

**Reg. No:**

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

**B.Tech I Year I Semester Regular Examinations December 2018**

**PHYSICS**

(Common to CE,AGE)

Time: 3 hours

Max. Marks: 60

**PART-A**

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

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|----------|---|----|
| <b>1</b> | <b>a</b> Define force what are the basic forces in nature.                | 2M |
|          | <b>b</b> What is hungry operator?   | 2M |
|          | <b>c</b> What are the physical characteristics of simple harmonic motion? | 2M |
|          | <b>d</b> Define stress and strain.  | 2M |
|          | <b>e</b> Write allotropes of carbon.                                      | 2M |

**PART-B**

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

**UNIT-I**

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|----------|--|----|
| <b>2</b> | <b>a</b> Define scalar product of vectors and give its properties.   | 7M |
|          | <b>b</b> Vectors is given by $A=2\hat{i}+3\hat{j}-4\hat{k}$ , by $B=6\hat{i}-8\hat{j}-3\hat{k}$ find out the angle between them. | 3M |

**OR**

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|----------|--|----|
| <b>3</b> | <b>a</b> Define isolated and variable mass systems.                | 3M |
|          | <b>b</b> Formulate Newton's second law for a variable mass system. | 7M |

**UNIT-II**

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|----------|---|----|
| <b>4</b> | <b>a</b> Derive the expression for acceleration of particle in rotating co ordinate system. | 7M |
|          | <b>b</b> Develop the concepts of centrifugal force and coriolis force.                      | 3M |

**OR**

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|----------|---|----|
| <b>5</b> | <b>a</b> What is coriolis force? Under what conditions it equals to zero and maximum.   | 5M |
|          | <b>b</b> Calculate the fictitious force and total force acting on freely falling body whose mass is 5 kg with respect to frame moving downward with acceleration of $2 \text{ m/sec}^2$ . | 5M |

**UNIT-III**

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|----------|--|----|
| <b>6</b> | <b>a</b> Establish the equation of motion of simple harmonic oscillator. | 5M |
|          | <b>b</b> Derive the solution for equation of simple harmonic oscillator. | 5M |

**OR**

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|----------|--|----|
| <b>7</b> | <b>a</b> State the phenomenon of resonance and its examples.   | 6M |
|          | <b>b</b> A body of mass 3 kg is hanging from a vertical spring. When a mass of 0.5 kg is gently added the spring is further stretched by 5 cm. If the extra mass is removed and the first is set into oscillation, calculate the period of oscillation | 4M |

**UNIT-IV**

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|----------|---|----|
| <b>8</b> | <b>a</b> What is Hook's law? Describe the behavior of wire under an increasing load.  | 7M |
|          | <b>b</b> One end of a wire 2 m long and $0.2 \text{ cm}^2$ in cross-section is fixed in a ceiling and a load of 4.8 kg is attached to the free end. Find the extension of the wire Young's modulus of steel= $2.0 \times 10^{11} \text{ N/m}^2$ . Take $g=10 \text{ m/s}^2$ . | 3M |

**OR**

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|----------|--|----|
| <b>9</b> | <b>a</b> Derive equation for energy stored per unit volume in stretched wire.  | 7M |
|          | <b>b</b> A uniform steel wire of density $7800 \text{ kg/m}^3$ is 2.5 m long and mass $15.6 \times 10^{-3} \text{ kg}$ . It extends by 1.25 mm when loaded by 8 kg. Calculate the value of Young's modulus for steel ? | 3M |

**UNIT-V**

**Q.P. Code:** 18HS0848

**R18**

**10 a** What is quantum confinement?

4M

**b** Write the applications of nanomaterials.

6M

**OR**

**11 a** Explain Sol-Gel technique for synthesis of nanomaterial.

7M

**b** Write advantages of sol-gel process.

3M

\*\*\*END\*\*\*