

School of Basic Sciences**Bachelor of Science Honours in Physics
Semester End Examination - Jun 2024****Duration : 180 Minutes
Max Marks : 100****Sem IV - C1UD403T - Electromagnetic Theory**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

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| 1) | Define magnetization and magnetic dipole moment. | K1(3) |
| 2) | What is Nicol's prism and its use in polarization. | K2(4) |
| 3) | Write Maxwell's equation in differential and integral form for good conductors. | K2(6) |
| 4) | Illustrate the magnetic boundary conditions when Electromagnetic wave propagates from one linear medium to another linear medium. | K3(6) |
| 5) | Derive the one dimensional general wave equation and find the solution for wave equation. | K3(6) |
| 6) | Explain specific rotation using diagram. | K3(9) |
| 7) | Briefly explain about the wave incident obliquely to the surface of perfect conductor. | K3(9) |
| 8) | Explain field energy and power transmitted in optical fiber Communications. | K4(8) |
| 9) | Discuss the advantages of optical fiber communication system with respect to wavelength and attenuation. | K4(12) |
| 10) | A step index fiber has a normalized frequency $V = 29.9$ at 13.50 nm wavelength. If the core radius is $35 \mu\text{m}$, find the numerical aperture. | K5(10) |
| 11) | Derive General Field relation for time varying electric and magnetic fields using Maxwell's' equations. | K5(15) |

OR

Write Maxwell equation for conducting medium and find its solutions. K5(15)

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| 12) | What is the difference between acceptance angle, critical angle and numerical aperture? | K6(12) |
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OR

Draw a block diagram of fiber optic communication system and describe the function of each component. K6(12)