

Assignment questions for 4th semester M.Sc. Physics

20.06.2016

Course MP 4.1: Nuclear detectors & Reactor theory

(5 X 4=20)

1. Explain the working of the gas filled detectors and explain their I-V characteristics.
2. Discuss the working of operational amplifiers and their applications.
3. Give a comprehensive account of the statistical model of fission.
4. Obtain an expression for critical size reactor for different shapes.

Course MP 4.2: Advanced Condensed Matter Physics

(5 X 4=20)

1. Explain in detail the construction of a Ewald sphere and its significance in understanding the diffraction of X-rays from a crystal.
2. Describe in detail the Weissenberg method of photographing X-ray diffraction pattern from a single crystal, and analysis of the data.
3. Discuss the least square method for the refinement of the crystal structure.
4. Write a note on Atomic Force Microscopy. Explain different modes of operation of AFM with their advantages.

Course MP 4.3: Atmospheric Physics

(5 X 4=20)

1. How the atmosphere is heated up? Explain in detail.
2. Explain Rossby and Kelvin waves in the atmosphere.
3. What do you mean by aerosols? How they are produced? Mention their properties.
4. Obtain the relationship between ions and electrical conductivity of the atmosphere.

Course MP 4.4: Numerical Computational Analysis

(5 X 4=20)

1. Explain the four basic arithmetic operations on two numbers represented in normalized floating point notation with examples. Also, describe the concept of zero in floating point with example.
2. Using below data

x	0	1	2	3
$f(x)$	1	2	33	244

Fit quadratic spline with $M(0) = f''(0) = 0$. Hence find an estimate of $f(2.5)$.

3. Derive Trapezoidal rule and Composite Trapezoidal rule to evaluate $I = \int_a^b f(x) dx$.
4. Derive Euler's method to solve the 1st order initial value problem

$$\left. \begin{array}{l} y' = f(x, y) \\ y(x_0) = \eta \end{array} \right\} \text{ on } (x_0, b)$$

Using this method, with step length $h=0.3$, find the approximate value of $y(0.6)$. Given $y' = x(y+x) - 2$, $y(0)=2$.

***Instructions:**

- All topics are compulsory.
- Assignment for each Course (paper) should be submitted separately.
- Assignments should be hand-written on A-4 size paper and bound properly.
- **Course (paper) Title, Register number and Name of the candidate** should be clearly mentioned on each assignment.
- Assignment should be submitted to The Chairman, Department of Studies in Physics, Karnataka State Open University, Mysuru-6, **on or before 31st July 2016**.