

**Reg. No:**

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

**B.Tech I Year I Semester Regular Examinations January 2020**

**ADVANCED PHYSICS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

- 1 a** Describe the formation of Newton's ring with necessary theory. **7M**  
**b** Explain how the wavelength of light sources is determined by forming Newton's rings. **5M**

**OR**

- 2 a** What is diffraction grating how it is constructed? **8M**  
**b** A plane grating having 10520 lines per cm is illuminated with light having a wave length of  $5 \times 10^{-5}$  cm at normal incidence, then how many orders are visible in the grating spectra? **4M**

**UNIT-II**

- 3 a** What is the importance of acoustics in engineering? **6M**  
**b** How we optimize the reverberation time in the music halls? **6M**

**OR**

- 4 a** Write the properties of Ultrasonic waves. **6M**  
**b** Explain the detection methods of Ultrasonic waves. **6M**

**UNIT-III**

- 5 a** Define i) magnetic moment and ii) magnetic susceptibility. **4M**  
**b** Explain the origin of magnetic moments. **8M**

**OR**

- 6 a** Derive the expression for electronic polarizability in dielectrics. **8M**  
**b** The dielectric constant of He gas at NTP is 1.0000684. Calculate the electronic polarizability of He atoms if the gas contains  $2.7 \times 10^{25}$  atoms per  $m^3$ . **4M**

**UNIT-IV**

- 7 a** Explain the construction and working of Nd:YAG laser with suitable energy level diagram. **8M**  
**b** What are the advantages of Nd:YAG laser? **4M**

**OR**

- 8 a** What is the acceptance angle of an optical fibre and derive an expression for it. **8M**  
**b** An optical fibre has a core refractive index of 1.44 and cladding refractive of 1.40. Find its acceptance angle and numerical aperture. **4M**

**UNIT-V**

- 9 a** Explain why surface to volume ratio very large for nano materials? **8M**  
**b** What is Quantum Confinement? **4M**

**OR**

- 10 a** How we synthesis nanomaterial by Sol-Gel technique? **8M**  
**b** Write advantages of sol-gel process. **4M**

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