



K17P 0397

Reg. No. :

Name :

Fourth Semester M.Sc. Degree (Reg./Suppl./Imp.) Examination, March 2017
(2014 Admission Onwards)

PHYSICS

PHY4C15 : Numerical Technique and Probability

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer any two.

1. a) Give an account of Chi-square distribution. Explain the probability density function of Chi-square distribution. Mention the applications of the Chi-square distribution.

OR

- b) What do you understand by theoretical distributions ? Discuss the relation between Binomial, Poisson and Normal distributions. Why does the Normal distribution occupy the most honourable position in statistical analysis.
2. a) i) Explain Simpson's $\frac{3}{8}$ rule.
ii) Briefly describe Regula Falsi method for finding the real root of an equation.

OR

- b) i) Derive Lagrange's Interpolation formula for unequal intervals.
ii) Obtain the Euler's formula for the numerical solution of the differential equation. (2×12=24 Marks)

SECTION – B

Answer any four.

1 mark for Part – a, 3 mark for Part – b, 5 mark for Part – c.

3. a) What is the probability that a leap year selected at random will contain 53 Tuesdays ?
b) State and prove Addition theorem of probability.
c) Briefly explain Bayes' theorem.

P.T.O.



4. a) What is binomial distribution ?
b) What are the properties of Normal distribution.
c) Fit a Poisson distribution to the following data and calculate the theoretical frequencies.

x:	0	1	2	3	4
f:	123	59	14	3	1

5. a) When shall we not use Newton-Raphson method ?
b) Give an account of Iteration method for obtaining solutions for transcendental equations.
c) Find a real root of the equation $x^3 - 3x + 1 = 0$ lying between 1 and 2 correct to three places of decimal by using bisection method.
6. a) What is the order of convergence of the method of successive approximations ?
b) What are the conditions for the validity of Chi-square test ?
c) Find the first and second order differences for $f(x) = ab^{cx}$.
7. a) When will we use Newton's backward interpolation formula ?
b) Obtain Newton's forward interpolation formula for equal intervals.
c) Use the Trapezoidal rule to estimate the integral $\int_0^2 e^{x^2} dx$ taking the number 10 intervals.
8. a) Write the Runge-Kutta fourth order formulae .
b) Explain the principle of least squares.

- c) Evaluate the integral $\int_0^1 \frac{x^2}{1+x^3} dx$ using Simpson's $\frac{1}{3}$ rule. (4×9=36)