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Question Paper Code: 52005

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Second Semester

Computer Science Engineering

15UPH205 - SEMICONDUCTOR PHYSICS AND OPTO ELECTRONICS

(Common to ECE and IT)

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. What happens when a material is heated? CO1- R
(a) It contracts (b) It melts (c) It expands (d) It bursts
2. Example of high resistivity material is _____ CO1- R
(a) Copper (b) Gold (c) Aluminium (d) Carbon
3. What are the charge carriers in semiconductors? CO2- R
(a) Electrons and holes (b) Electrons (c) Holes (d) Charges
4. What is the name of the continuous curve in the magnetic field, the tangent of which gives the direction of magnetic intensity? CO2- R
(a) Magnetic lines of force (b) Magnetic lines of induction
(c) Magnetic force (d) Magnetic dipole moment
5. Which of the following easily adapt itself to store electrical energy? CO3- R
(a) Passive dielectric (b) Superconductor (c) Active dielectric (d) Polar molecules
6. The phenomena of super conductors was first discovered by ____ CO3- R
(a) Kammerlingh Onnes (b) Neils bohr (c) Richard Smalley (d) Otto lehman

7. Compositional and structural differences between photonic and electronic devices _____ CO4- R
- (a) provide high efficiency (b) provide low efficiency
- (c) highly used (d) create problems
8. Optical interconnection between optoelectronic device is achieved in ___ CO4- R
- (a) Wavelength operator (b) Wavelength converter
- (c) Replication technology (d) Chip-to-chip interconnection
9. Multimode step index fiber has _____ CO5- R
- (a) Large core diameter & large numerical aperture
- (b) Large core diameter and small numerical aperture
- (c) Small core diameter and large numerical aperture
- (d) Small core diameter & small numerical aperture
10. The fibers mostly not used nowadays for optical fiber communication system are _____ CO5- R
- (a) Single mode fibre (b) Multimode step fibre
- (c) Multimode graded fibre (d) Coaxial fibre

PART – B (5 x 2= 10Marks)

11. Write the demerits of classical free electron theory. CO1- R
12. What are the Fermi levels in semiconductors? CO2- R
13. What is dielectric constant? CO3- R
14. Define Franz-Keldysh effect. CO4- R
15. What are the advantages of optical fibre cable? CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Deduce the expressions for electrical and thermal conductivity. CO1- U (16)
- Or
- (b) Deduce an expression for density of energy states. CO1- U (16)
17. (a) What is Hall Effect? Obtain expressions to find Hall coefficient and Hall voltage. Mention any two applications of Hall effect. CO2- U (16)

Or

- (b) Explain the domain theory of ferromagnetism. Also the energies involved in the domain growth. CO2- U (16)
18. (a) (i) Distinguish between soft and hard superconductors. CO3- U (8)
- (ii) Explain briefly about high temperature super conductors. CO3- U (8)
- Or
- (b) Explain the different types of polarization mechanism in dielectrics. CO3- U (16)
19. (a) What do you meant by modulation? Explain the pulse code modulation along with the required basic elements using the block diagram. CO4- U (16)
- Or
- (b) What are optical switches? Discuss the operation of the optical switches with a neat block diagram. CO4- U (16)
20. (a) (i) Illustrate the types of optical fibre cable. CO5- U (8)
- (ii) Select the use of splicing rather connectors and connect mechanical splicing and fusion splicing. CO5- U (8)
- Or
- (b) What is a fibre optic sensor? Integrate the principle and working of the temperature and pressure sensor? CO5- U (16)

