

Mid-West University
Examinations Management Office

End Semester Examinations-2080

Master level/ M.Sc.(Physics)/2nd Semester

Time: 3 hours

Subject: Mathematical Physics II (PHY551)

Full Marks: 37.5

Pass Marks: 18.75

Candidates are required to give their answer in their own words as far as Practicable. The figures in the margin indicate full marks.

Attempt all the questions:

1. What do you mean by the singularity of a function? Describe various types of singularities.

Evaluate by the method of residue $I = \int_0^{2\pi} \frac{\cos^2 \theta d\theta}{a + b \cos \theta}$ $a > b > 0$. [10]

2. Define Binomial, Normal, and Poisson distributions separately. How are they related to each other? Explain precisely. [10]

OR

- a) What do you mean by student t-distribution? Derive its probability density function.

[5]

- b) Define confidence interval. Following are the random data from a population that has gauss normal distribution,

7.12 4.95 6.18 5.69 8.74 2.90

Determine 90% and 95% confidence intervals for the population mean. [5]

3. Prove Cauchy's integral formula. Evaluate using Cauchy's integral formula

$\int_C \frac{dz}{z(z+2)}$ where C is a circle $|z| = 1$. [5]

4. What are integral equations? Explain the separable kernel of the Fredholm integral equation of the second kind. [5]

OR

Discuss Integral equations in Dispersion theory with an appropriate example. [5]

5. Describe the Runge-Kutta method to solve the first-order differential equation.

Given $\frac{dy}{dx} = x + y^2$ $y(0) = 1$, find $y(0.2)$, when $x = 0.1$, using Runge-Kutta method of order four. [5]

6. What do you mean by covariance and co-relation? Prove that the value of co-relation lies between -1 to +1. [2.5]

The End