# SREE VIDYANIKETHAN ENGINEERING COLLEGE
**(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)**
**I B.Tech I Semester (SVEC-16) Regular/Supplementary Examinations December - 2018**
## ENGINEERING PHYSICS
**[Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering]**

Time: 3 hours                                                                                    Max. Marks: 70
### Answer One Question from each Unit
### All questions carry equal marks

## UNIT-I

1  a)  Explain the construction and operation of a semiconductor laser.                    10 Marks
   b)  The refractive indices of core and cladding materials of a step index fibre are 1.48   4 Marks
       and 1.45 respectively.  Calculate:
         i) Numerical aperature.            ii) Fractional refractive indices change.
         iii) Acceptance angle.             iv) Critical angle at core-cladding interface.

**(OR)**

2  a)  Draw the block diagram of an optical fiber communication system and explain       9 Marks
       the function of each block.
   b)  Mention various applications of optical fibers.                                    5 Marks

## UNIT-II

3  a)  Show that the energies of a particle in a potential box are quantized.            11 Marks
   b)  An electron is bound in a one dimensional box having size of $4 \times 10^{-10}$m.  What will   3 Marks
       be its minimum energy?

**(OR)**

4  a)  Explain Fermi-Dirac distribution for electrons in a metal. Discuss its variation with   9 Marks
       temperature.
   b)  Explain the origin of energy bands formation in solids.                           5 Marks

## UNIT-III

5  a)  Draw the energy band diagram and V-I characteristics of a p-n junction diode.     4 Marks
   b)  Explain the construction and working of LED.                                      5 Marks
   c)  Explain the working condition of a solar cell.                                    5 Marks

**(OR)**

6  a)  Justify the statement "All dielectrics are insulators but all insulators are not   2 Marks
       dielectrics".
   b)  Define :  i) Dielectric constant.    ii) Electric Polarisation.    iii) Polarizability.   3 Marks
   c)  Deduce the expression for electronic polarization in dielectrics.                 9 Marks

## UNIT-IV

7  a)  Define the terms critical temperature, critical magnetic field, critical current and   6 Marks
       flux quantisation of a superconductor.
   b)  State **dc** Josephson effect and **ac** Josephson effect.                         4 Marks
   c)  List any six applications of superconductors.                                     4 Marks

**(OR)**

8  a)  Define the term absorption coefficient. Explain the methods used to measure the   7 Marks
       absorption coefficients.
   b)  What are the basic necessities of an acoustically good hall?                      7 Marks

## UNIT-V

9  a)  Explain the principle factors which affect the properties of nanomaterials.       5 Marks
   b)  Discuss in detail about the fabrication of nanomaterials by pulsed laser deposition.   9 Marks

**(OR)**

10  a)  What are Miller Indices? Illustrate the steps to find the Miller indices by considering   5 Marks
        a suitable example.
    b)  What are Top Down and Bottom Up methods? Describe the process of Ball Milling    9 Marks
        technique in the fabrication of nano materials.

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