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

**B.Tech I Year I Semester Supplementary Examinations June 2019**

**PHYSICS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

**PART-A**

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

- |   |   |   |    |
|---|---|---|----|
| 1 | a | State Ampere's law in magneto statics.  | 2M |
|   | b | How we protect our self from harmful effects of electromagnetic radiation?  | 2M |
|   | c | A class room of volume 200 m <sup>3</sup> has a reverberation time 1.6 seconds. Calculate the total sound absorption coefficient of the class room. | 2M |
|   | d | What is life time of an atom in excited state? Give the life time of Hydrogen atom in excited state.  | 2M |
|   | e | What is quantum confinement?  | 2M |

**PART-B**

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

**UNIT-I**

- |   |   |  |    |
|---|---|--|----|
| 2 | a | State and write Maxwell's equation in differential form.   | 5M |
|   | b | Derive the continuity equation and write its significance. | 5M |

**OR**

- |   |   |   |    |
|---|---|---|----|
| 3 | a | Classify the magnetic materials based upon spin magnetic moments.   | 7M |
|   | b | A magnetic material has a magnetization of 3300 A/m and flux density of 0.0044 Wb/m <sup>2</sup> . Calculate the magnetizing force of the material. | 3M |

**UNIT-II**

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|---|--|-----|
| 4 | Deduce the relation between the Electric (E) and Magnetic (B) fields of electromagnetic waves. | 10M |
|---|--|-----|

**OR**

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|---|---|--|----|
| 5 | a | Compare electromagnetic waves and sound waves. | 6M |
|   | b | Explain the electromagnetic spectrum.          | 4M |

**UNIT-III**

- |   |   |  |    |
|---|---|--|----|
| 6 | a | Derive general differential equation of motion for a simple harmonic oscillator and obtain its solution. | 7M |
|   | b | Name the periodic motion which is not oscillatory.   | 3M |

**OR**

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|---|---|--|-----|
| 7 | a | Describe the formation of Newton's ring with necessary theory. | 10M |
|---|---|--|-----|

**UNIT-IV**

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|---|---|---|----|
| 8 | a | List out the characteristics of laser.  | 3M |
|   | b | Explain the construction and working principle of He-Ne laser with suitable energy level diagram. | 7M |

**OR**

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|---|---|--|----|
| 9 | a | Explain the difference between spontaneous and stimulated emission of radiation. | 4M |
|   | b | Write short note on applications of lasers in science and engineering.           | 6M |

**UNIT-V**

- |    |   |  |    |
|----|---|--|----|
| 10 | a | Define top down and bottom up process.                   | 3M |
|    | b | Explain Sol-Gel technique for synthesis of nanomaterial. | 7M |

**OR**

- |    |   |   |    |
|----|---|---|----|
| 11 | a | What are carbon nanotubes? Mention its structures.                | 5M |
|    | b | Discuss the sensor and catalyst applications of carbon nanotubes. | 5M |

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