Forward interpolation formula.

OR

b By means of Newton's divided difference formula, find the value of f(8) given

x	4	5	7	10	11	13
J&L-	48	100	294	900	1210	3028

20 a Derive the Newton's backward difference formula to compute the derivatives.

OR

b Use Romberg's method to compute f---------r4x correct to 4 decimal places.

Flence, deduce an approximate value of *n.*

Z-Z-Z END