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23/05/18

**Question Paper Code : 41645**

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B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018  
First Semester  
Civil Engineering  
PH 6151 – ENGINEERING PHYSICS – I  
(Common to all Branches except Marine Engineering)  
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Define inter-atomic distance and inter-planar distance.
2. What is graphite structure ?
3. What are types of Moduli of elasticity ?
4. What is radial flow of heat ?
5. Write down Schrodinger time independent and dependent wave equations.
6. What are advantages of Transmission electron microscope ?
7. Calculate the intensity level in decibel of a sound of intensity  $10^{-9} \text{ Wm}^{-2}$ .
8. List some of the properties of ultrasonics.
9. What is a metastable state ? Explain its importance in lasers.
10. The refractive index of the core and cladding of a fiber are 1.45 and 1.4 respectively. Find the numerical aperture, acceptance angle and  $\Delta$ .

PART – B

(5×16=80 Marks)

11. a) Obtain the number of lattice points per unit cell, coordination number and packing factor with reference to BCC and FCC lattices. (8+8)
- (OR)
- b) Explain any two crystal growing techniques. (8+8)



12. a) Draw stress-strain diagram and discuss the behaviour of ductile material under loading. What are effects of change in temperature in elastic bodies ? (12+4)

(OR)

- b) Derive an expression for the quantity of heat flow through a metal slab whose faces are kept at two different temperatures. Use this expression to determining the coefficient of thermal conductivity of a bad conductor by Lee's disc method. (6+10)

13. a) What is Compton effect ? Give the theory of Compton effect and show that the Compton shift  $\Delta\lambda = \frac{h}{m_0c}(1 - \cos\theta)$ . (16)

(OR)

- b) Derive an expression for energy levels of a particle enclosed in one-dimensional potential box of width  $a$  and infinite height. (16)

14. a) Derive Sabine's formula for reverberation time and explain its importance. (16)

(OR)

- b) Explain two important applications of ultrasonics as a tool for non-destructive testing. (8+8)

15. a) Explain with neat sketches the principle, construction, working and energy level diagram of Nd:YAG laser. (16)

(OR)

- b) Describe the fiber optic communication system with suitable diagram. What are the advantages of fiber optic communications ? (16)