

**Reg. No:**

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

**B. Tech I Year I Semester Supplementary Examinations November 2020**  
**PHYSICS**  
**(Common to CE & AGE)**

Time: 3 hours

Max. Marks: 60

**PART-A**

(Answer all the Questions  $5 \times 2 = 10$  Marks)

- |   |  |   |
|---|--|---|
| 1 | <b>a</b> Define Newton's first law of motion.<br><b>b</b> What is hungry operator?<br><b>c</b> State the phenomenon of resonance.<br><b>d</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 $g=10\text{m/s}^2$ .<br><b>e</b> What is nanoscience and nanotechnology? | <b>2M</b><br><b>2M</b><br><b>2M</b><br><b>2M</b><br><b>2M</b> |
|---|--|---|

**PART-B**

(Answer all Five Units  $5 \times 10 = 50$  Marks)

**UNIT-I**

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

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|---|---|------------------------|
| 3 | <b>a</b> Define Newton's second law of motion.<br><b>b</b> Derive the relation for masses to its acceleration of bodies by Newton's second law. | <b>2M</b><br><b>8M</b> |
|---|---|------------------------|

**UNIT-II**

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|---|---|------------|
| 4 | Explain the effect of coriolis force due to rotation of earth | <b>10M</b> |
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**OR**

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| 5 | <b>a</b> Write the properties of inertial forces.<br><b>b</b> A body is dropped from a height of 490 m above the earth. Assuming $g$ is constant, find the deflection of the body from the vertical due to coriolis force when it reaches to the ground? (where latitude is zero) | <b>5M</b><br><b>5M</b> |
|---|---|------------------------|

**UNIT-III**

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

**OR**

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| 7 | <b>a</b> What is forced vibration?<br><b>b</b> Derive the differential equation of motion of particle under forced vibrations. | <b>6M</b><br><b>4M</b> |
|---|--|------------------------|

**UNIT-IV**

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|---|---|------------------------|
| 8 | <b>a</b> Explain the classification of beams.<br><b>b</b> Find the work done in stretching a wire of cross-section $1.25 \text{ mm}^2$ and length 0.14 mm<br>The Young's modulus of wire is $45 \text{ GN/m}^2$ . | <b>7M</b><br><b>3M</b> |
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**OR**

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| 9 | <b>a</b> Explain the terms rigidity modulus ( $\eta$ ) and poisson's ratio of elastic materials and write its importance in elastic materials.<br><b>b</b> The Young's modulus for steel is $Y=2 \times 10^{11} \text{ N/m}^2$ and its rigidity modulus $\eta=8 \times 10^{10} \text{ N/m}^2$ . Find the Poisson's ratio and its bulk modulus. | <b>7M</b><br><b>3M</b> |
|---|--|------------------------|

**UNIT-V**

- 10** **a** What are the techniques available for synthesizing nanomaterials?  
**b** Explain Sol-Gel technique for synthesis of nanomaterial.

OR

- 11**    **a** What are carbon nanotubes? Mention its structures.  
         **b** Write brief note on applications of carbon nanotubes.

3M

7M

5M

5M

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