M 27342

Reg. No. : .....

Name : .....

II Semester M.A./M.Sc./M.Com. Degree (Regular/Supplementary/ Improvement) Examination, March 2015
(2013 and Earlier Admn.)
PHYSICS
PH 201 : Mathematical Physics – II

Time : 3 Hours Max. Marks : 50

Instructions : 1) Section – **A** : Answer **any two** questions. **Each** question carries **10** marks.
2) Section – **B** : Answer **any five** questions. **Each** question carries **3** marks.
3) Section – **C** : Answer **any three** questions. **Each** question carries **5** marks.

SECTION – A

1. What is Newman series ? Illustrate the Neumann method with help of the following integral equation :

$$\phi(x) = x + \frac{1}{2}\int_{-1}^{+1} (t - x)\,\phi(t)dt$$

2. Discuss SU(2) and SU(3) groups and write representation of SU(3) group.

3. Explain in detail the general properties of Green's function. Explain Green's function in two and three dimensions.

4. Explain the non-linear motion in one dimension and sketch the bifurcation diagram of any differential equation. **(2×10=20)**

SECTION – B

5. What is integral equation ? Discuss the role of Hilbert-Schmidt method in it.

6. Show that $G(r_1, r_2) = G(r_2, r_1)$ where G is the Green's function.

P.T.O.

7. Show that all subgroups of abelian groups are automatically invariant.
8. Give the physical application of SU(2) group.
9. What is logistic differential equation ?
10. What is elliptic integral ? Give its physical importance with suitable example.
11. Discuss Taylor' expansion. Give its importance.
12. Discuss the ideas of nonintegrability of differential equations. **(5×3=15)**

SECTION – C

13. Use the separable Kernel technique to show that $\psi(x) = \lambda \int_0^x \cos x \sin t \psi(t) dt$ has no solution.
14. Using the method of Green's function, find the solution of the differential equation $\frac{d^2\psi}{dx^2} = -\cos x \;\; 0 \le x \le 2\pi$ with the boundary condition $\begin{matrix}\psi(0) = \psi(2\pi) \\ \psi(0) = \psi'(2\pi)\end{matrix}$.
15. Prove every subgroup of an Abelian group is a normal subgroup.
16. Explain how logistic map is an example of discrete chaotic system.
17. Show that $B_n(1) = (-1)^n B_n(0)$. **(3×5=15)**
