Registration No:

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B.TECH. DEGREE EXAMINATION-Nov-Dec.2018
End Semester Examination-I Semester
BBSBS 1021-Engineering Physics
(Regulations 2017)(Common to BT, CHEM., CIVIL, EE, EEE, MECH Branches)
Time : 3 Hours   Maximum : 100 Marks   Question Code:31312
Answer ALL Questions

PART-A (10 X 2=20 Marks)

1.
(a) The restoring force of an oscillator is maximum at….. position.   [CO1][PO1]
     a. Mean   b. End   c. 2cm   d. Infinity
(b) The graph between the displacement and the velocity of a simple harmonic oscillator is….   [CO1][PO1]
    a. sphere   b. cylinder   c. Ellipse   d. cube
 (c) In case of Newton's ring experiment the rings are produced by division of...........   [CO1][PO1]
     a. wave length   b. wave front   c. amplitude   d. none
(d) L A S E R stands for Light Amplification by...........Emission of radiation.   [CO2][PO1]
     a. stopping   b. spontaneous c. source   d. stimulated
(e) Example of gas lasing material is ....   [CO2][PO1]
     a. He – Ne   b. Semiconductor   c. Ruby   d. None
(f) The working principle of optical fibre is ....   [CO2] [PO1]
     a. Reflection   b. Refraction   c. Diffraction   d. Total internal reflection
(g) The smallest volume unit cell in a crystal structure is called as: [CO3][PO1]
     a. primitive   b. fcc   c. bcc   d. None
(h) Electromagnetic wave travels with the speed ....in free space.   [CO4][PO1]
     a. 3×10^8 ms-1   b. 3×10^{10} ms-1   c. 5×10^5 ms-1   d. 7×10^6 ms-1
(i) Divergence of a vector field is a.................   [CO4][PO1]
     a. Scalar   b. Pseudo Scalar   c. Vector   d. Tensor
(j) The minimum energy required for photoelectric effect is called..........   [CO5][PO1]
     a. Stopping potential   b. Threshold frequency   c. Wave function
     d. Work function

PART-B (10 X 2=20 Marks)
2. (a) Show that total energy of the simple harmonic oscillator is constant.?   [CO1][PO1]
   (b) Differentiate between coherent and incoherent superposition.   [CO1] [PO1]
   (c) What are the characteristics of a Laser beam.   [CO2] [PO1]
   (d) What is Miller Indices of a crystal plane.   [CO3][PO1]
   (e) Define Bragg's law ?   [CO3] [PO1]
   (f) State Faraday's laws of electromagnetic induction.   [CO4] [PO1]
   (g) State and write Poynting theorem and justify that it explains about the conservation of   [CO4][PO1]
       electromagnetic energy?
   (h) State Stokes theorem.   [CO4][PO1]
   (i) Calculate the de Broglie wavelength of a neutron whose kinetic energy is 0.025ev.   [CO5][P02]
   (j) Show graphically the variation of kinetic energy with frequency of incident light in   [CO5][PO1]
      photoelectric effect.

PART-C (4 X 15=60 Marks)

3. (a) (i) Discuss with a neat diagram that how interference fringes are produced in   [10][CO1][PO1]
        Bi-prism Experiment and derive the expression for fringe width?
    (ii) How coherent sources are produced by the division of wave front in case of   [5][CO1][PO1]
        Newton 's ring experiment.
(or)
   (b) (i) What is an optical fiber? Discuss different parts of an optical fiber?   [10][CO1][PO1]
        Differentiate between the step-index and graded-index optical fibers? Discuss its
        advantages and disadvantages?
    (ii) Give five examples of Optical Fibers used in communication?   [5][CO1][PO1]

4. (a) (i) What is Miller indices? Discuss the method to determine the Miller Indices of a   [10][CO3][PO1]
        crystal plane? Explain with examples.
    (ii) Classify materials on the basis of band theory.   [5][CO3][PO1]

(or)
   (b) (i) Discuss the construction and properties of the reciprocal lattice.   [10][CO3][PO1]
    (ii) Determine the reciprocal lattice of Simple Cubic lattice.   [5][CO3][PO2]

5. (a) (i) Write Maxwell's equations in differential as well as in integral form and state the   [10][CO4][PO1]
        fundamental laws from which they are derived. Magnetic monopole does not exist,
        justify using appropriate law
    (ii) Distinguish between conduction current and displacement current.   [5][CO4][PO2]

(or)
   (b) (i) Derive the expression for electromagnetic wave equation in terms of electric field in   [10][CO4][PO1]
        a conducting medium using Maxwell's equations
    (ii) A point source emits light with power 250 W. Find the average value of the Poynting   [5][CO4][PO2]
        vector at a distance of 2m from the source
6. (a) (i) Using Schrodinger's equation, discuss the case of a free particle in one dimensional   [8][CO5][PO1]
        potential well. Mention its energy Eigen values of the excited states
    (ii) State Heisenberg's Uncertainty principle .Using Uncertainty principle prove the   [7][CO5][PO2]
        Non-existence of electron in Nucleus
(or)
   (b) (i) What is CNT? Give applications of nano particles?   [8][CO5][PO1]
    (ii) Make a comparison between PVD and CVD synthesis of nano-particles.   [7][CO5] [PO2]

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