

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034.  
B.Sc. DEGREE EXAMINATION – MATHEMATICS  
SECOND SEMESTER – APRIL 2003

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**MT 2500 / MAT 501 – ALGEBRA ANALYTICAL GEOMETRY,**  
**CALCULUS – II**

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23.04.2003  
9.00 – 12.00

Max : 100 Marks

**PART – A**

(10×2=20 marks)

*Answer ALL questions. Each question carries TWO marks.*

01. Prove that  $\int_0^{\frac{\pi}{2}} \sin^n x dx = \int_0^{\frac{\pi}{2}} \cos^n x dx$ .
02. Evaluate
03. State cauchy's root test for convergence of a given series.
04. Show that
05. If  $Y =$  show that
06. Solve
07. Solve where
08. Evaluate
09. Find the equation to the plane through the point (3,4,5) and parallel to the plane
10. Find the equation of the sphere with centre (-1, 2, -3) and radius 3 units.

**PART – B**

(5×8=40 marks)

*Answer any FIVE questions. Each question carries EIGHT marks.*

11. If  $n =$  prove that
12. Evaluate .
13. Sum the series .
14. Sum the series .
15. Solve .
16. Solve .
17. Test for convergence of the series .
18. Find the perpendicular distance from P (3, 9, -1) to the line .

**PART – C**

(2×20=40 marks)

Answer any TWO questions. Each question carries TWENTY marks.

19. a) Evaluate  $I =$  (10)  
b) Find the reduction formulae for  $I_n =$  (10)
20. a) Solve by variation of parameter method. (10)  
b) Solve (10)
21. a) Sum the series (10)  
b) Sum the series (10)
22. a) Show that the series is convergent when  $k$  is greater than unity and divergent when  $k$  is equal to or less than unity. (10)  
b) Find the equation of the sphere which passes through the circle and touch the plane (10)

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