Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Physics) (2018 Batch) (Sem.–1)

MATHEMATICAL PHYSICS–I

Subject Code : MSPH-411-18

M.Code : 75122

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying FIVE marks each and students have to attempt any SIX questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a) What is an analytic function?

b) State Cauchy Integral theorem.

c) What do you understand by singularities?

d) Discuss briefly dirac delta function.

e) What are Dirichlet boundary conditions?

f) Write an expression for generating function of Bessel's function.

g) Express the orthogonality condition of Legendre polynomials.

h) Discuss the role of random variables in statistics.

i) What are Hankel functions?

j) Write an expression for generalized Laguerre differential equation and corresponding solution.

SECTION-B

2. State and prove Cauchy Riemann conditions.

3. Elaborate the Laurent expansion.

4. Explain the method of separation of variables by taking a suitable example.

5. Find the relation between beta and gamma functions.

6. Obtain the first two recurrence relations of Bessel function.

7. Differentiate between Poisson and Normal distribution.

8. Explain how the gamma function is used to calculate the factorial of negative integers.

SECTION-C

9. Solve the Bessel differential equation by power series method.

10. What are Associated Legendre functions? Obtain expression for two recurrence relations.

11. Show how the residue theorem helps in solving the definite integrals. Give one example.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.