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

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

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| **Code :** | **19PH1011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ENGINEERING PHYSICS LASERS, FIBER OPTICS, WAVES AND ELECTROMAGNETICS** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
|  | **PART – A (10 X 1 = 10 MARKS)** | | |
| 1. | Holography is the phenomenon of \_\_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 |
| 2. | Coherence,directionality, Intensity and \_\_\_\_\_\_\_\_\_\_\_ are the characteristics of Laser. | CO1 | 1 |
| 3. | A step index fibre has a core refractive index of 1.5 and that of cladding is 1.48. Its numerical aperture is \_\_\_\_\_\_\_\_\_\_\_. | CO2 | 1 |
| 4. | The process of forming a permanent joint between two optical fibre is called \_\_\_\_\_\_\_\_\_\_. | CO2 | 1 |
| 5. | For the points of equilibrium on the potential energy curve, du/dx is \_\_\_\_\_\_\_\_ zero.  a) greater than b) equal to c) less than | CO3 | 1 |
| 6. | Give an example for the periodic motion that is not oscillatory in nature. | CO3 | 1 |
| 7. | When two waves interfere, does one alter the progress of the other? Is there a loss of energy? | CO4 | 1 |
| 8. | One waxing and one wanning of sound constitutes one Beats. The number of waxing and wanning in one second is called the \_\_\_\_\_\_\_\_\_\_\_ of beats. | CO4 | 1 |
| 9. | What is a crystal? | CO5 | 1 |
| 10. | Give any two applications of Piezo electric materials. | CO5 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | | | | |
| 11. | | Explain stimulated emission. | | CO1 | 3 | |
| 12. | | List the advantages of using optical fibre in communication system. | | CO2 | 3 | |
| 13. | | Relate the effect of natural frequency of the system and frictional force in the case of Under damping, over damping and critical damping. | | CO3 | 3 | |
| 14. | | A wave along a string is represented by the following equation (x in metres and  t in seconds), Y=0.02 sin(30t-4.0x)m. Find the amplitude and frequency. | | CO4 | 3 | |
| 15. | | Define Inverse piezo electric effect. | | CO5 | 3 | |
| 16. | | State and explain Gauss Divergence theorem. | | 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 principle,construction and working of carbondioxide laser with energy level diagram. | CO1 | | 12 |
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| 18. | a. | | Explain the working of Fibre endoscope. | CO2 | | 6 |
| b. | | Differentiate between step index and graded index fibre. | CO2 | | 6 |
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| 19. |  | | How will you ascertain the acceleration due to gravity using the physical pendulum. Explain with a neat sketch. | CO3 | | 12 |
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| 20. | a. | | Obtain the differential wave equation. | CO4 | | 8 |
| b. | | Distinguish tranverse from longitudinal wave motion with example. | CO4 | | 4 |
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| 21. | a. | | Outline the Synthesis of Silicon materials. | CO5 | | 6 |
| b. | | Give an account on ceramics. | CO5 | | 6 |
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| 22. | a. | | Explain Double crucible technique of preparation of optical fibres. | CO2 | | 8 |
| b. | | List the differences between a Harmonic oscillator and Anharmonic oscillator. | CO3 | | 4 |
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| 23. | a. | | Explain the recording of holography. | CO1 | | 6 |
| b. | | Discuss the importance of piezoelectric materials in various fields. | CO5 | | 6 |
|  | |  | **Compulsory:** |  | |  |
| 24. | a. | | Illustrate mathematically how and at what conditions the Ampere’s circuital law fails. How did Maxwell modify the Ampere’s law to made it consistent for all conditions? Give mathematical justifications to prove its consistency. | CO6 | | 8 |
| b. | | Write down the Maxwell’s equation. | CO6 | | 4 |