

# AE-750

M.Sc. (Final)

Term End Examination, 2016-17

# PHYSICS

## Optional

### Paper - II (A)

# Numerical Methods and Programming

*Time : Three Hours]                      [Maximum Marks : 100*  
*[Minimum Pass Marks : 36*

**Note** : Answer **five** questions in all, selecting at least **two** questions from each Section. All questions carry equal marks.

## Section - A

1. (a) Describe solution of non-linear and transcendental equation.  
(b) Find a real root of equation  $x^3 - 3x - 5$  using bisection method.

( 2 )

2. (a) Solve the following system of equations using Gaussian elimination method :

$$x + 2y - z = 3$$

$$3x + 3y - 2z = 5$$

$$2x + 3y - z = 2$$

- (b) Find the real root of the equation  $x = e^x$  by using Newton-Raphson method.
3. Describe Trapezoidal formula and Simpson's  $\frac{1}{3}$  formula.
4. Explain solution of ordinary differential equation by Euler and Runge methods.
5. (a) Describe Runge-Kutta method for finding the solution of partial differential equation.
- (b) Apply the fourth order Runge-Kutta method to find  $y(0.4)$  given that  $y' = (x - y)$ ,  $y(0) = 1$ .

### Section - B

6. (a) Describe C-programming structure and variables assignment declaration and expression.
- (b) Explain floating point in 'C' data input and output control.

( 3 )

7. (a) Describe Print off and Scanoff function.  
(b) Explain control statement and decision making in 'C'.
  8. (a) Describe local and global variables.  
(b) Explain declaration of function and array declaration.
  9. (a) Describe about nesting of in statement with suitable example.  
(b) Describe about nesting of for loop with suitable example.
  10. (a) Explain while loop statement.  
(b) Describe Newton-Raphson integration method for the 'C' programming.
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