

Reg. No:

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

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

**ENGINEERING PHYSICS**

(Common to CE&AGE)

Time: 3 hours

Max. Marks: 60

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

**UNIT-I**

- 1 a Define vector and scalar quantities and give two examples. 4M  
b Define gradient of a scalar field and give its physical significance. 8M

**OR**

- 2 a Explain inertial and non-inertial frames of reference 4M  
b Obtain an expression for velocity of a body moving in a rotating frame of reference with constant angular velocity. 8M

**UNIT-II**

- 3 a Classify different types of beams. 8M  
b Obtain an expression for the internal energy due to strain. 4M

**OR**

- 4 a Define shear strain. Explain how shear strain is related to modulus of rigidity. 8M  
b The Young's modulus for steel is  $Y=2 \times 10^{11} \text{N/m}^2$  and its rigidity modulus  $\eta=8 \times 10^{10} \text{N/m}^2$ . Estimate the Poisson's ratio and its bulk modulus. 4M

**UNIT-III**

- 5 a Explain reverberation and reverberation time. 4M  
b Derive Sabine's formula for reverberation time. 8M

**OR**

- 6 a Give any four methods for the detection of ultrasonics. 4M  
b Write the applications of ultrasonics. 8M

**UNIT-IV**

- 7 a Define damped harmonic motion. Give examples. 4M  
b Derive and solve differential equation of damped harmonic oscillator. 8M

**OR**

- 8 a Distinguish between damped and forced oscillations with suitable examples. 4M  
b Explain the phenomenon of resonance and write the applications of resonance in various fields. 4M  
c The frequency of a tuning fork is 300Hz. If its quality factor Q is  $5 \times 10^4$ , find the time after which its energy becomes (1/10) of its initial value. 4M

**UNIT-V**

- 9 a What are nanomaterials? Explain the basic principles of nanomaterials. 8M  
b Outline the properties of nanomaterial that are affected due to increased surface area to volume ratio. 4M

**OR**

- 10 a Explain the synthesis of nanomaterial by ball milling method. 8M  
b Discuss the advantages of nanomaterial. 4M

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