Khaja Bandanawaz University ,Kalaburagi
B.E .Module Question paper
Engineering Physics
(Common to all branches)
(Effective from the academic year 2019-20)
Semester I/II

Module 1

2 Marks

1) Define Laser.
2) Explain the term Induced Absorption.
3) Define Spontaneous Emission.
4) Define Stimulated Emission.
5) What is Population Inversion?
6) Define Fractional Index change.
7) Explain the terms
   (a) Resonant Cavity
   (b) Metastable State.
8) Define Optical Fiber.
9) What is total internal reflection?
10) Define Numerical Aperture.
11) Define angle of acceptance.

4 Marks

1) Explain the requisites of a laser system.
2) Explain the terms
   a) Resonant Cavity
   b) Pumping
   c) Lasing
   d) Active System
3) What are Laser's? Mention any two applications of Lasers.
4) Derive an Expression for Numerical Aperture of an optical Fibers.
5) Explain Point – Point communication system with a block diagram.

6 Marks / 8 Marks

1) Derive an expression for Einstein's co-efficient.
2) Explain the construction and working of semiconductor diode laser with neat diagram.
3) Explain the construction and working He-Ne laser with neat diagram.
4) Explain different types of optical fibers with its refractive index profile.
5) Define attenuation. Explain the factors responsible for fiber loss.

10 Marks

1) Define Laser Explain the construction and working He-Ne laser with neat diagram.
2) What is Population Inversion? Explain different types of optical fibers with its refractive index profile.

Module 2

2 Marks

1) What is Hall Effect?
2) Define Fermi energy.
3) What is Hall voltage?
4) What are Nanomaterials?
5) What is Carbon Nanotube?

4 Marks

1) What is Electron Concentration?
2) Mention the Expression for Electron Concentration.
3) What is Hole Concentration?
4) Mention the Expression for Hole Concentration.
5) Define Lasing and Active system.
6) Define Hook's Law.

6Marks / 8 Maraks

1) Derive an expression for Fermi-level in an intrinsic semiconductor.
2) Explain top down approach with neat figure.
3) Explain bottom up approach with neat figure.
4) Explain the properties of CNTs.
5) Mention the application of CNTs

10 Marks

1) What is Electron Concentration? Derive an expression for Fermi-level in an intrinsic semiconductor.
2) What are Nanomaterials? Explain top down & Bottom up approach with neat figure.
3) What is Hall effect? Derive an expression for Hall voltage and Hall coefficient.
4) Explain Sol-gel method and Ball-milling method for synthesis of Nanomaterials.
5) Explain the construction and working of SEM.
6) Explain the construction and working of Atomic force microscopy.
7) Explain the Arc discharge method for synthesis of CNTs.

Module 3

2 Marks

1) Define Elasticity.
2) Define Plasticity.
3) Define Young's Modulus.
4) Define Bulk Modulus.
5) Define Rigidity Modulus.
6) Define Poisson's Ratio

4 Marks

1) Explain Strain hardening.
2) Explain Strain Softening.
3) Derive the relation between Y,n,K.
4) All Numericals.

6Marks / 8 Marks

1) Define Hook's law. Explain the stress – strain diagram.
2) Obtain an expression for Bulk modulus interms of **α** and **β.**
3) Obtain an expression for Rigidity modulus interms of **α** and **β**

10 Marks

1) Explain Strain Softening & Define Hook's law. Explain the stress – strain diagram
2) Derive an Exprssion for bending of beams .
3) Derive an expression for Single cantilever

Module – 4

2 Marks

1).Define System
2).Define Thermodynamics
3). Define Sensors

4 Marks

1). Write a note on types of system
2) .Write a note Principles of sensing
3)Explain Types of thermodynamics process

6 Marks

1) Write a note on Microscopic and macroscopic approaches
2) Explain Mechanical sensor
3) Write a note on properties of thermodynamics

8 Marks

1) Derive Gibbs and Helmholtz functions
2) Explain Acoustic and Magnetic Sensor
3) Difference between ideal gas and real gases

10 Marks

1) With neat diagram Radiation and Thermal sensors
2) Define System, types of system, Types of thermodynamics process,

Module – 5

2 Marks

1) Define Space lattice.
2) Define Polymarphism.
3) Define Allotropy.

4 Marks

1) Define lattice points, unit cell, Bravais lattice and primitive cell
2) The grating space of calcite is $3.036A^0$ and for the first order Bragg reflection the glancing angle is 12^0. Find the path difference between the rays
3) Discuss the allotropy of carbon with reference to diamond and graphite

6 Marks

1) Give a qualitative explanation of perovskite crystal structure
2) Define coordination number and packing factor. Calculate the packing factor for BCC &FCC Structure

8 Marks

1) Describe briefly the seven crystal systems
2) Obtain an expression for the inter planar distance in a cubic crystal in terms of Miller indices
3) Define coordination number and packing factor. Calculate the packing factor for BCC &FCC structure

10 Marks

1) Describe Fermi level in intrinsic semiconductor and hence obtain the expression for Fermi energy in terms of energy gap of intrinsic semiconductor
2) Give a brief account for Fermi-Dirac distribution theory. Obtain the expression for Fermi energy at 0 K