



M 25138

Reg. No. :

Name :

**II Semester M.A./M.Sc./M.Com. Degree (Reg./Supple./Improv.)
Examination, March 2014**

**PHYSICS
PH-201 : Mathematical Physics – II**

Time: 3 Hours

Max. Marks: 50

SECTION – A

Answer **any 2** questions :

2×10=20

1. a) What do you mean by separable kernel ?

b) Solve the integral equation $y(x) = x - \int_0^x xz^2y(z)dz$.

2. Find an approximate Green's function for the equation $y'' + \frac{1}{4}y = f(x)$ with boundary conditions $y(0) = y(\pi) = 0$. Hence solve for $f(x) = \frac{x}{2}$.

3. Obtain the character table of C_{4v} .

4. a) Discuss the convergence of $\sum_{n=1}^{\infty} \frac{1}{(2n-1)(2n+1)}$

b) State and prove Weierstrass M test for the uniform convergence of functions.

SECTION – B

Answer **any 5** questions :

5×3=15

5. Define Fourier transform. Explain any two properties of Fourier transforms.

6. Explain Gram Schmidt Orthogonalisation process.

P.T.O.



7. What do you mean by homomorphism between two groups ? Define kernel of a homomorphism.
8. What do you mean by finite continuous group ? Give an example.
9. Prove that for the logistic map $G(x) = 4x(1 - x)$, there is an orbit of period k , for each positive integer k .
10. Construct Cantor set.
11. What do you mean by absolute convergence ? Give an example.
12. What do you mean by uniform convergence ? Give an example.

SECTION - C

Answer any 3 questions :

3x5=15

13. Show that the n -th group of unity, $e^{i2\pi k/n}$, $1 \leq k \leq n$, form a cyclic group of order n under scalar multiplication.
14. What do you mean by $SU(2)$ group ? Write any physical application of $SU(2)$ group.
15. Briefly compare box-counting dimension and correlation dimension.
16. Show that $\cos x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!}$.
17. Derive Euler-Maclaurin integration formula.