LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



**B.Sc.** DEGREE EXAMINATION – **PHYSICS**

FOURTH SEMESTER – **APRIL 2012**

# MT 4203/4200 - ADVANCED MATHEMATICS FOR PHYSICS

Date : 19-04-2012 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

**SECTION – A**

**ANSWER ALL QUESTIONS: (10 x 2 = 20)**

1. Evaluate



1. Define Fourier series.
2. State the necessary and sufficient condition for the ordinary differential equation to be exact.
3. Write the general solution when the roots are imaginary.
4. Define Beta function.
5. State the relation between Beta and Gamma function.
6. If the vector is solenoidal, find .



1. State Stokes theorem
2. Define any two properties of cyclic group.
3. Define Kronecker’s delta.

**SECTION – B**

**ANSWER ANY FIVE QUESTIONS: (5 x 8 = 40)**

1. Solve .



1. Find a sine series for in the range to .



1. Evaluate .



1. Solve .



1. Solve.



1. Evaluate , where R is the region in the first quadrant bounded by the hyperbolas and and the circles and .



1. If , find and at .



1. Prove that the set is an abelian multiplicative finite group of order 4.



**SECTION – C**

**ANSWER ANY TWO QUESTIONS: (2 x 20 = 40)**

1. (a) Find the Fourier series to represent in the interval . (16+4)



(b) Define Half Range Fourier Series.

1. Solve (20)



1. (a) Change the order of integration in the integral and evaluate it.



(b) Solve . (15+5)



1. (a) Verify Gauss Divergence theorem for over the surface of the cube bounded by co-ordinate planes and the plane



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(b) Prove that the Cancellation law holds good in a Group. (15+5)

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