Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18PH1001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ENGINEERING PHYSICS - ELECTROMAGNETISM, OPTICS AND PROPERTIES OF MATTER** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
| **PART – A (10X1=10 MARKS)** | | | |
| 1. | When an electric field is applied is applied to an ionic crystal, the type of polarization that arises is known as \_\_\_\_\_\_\_\_\_\_. | CO1 | 1 |
| 2. | Addition of impurities \_\_\_\_\_\_\_\_\_ the superconducting properties.   1. Enhances b) Decreases c) Destroys d) Does not change | CO1 | 1 |
| 3. | The ratio of E/B in an electromagnetic wave is a well known constant in physics and is equal to \_\_\_\_\_\_\_\_\_\_\_\_. | CO2 | 1 |
| 4. | In vacuum, the energy density associated with electric field is equal to the energy density of \_\_\_\_\_\_\_\_\_\_\_. | CO2 | 1 |
| 5. | \_\_\_\_\_\_\_\_ is the inherent property of all fluids and may be called the internal friction offered by a fluid to the flow. | CO3 | 1 |
| 6. | An example of adhesive force is \_\_\_\_\_\_\_\_. | CO3 | 1 |
| 7. | The branch of optics for which the ray description is adequate is called \_\_\_\_\_\_\_\_. | CO4 | 1 |
| 8. | \_\_\_\_\_\_\_\_ is a phenomenon in which two waves combine to form either constructive or destructive patterns. | CO4 | 1 |
| 9. | The type of waves which need a material medium to travel through are \_\_\_\_\_\_\_. | CO5 | 1 |
| 10. | State the characteristics of a simle harmonic motion. | CO5 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | Define Meissner effect with an illustration. | CO1 | 3 |
| 12. | List out the key properties of electromagnetic waves. | CO2 | 3 |
| 13. | Mention the significance of Reynold’s number. | CO3 | 3 |
| 14. | Define diffraction of light. | CO4 | 3 |
| 15. | Derive a relation between frequency and wavelength in a wave motion. | CO5 | 3 |
| 16. | Identify which among the following particles will have shorter wavelength. Give reason for the same.  i) Electron. ii) Electron Neutrino. iii) Proton. iv) Neutron. | CO6 | 3 |

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| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | | |
| 17. |  | Explain the different types of supercondutors with a neat sketch about how they respond to the applied magnetic field. | CO1 | 12 |
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| 18. |  | Derive an expression for Maxwell’s first and second electromagnetic wave equation. | CO2 | 12 |
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| 19. |  | Describe the determination of surface tension by Jaeger’s method with essential illustration. | CO3 | 12 |
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| 20. |  | With a neat diagram, explain the construction and working of Michelson interferometer. | CO4 | 12 |
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| 21. |  | Discuss damped oscillations and derive a general equation which describes damped oscillations. | CO5 | 12 |
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| 22. | a. | Define local field. Find an expression for local or internal field from basic assumptions. | CO1 | 10 |
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| b. | Calculate the electronic polarizability of an isolated tellurium (Te) atom. The atomic radius of Te atom is 1.42 Å. | CO1 | 2 |
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| 23. | a. | Arrive at a basic equation for one dimensional electromagnetic wave equation. | CO2 | 10 |
| b. | Gamma rays are the most energetic electromagnetic waves. A typical gamma ray is having a wavelength of 3 x 10-12 m. Find its frequency. | CO2 | 2 |
| **Compulsory:** | | | |  |
| 24. | a. | Describe the principle, construction and working of a Scanning Electron Microscope with a neat sketch. | CO6 | 10 |
| b. | Find the wavelength of an electron matter wave which is accelerated by a potential difference of 150 V. | CO6 | 2 |