18CHU06

PSG COLLEGE OF ARTS & SCIENCE

(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2019

(Second Semester)

Branch – **CHEMISTRY**

MATHEMATICS – II

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 x 1 = 10)

1 If the characteristic equations of matrices A & B are same then they are ___ Matrices.

(i) Singular (ii) Similar (iii) Equal (iv) Non-singular

2 The equation $Ax = \lambda x$ is called____ of the matrix A.

(i) Characteristic equation (ii) Characteristic value

(iii) Characteristic polynomial (iv) Polynomial equation

3 The partial differential equation of Z = (x+a)(y+b), after eliminating a and b is.

(i) Z = p+q (ii) Z = p/q (iii) Z = p-q (iv) Z = pq

4 Solve : $\frac{\partial^2 z}{\partial y^2} = \sin y$. Solution is Z=.

(i) Sin y (ii) -sin y (iii) -sin y+y+ $\phi(x)$ (iv) -sin y+yf(x)+ $\phi(x)$

5 $\int_{-a}^{a} f(x)dx = 2\int_{0}^{a} f(x)dx$ if f(x) is .

(i) Odd (ii)f(-x)=-f(x) (iii) Even (iv) Rational

6 $\int_{0}^{\Pi} \sin mx \sin nk = 0$ if ___, where m and n are integers .

(i) m=n (ii) $m \neq n$ (iii) m=n=1 (iv) m-n=0

7 $L(e^{-at}) =$.

(i) $\frac{1}{s-a}$ (ii) $\frac{s}{s-a}$ (iii) $\frac{s}{s+a}$ (iv) $\frac{1}{s+a}$

8 Find $L(t^3-3t^2+2)$.

(i) 0 (ii) $\frac{6}{s^4}-\frac{2}{s^3}+6$ (iii) $\frac{6}{s^4}-\frac{6}{s^3}+\frac{2}{s}$ (iv) $\frac{2}{s^4}+\frac{2}{s^2}+\frac{3}{s}$

9 _____ is a self – correcting method.

(i) Direct (ii) Indirect (iii) Elimination (iv) Facterozation

10 Fer some systems____ is the only course available.

(i) Iterative (ii) Indirect (iii) Elimination (iv) Approximation

SECTION - B (25 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 5 = 25)

11 a Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$.

OR

b Calculate A^4 when $A = \begin{bmatrix} -1 & 3 \\ -1 & 4 \end{bmatrix}$.

12 a Form the PDE by eliminating f and ϕ from $z = xf\left(\frac{y}{x}\right) + y\phi(x)$.

12 Cont...

b Solve $\frac{\partial^2 z}{\partial x^2} = a^2 z$, given that when x=o, $\frac{\partial z}{\partial x}$ = a sin y and $\partial z/\partial y = 0$.

13 a Find the fourier sine series for $\pi x - x^2$ in (o, π).

OR

b If $f(x) = \begin{cases} -x \text{ in } -\pi < x < 0 \\ x \text{ in } 0 < x < \pi \end{cases}$, expand f(x) as a fourier series in $[-\pi, \pi]$.

14 a Find $L^{-1}\left[\frac{s^2}{(s-1)^3}\right]$.

OR

b Find $L^{-1}\left[\frac{1}{(s+1)(s^2+2s+2)}\right]$.

15 a Solve the system of equations x+y+z+w=z, 2x-y+2z-w=-5,3x+2y+3z+4w=7 and x-2y-3z+2w=5 by Gauss – Jordan method.

OR

b Solve : 3x+4y+5z=18, 2x-y+8z=13, and 5x-2y+7z=20 by Gauss – Elimination Method.

SECTION -C (40 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 8 = 40)

16 a If $A = \begin{pmatrix} 7 & 3 \\ 2 & 6 \end{pmatrix}$ find A^n interns of A .

OR

b Verify Cayley Hamilton Theorem for $A = \begin{pmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{pmatrix}$ and hence find its Inverse.

17 a Find the general solution of $x(z^2-y^2)p+y(x^2-z^2)q=z(y^2-x^2)$.

OR

b Find the general solution of x(y-z)p+y(z-x)q=z(x-y).

18 a Find the Fourier Series of $f(x) = x(2\pi - x)$ in $(0, 2\pi)$ using this obtain the sum of $\sum_{n=1}^{\infty} \frac{1}{n^2}$.

OR

b Find the Fourier Series of $f(x) = x^2$ in $(-\pi, \pi)$. Using this obtain the sum of $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \ldots$

19 a Solve $\frac{dy}{dt} + y = 2+3t+t^2$ when y(o)=1.

OR

b Solve $y'' + y = \sin t$ given $y(0)=1$, $y'(0)=\frac{1}{2}$.

20 a Solve the following systems of equations by Gauss Jacobi method : (Correct to 3 decimal places).
8x-3y+2z=20,4x+11y-z=33,6x+3y+12z=35.

OR