Avinashilingam Institute for Home Science and Higher Education for Women
Coimbatore- 641043.

B.Sc Degree Examination – April 2019
Semester - II

Class : I UG **Time: 3 hours**
Major : Chemistry **Max. Marks: 100**

18BCHI03– DSE II - CLASSICAL MATHEMATICS

Part-A(10x1=10)

Answer All Questions

Choose the correct answer

1. An expression of the of the form $\frac{P}{Q}$ where P and Q are polynomials in x is called _____

a) decimals b) fraction c) rational fraction d) irrational

2. In binomial theorem $|x|$ <1 ,its range is_____

a) -1< x < 0 b) -1< x < 0.5 c) -1< x < 1 d) -1< x < 1

3. Lt $(1+\frac{1}{n})^{n}$ = _____

a) 0 b) -1 c) e d) log n

4. e^{x} = _____

a) $1+x+x^2+\frac{x^2}{2!}+\frac{x^3}{3!}+\ldots$ b) $1+x+x^2+\frac{x^2}{2!}-\frac{x^3}{3!}+\ldots\ldots$

c) $1-x-x^2+\frac{x^2}{2!}-\frac{x^3}{3!}-\ldots$ d) $1.x.x^2.\frac{x^2}{2!}.\frac{x^3}{3!}\ldots\ldots\ldots$

5. The Eigen values of A are _____

a) natural numbers b) complex c) real d) rational

6.The Matrix A^2 has the eigen values _____

a) $\lambda_1, \lambda_{2,\ldots\ldots\ldots}$ b) $\lambda_1^2 \lambda_2^2,\ldots$ c) $\lambda_{1+}, \lambda_{2,+\ldots\ldots\ldots}$ d) $k\lambda_1, k\lambda_{2,\ldots\ldots\ldots}$

7. The differential coefficient of a constant is_____

a) 0 b) -1 c) e d) log n

8.In Homogeneous equations f /(x,y) = _____

a) $xF(\frac{y}{x})$ b) $x^2F(\frac{y}{x})$ c) $x^nF(\frac{y}{x})$ d) $xF(\frac{x}{y})$

9. $\frac{d}{dx}$ (sin x) = _____

a) –cos x b) sec x c) tanx d) cos x

10. $\frac{d}{dx}$ (cosecx) = _____

a) –cot x b) sec x c) –cot x cosec x d) cos x .

PART-B **5x6 =30**

Answer All Questions

11.a) Show that the n th co efficient in the expansion of (1-x) $^{-n}$ is the double of (n-1) th coefficient where n is an integer .

(OR)

11. b) Evaluate $\lim_{x\to\infty} \frac{\sqrt{2x+a}-\sqrt{3x}}{\sqrt{x+3a}-2\sqrt{x}}$

12.a) Show that $\sum_{0}^{\infty} \frac{(5n+1)}{(2n+1)} = \frac{e}{2} + \frac{2}{e}$.

(OR)

12. b) Analyze the following sum the series to infinity :

$$\frac{1}{1.2.3} + \frac{5}{3.4.5} + \frac{9}{5.6.7} + \cdots$$

13.a) Derive the Eigen values for Symmetric Matrices .

(OR)

13. b) Evaluate $\int \sqrt{((x-3(7-x))}\,dx$

14.a) Solve $\frac{dy}{dx} - y \tan x = \frac{\sin x \cos^2 x}{y^2}$

(OR)

14. b) Write the rules for integrating factors

15. a) (i) Solve : (y^2 + z^2 _p –xyq = -xz (using clairut's form)

(ii) Solve $\frac{dy}{dx}$ +y log x = $e^x x^{-1/2 \log x}$

(OR)

15. b) Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$

PART – C

Answer ALL the questions **5 x 12 =60**

16.a) Resolve $\frac{5x^2+18x+22}{(x-1)(x+2)(2x+3)}$ into partial fractions

(OR)

16. b) Show that $\sqrt{x^2+4} - \sqrt{x^2+1} = \frac{3}{2x}\left(1 - \frac{5}{4x^2} + \frac{21}{8x^4}\right)$

17.a) Expand : e ^{x} = 1+x + x ^{2} + $\frac{x^2}{2!}$ + $\frac{x^3}{3!}$ +… (using exponential series).

(OR)

17. b) Sketch the following series to infinity : $\frac{1^3}{2!} + \frac{2^3}{3!} + \frac{1^3}{4!} + \ldots\ldots\ldots\ldots\ldots$

18.a) Evaluate the matrix $A^6 - 25A^2 + 122A$ where $A = \begin{bmatrix} 0 & 0 & 2 \\ 2 & 1 & 0 \\ -1 & -1 & 3 \end{bmatrix}$

(OR)

18. b) State and prove Cayley Hamilton Theorem .

19.a) Evaluate : (i) $\int_0^1 \int_0^1 (x^2 + y^2)\, dydx$

(ii) Change the order of integration in the integral $\int \int_{\frac{x^2}{a}}^{2a-x} xydxdy$.

(OR)

19. b) (i) Using clairaut's form Find the general solution of (y+z) p + (z+x) q = x+y.

(ii) Solve : pxy +pq+qy =yz.

20.a) (i) Solve ($y^2 + 2x^2y$)dx + ($2x^3 - xy$)dy =0.

(ii) Solve : ($y^2 e^x + 2xy$)dx – x^2 dy =0

(OR)

20. b) Solve: $\frac{d^2y}{dx^2} + y = \sec x$.

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