**National Institute of Technology Kurukshetra**
**B. Tech. PHIC-101, Sessional -- I (CE, PI, ME, EC, EE only)**
**All questions are compulsory** (25/09/2023)

Time allotted: 50 min. Max. Marks: 20

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|---|---|---|
| 1 | A particle trapped in a one-dimensional box of length L is described by the normalized wave function $\Psi = ax$. What is the expectation value of the particle's position <x>.? | 4 |
| 2 | How does the concept of Bohr's orbit violate the uncertainty principle? Explain. | 4 |
| 3 | Calculate the value of Poynting vector of sun surface, if sun radius is $7x10^8$ m and Sun radiates $4 x10^{26}$ joule energy per second. Or *Show the principal directions [011], [-1-11], [1-10], and [10-1] in a cube.* | 4 |
| 4 | Derive the Maxwell equations for free space. | 4 |
| 5 | Describe the significance of wave function and Schrodinger equation, in detail. | 4 |