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

PART-B

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

UNIT-I

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|----------|--|----|
| 2 | a Define scalar product of vectors and give its properties. | 7M |
| | 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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| 3 | a Define isolated and variable mass systems. | 3M |
| | b Formulate Newton's second law for a variable mass system. | 7M |

UNIT-II

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

OR

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|----------|---|----|
| 5 | a What is coriolis force? Under what conditions it equals to zero and maximum. | 5M |
| | 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 m/sec^2 . | 5M |

UNIT-III

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

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| 7 | a State the phenomenon of resonance and its examples. | 6M |
| | 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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|----------|---|----|
| 8 | a What is Hook's law? Describe the behavior of wire under an increasing load. | 7M |
| | b One end of a wire 2 m long and 0.2 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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|----------|--|----|
| 9 | a Derive equation for energy stored per unit volume in stretched wire. | 7M |
| | b A uniform steel wire of density 7800 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