PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION JUNE 2014
(First Semester)

Branch – **STATISTICS**

MATHEMATICS - I

Time : Three Hours Maximum : 75 Marks

SECTION-A (20 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 2 = 20)

1 If α,β,γ are the roots of $x^3+px^2+qx+r=0$, Find the condition if $\alpha+\beta=0$.

2 If α,β,γ are the roots of $x^3+px^2+qx+r=0$, Find the value of $\sum\alpha^2\beta$.

3 State the formula for radius of curvature.

4 Define Evolute.

5 If f(2a-x)=-f(x), Prove that $\int_0^{2a} f(x)dx = 0$.

6 Define Beta function.

7 Define Gamma function.

8 Evaluate $\int_0^1\int_0^2 xy^2 dy$.

9 Write down the expansions of cos θ and sin θ in a series of ascending powers of θ.

10 Show that cosh x>1 when x is real.

SECTION - B (25 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 5 = 25)

11 a Solve $x^3-15x^2+71x-105=0$, given that the roots are in arithmetic progression.

OR

b Diminish the roots of the equations $x^4+3x^3-2x^2-4x-3=0$ by 3.

12 a Find the radius of curvature of the curve $x^4+y^4=2$ the point (1,1).

OR

b Find the coordinates of the centre of curvature of the curve xy=z at the point (2,1).

13 a Show that $\beta(m,n)=\frac{m\ n}{(m+n)}$.

OR

b Prove that $(n+1)=n\ n$.

14 a Evaluate $\iint xydxdy$ over the positive quadrant of the circle $x^2+y^2=a^2$.

OR

b Evaluate $\int_0^a\int_0^b (x^2+y^2)dxdy$.

Cont...

15 a Express $\cos 6\theta$ in a series of powers of $\cos\theta$.

OR

b Evaluate $\lim_{x\to 0} \frac{1-\cos x}{x^2}$

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 Solve $4x^4-20x^3+33x^2-20x+4=0$.

17 Find the evolute of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.

18 Establish the reduction formula for $\int \sin^n x\,dx$ and evaluate $\int_0^{n/2} \sin^{10} x\,dx$.

19 Evaluate $\iiint xyz\,dx\,dy\,dz$ over the positive octant of the sphere $x^2+y^2+z^2=a^2$.

20 Expand $\sin^8\theta$ is a series of cosines of multiples of θ.

Z-Z-Z END