

5. (a) (i) Find the solution of Poisson's equation  $\nabla^2 \phi = -\rho(r)$  using Green's function. (12)

- (ii) Find the Green's function for the boundary value problem

$$\frac{d^2 y}{dx^2} - k^2 y = f(x) \quad \text{with boundary conditions } y(\pm \infty) = 0. \quad (8)$$

Or

- (b) Explain the stretched string wave equation. (20)

**4529/MP1**

**MAY 2010**

Paper I — MATHEMATICAL PHYSICS

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(For those who joined in July 2003 and after)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

All questions carry equal marks.

1. (a) (i) State and prove Green's theorem in vector analysis. (10)
- (ii) Explain outer product and inner product of tensors. (10)

Or

- (b) (i) State and prove Cayley-Hamilton theorem. (10)
- (ii) Obtain an expressions for grad  $\phi$  and div A in spherical polar co-ordinates. (10)

