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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (2012 to 2017) (Sem.-1,2)

ENGINEERING PHYSICS

Subject Code : BTPH-101

M.Code : 54105

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

Write briefly :

1. What do you mean by a rotational and irrotational field?
2. Give the expression for Poynting vector and its physical significance.
3. Differentiate between Type-I & Type-II superconductors.
4. Define terms: unit cell, basis and space lattice.
5. Write about the basic components of a laser system.
6. What do you understand by material dispersion and pulse broadening in optical fibres?
7. Write Einstein's two postulates of special theory of relativity.
8. Derive the energy-momentum relationship.
9. What do you understand by eigen functions & eigen values in quantum mechanics?
10. What is the surface to volume ratio at nanoscale?

SECTION-B

11. a) Discuss different types of polarization in dielectrics. 3
b) Write Maxwell's equations in free space in their integral form. 2
c) Explain Electromagnetic spectrum giving basic ideas of different regions. 3
12. What is a superconducting state of a substance? Explain superconductivity on the basis of BCS theory. 8
13. a) Differentiate between continuous and characteristic X-rays. 3
b) Discuss briefly the experimental method for crystal structure determination by X-ray diffraction. 5
14. a) Differentiate between three & four level laser systems. 3
b) Discuss the construction, working and energy level diagram of He-Ne Ruby laser. 5

SECTION-C

15. a) Discuss the propagation mechanism of light waves in optical fibre. 2
b) What are single mode, multimode and graded index fibres? 3
c) Write a short note on the applications of optical fibres. 3
16. a) Explain the construction, working and result of Michelson Morley experiment. 5
b) Derive the expression for addition of velocities under relativistic motion. 3
17. a) By giving suitable examples, explain the need and origin of quantum mechanics. 4
b) Derive time-independent Schrodinger wave equation. 4
18. a) Discuss the basic difference between 0D, 1D, 2D and 3D nanomaterials. 4
b) What do you understand by carbon nanotubes and methods for their synthesis? 4

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.