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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations Feb-2021

PHYSICS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

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|---|---|--|----|
| 1 | a | Define Electrical Oscillator. | 2M |
| | b | Define Meta stable state. | 2M |
| | c | What are matter waves. | 2M |
| | d | Define Drift Velocity. | 2M |
| | e | Define top down and bottom up process. | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|---|--|----|
| 2 | a | What are damped oscillations? Derive the equation of motion and solution of damped oscillator. | 7M |
| | b | An under damped oscillator has its amplitude reduced to $(1/10)^{th}$ of its initial value after 100 oscillations. If time period is 2 seconds, calculate (i) the damping constant and (ii) the decay modulus. | 3M |

OR

- | | | | |
|---|---|---|----|
| 3 | a | What are forced oscillations? Obtain an expression for the amplitude of forced oscillator and give the condition for amplitude resonance. | 6M |
| | b | Draw the Mechanical Analogy of S.H.M. | 4M |

UNIT-II

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|---|---|--|----|
| 4 | a | Describe the important characteristics of laser beam. | 6M |
| | b | Explain the difference between spontaneous and stimulated emission of radiation. | 4M |

OR

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|---|---|--|----|
| 5 | a | Explain the construction and working of Nd:YAG laser with suitable energy level diagram? | 6M |
| | b | What are the advantages of Nd:YAG laser? | 4M |

UNIT-III

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|---|---|--|----|
| 6 | a | Derive Schrödinger's time independent wave equation. | 7M |
| | b | Explain the physical significance of wave function. | 3M |

OR

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|---|---|---|----|
| 7 | a | Describe the behavior of particle in a one-dimensional infinite potential well in terms of Eigen values and function. | 7M |
| | b | An electron is confined to a one-dimensional potential box of 2 \AA length. Calculate the energies corresponding to the second and fourth quantum states (in eV). | 3M |

UNIT-IV

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|---|---|---|----|
| 8 | a | Explain quantum free electron theory. | 6M |
| | b | Write its advantages over classical free electron theory. | 4M |

OR

- 9 a Explain intrinsic semiconductor. **5M**
- b What is Fermi level? Locate its position for intrinsic semiconductor. **5M**

UNIT-V

- 10 a What is Quantum Confinement? **4M**
- b Write the applications of nonmaterial. **6M**

OR

- 11 a What are the techniques available for synthesizing nanomaterials? **3M**
- b Explain ball-milling technique for synthesis of nanomaterial? **7M**

END