PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2018
(First Semester)

Branch - **STATISTICS**

MATHEMATICS -1

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1 If a+ip is the root of the polynomial f(x)=0 then find the other root is
(i) a-P (ii) a-ip (iii) -a+ip (iv) -a-ip

2 The equation with rational coefficients, whose roots are $1 + S,\ 3$ is
(i) $5x^2+5x+3=0$ (ii) $x^3+x^2-5x+3=0$ (iii) $x^3-5x^2+5x+3=0$ (iv) $x^2-3=0$

3 Any m x 1 matrix is called_____ matrix.
(i) Row (ii) Square (iii) Column (iv) Scalar

4 A Square matrix A is said to be singular if |A| is
(i) =One (ii) * 0 (iii) =0 (iv) co

$\frac{d}{dx}-i[(x^2+l)(x+2)] =$
(i) x^2+x+l (ii) $3x^2+x+l$ (iii) $3x^2+4x$ (iv) $3X^2+4X+1$

$\frac{d}{dx}-+\{v^{(x^2+2)}) =$
(i) Vx(5x²) (ii) 5xX/; (iii) $\frac{5x^2+2}{2A/X}$ (iv) 2x^(5x + 2)

If u $= \frac{Xy}{x+y}$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$
(i) 0 (ii) u (iii) $\frac{xy}{(x+y)^{Y}}$ (iv) $\frac{1}{(x+y)}$

Identify $|4x^3dx: = +c.$
(0 $4x^4$ (ii) $12x^2$ (iii) x^4 (iv)

$\frac{dy}{dx}$ of $x+y+3axy$ is
(i) $3x^2+3y^2+3ay$ (ii) $3x^2+3ay$ (iii)$-x^2+ay$ (iv) $\frac{x^{2}\hat{}ay}{y^2-ax)}$

10 If f(x)=f(a+x) then $|f(x)dx =$
(i) 0 (ii) $2x\int_0^a f(x)dx$ (iii) $n\int_0^a f(x)dx$ (iv) $(n-l)\int_0^a f(x)dx$

SECTION - B (25 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5x5 = 25)

11a If 2+V3 is a root of $x^4-6x^3+l\,lx^2-10x+2=T0$ then solve it.

12 a If A = $\begin{vmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{vmatrix}$ calculate $A^3-6A^2+7A+2I$.

OR

b If A = $\begin{vmatrix} 2 & -3 \\ 3 & 1 \\ -5 & 2 \end{vmatrix}$ calculate A(A-I) (A+2I).

13 a If x^x bring $\frac{dy}{dx}$

OR

b Find $\frac{dy}{dx}$ of $y=[(a-x)^2(b-x)^3]/(c-2x)^3$.

14 a If $y=a\cos(\log x)+b\sin(\log x)$ find $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}$.

OR

b If $y=x^{n-1}\log x$ find $x y_1$ and using this value find y_n.

15 a Solve $\int \frac{dx}{\sin x \cos^2 x}$

OR

b Solve $\int \frac{x\,dx}{(a+bx)^3}$

SECTION -C (40 Marks)

Answer **ALL** questions

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

16 a Solve: $x^5-5x^4+9x^3-9x^2+5x-1=0$.

OR

b Increase the roots of $x^4+16x^3+83x^2+152x+84=0$ by 4 and hence solve the equation.

17 a Examine for what values of A. and g the following equations have

(i) no solution (ii) a unique solution (iii) infinite number of solutions

x+y+z=6, x+2y+3z= 10, x+2y+A.z= g.

OR

b Test for consistency and examine: 5x+3y+7z=4, 3x+26y+2z=9, 7x+2y+10z=5.

18 a If $y = x^{\sqrt{a^2-x^2}}\, a^{\sin^{-1}\frac{x}{a}}$ discover $\frac{dy}{dx}$

OR

b If $x(1+y)^{1/2}+y(1+x)^{1/2}=0$ find $\frac{dy}{dx}$ interms of x.

19 a If $I_n = \frac{d^n}{dx^n}[x^n \log x]$ prove that $I_n = n!\left(\log x + 1 + \frac{1}{2} + \ldots + \frac{1}{n}\right)$

OR

b If u=f(x,y) and x = Xcosa - Ysina, y = Xsina + Ycosa find $\frac{a^2u}{dX^2}+\frac{a^2u}{dY^2}$

20 a Identify $\int \frac{dx}{1+\cos x}$.

OR