G/SEM/-3014

THIRD SEMESTER EXAMINATION -2013

M.Sc.

MATHEMATICS

PAPER-II

PARTIAL DIFFENTIAL EQUITIONS AND MECHANICS-II

TIME: 3 HOURS   **M.M. 80**

Note :- Attempt any two parts from each question. All question are compulsory and carry equal marks.

Unit-I

1.   (a)   Find the fundamental solution of Laplace equation $\Delta\Psi = 0$.

      (b)   Define Green's function and Find it's solution.

      (c)   Find the solution of Non-homogeneous equation on Transport equation.

Unit-II

2.   (a)   Derive fundamental solution of Heat equation.

      (b)   Show that there exits at most one solution $u \in c_1^2(\bar{u})_T$ of

      I.V.P. $\{_{u=g}^{u_T \Delta u = finU}{}_{on)T}^{T}$

                        1   **P.T.O.**

(c)   Find the solution of Non-homogeneous wove equation

      where $u(x,t) = \int_0^t u(x,t;s)ds \quad (x \in R^n, t \geq 0)$

Unit-III

3.   (a)   Derive Lagrange's equation from Hamilton's principle.

      (b)   Give a short note on Routh's equation.

      (c)   Define   (i) Scleronomic & Rheonomic system.

                        (ii) Holonomic & Non-holonomic System

                        (iii) Cycle Co-ordinates

Unit-IV

4.   (a)   State & prove Jacobi's identity for Poisson's brackets.

      (b)   State and prove fundamental Lemma of calculub of variation. http://www.a2zsubjects.com

      (c)   Derive Euler's equation for one dependent function & it's generalisation to'n' dependent function.

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Unit-V

5. (a) Find attraction of a spherical shell.

(b) Find the work done by the mutual attraction of the particles of self attracting system.

(c) State & prove Gauss therorem.

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3   end.