

SECTION-A

Answer all the following questions

5×10=50M

1. (a) what is Compton effect ? Considering the Compton scattering ,derive expression for Compton shift.
Or
(b) Explain Davison-Germer Experiment .
2. (a) Define Heisenberg's uncertainty principle. Explain through gamma ray microscope..
Or
(b) Derive Schrodinger's equation for time independent and dependent wave equations.?
3. (a) Derive an expression for the energy levels of a particle enclosed within infinite potential well (Rigid box).?
Or
(b) Explain Quantum mechanical Scattering and Tunneling in one dimension?
4. (a) Explain the Liquid drop model of Atomic nuclei.
Or
(b) Explain in detail about Gamma theory of Alpha decay..
5. (a) Explain in detail about nuclear fission and nuclear fusion.?
Or
(b) Explain the construction and working of He-Ne Laser with neat diagram?

SECTION -B

ANSWER ANY FIVE OF THE FOLLOWING

5X5=25 marks

6. Solve the Differential equation $(e^y + 1) \cos x \, dx + (e^y) \sin x \, dy = 0$
7. Define the singular point of Differential equation and write the different kinds of singular points?
8. Discuss about the partial Differential equation in a wide variety of situations of physical interest?
9. Derive Diffusion equation?
10. Write algebraic operations of complex numbers?
11. Find the residue of $f(z) = \frac{ze^z}{(z-a)^3}$ at $z = a$
12. Find the Fourier transform of the Gaussian distribution function $f(x) = N e^{-\alpha x^2}$ where N and α are constants.
13. State and explain convolution theorem of Laplace transform?
14. State and prove Laplace transform of integral?
15. Find the inverse Laplace transform of $\frac{1}{\sqrt{2s+5}}$

Mathematical
Physics