



K20P 0352

Reg. No. : .....

Name : .....

II Semester M.Sc. Degree (CBSS – Reg./Suppl./Imp.)  
Examination, April 2020  
(2014 Admission Onwards)  
**PHYSICS**  
**PHY2C07 : Mathematical Physics – II**



Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer both questions, either (a) or (b). Each question carries 12 marks.

1. a) Explain the idea of convergence, divergence and oscillatory of an infinite series. Give examples in each case. State and prove Cauchy's integral test for the convergence of an infinite series.

OR

b) Derive one dimensional wave equation and solve it using the method of separation of variables.

2. a) Define Fourier transform and inverse Fourier transform. State and prove convolution theorem for Fourier transform.

OR

b) Explain character table of  $C_{4v}$ .

(2×12=24)

SECTION – B

Answer any four (1 mark for part 'a', 3 marks for part 'b', 5 marks for part 'c').

3. a) State Leibniz criterion for the convergence of an infinite series of positive terms.

b) Give an example for a series which converges uniformly but do not converge absolutely.

c) State and prove binomial theorem for the expansion of  $(1 + x)^m$ .

P.T.O.



4. a) Write Laplace equation.  
b) What do you mean by Green's function.  
c) Explain the symmetry property of Green's function.
5. a) State Fourier cosine transform formula.  
b) Find the Fourier sine transform of  $e^{-3t}$ .  
c) Using Fourier transform, show that  $\int_0^{\infty} \frac{\omega \sin \omega x}{\omega^2 + a^2} d\omega = \frac{\pi}{2} e^{-ax}$ ,  $x > 0$ .
6. a) Define Laplace transform.  
b) Find Laplace transform of  $t \cos 2t$ .  
c) Find inverse Laplace transform of  $\frac{s}{s^2 - k^2}$  by partial fraction method.
7. a) Give example for a finite group.  
b) What do you mean by a normal subgroup? Give an example.  
c) Construct the multiplication table for the permutation group on 3 symbols,  $S_3$ .
8. a) What do you mean by equivalent representations of a group?  
b) What do you mean by irreducible representation of a group?  
c) Explain the special unitary group  $SU(2)$ . **(4×9=36)**