Reg. No. :

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Question Paper Code : 51104

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

First Semester

Civil Engineering

PH 6151 – ENGINEERING PHYSICS – I

(Common to all Branches)

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10×2=20 Marks)

1. The lattice constant of a cubic crystal is $2.5 A°$. Find the lattice spacing for the following planes in the lattice : (101) and (211).

2. What are Bravais lattices ?

3. List any four factors affecting the elasticity of a material.

4. Define Newton's Law of cooling.

5. Define Wien's displacement law. Give its limitation.

6. What are the properties of matter waves ?

7. State Weber-Fechner Law.

8. List any four factors affecting acoustics of buildings.

9. Define numerical aperture.

10. Show that the stimulated emission is not possible for Sodium D line at 300°C.

PART – B   (5×16=80 Marks)

11. a) i) Explain the construction and working of Bridgman techniques for growing crystals with its advantages.   (12)

   ii) A crystal has primitives of 1 A°, 2 A° and 3 A°. A plane (321) cuts an intercept of 1 A° along the X-axis. Find the intercepts of the plane along the other two axes.   (4)

(OR)

   b) Show that in ideal hexagonal closed packed structure c/a ratio is 1.663 and the density of atomic packing factor equals to that of the face-centered cubic structure.   (6+4+6)

12. a) Derive an expression for the internal bending moment of a beam in terms of radius of curvature. Elaborate the internal bending moment expression for rectangular cross section and circular cross section.   (16)

(OR)

   b) Derive the equation for one dimensional flow of heat expression and solve it under steady state condition.   (16)

13. a) Explain Compton effect and derive an expression for the wavelength of scattered photon, also briefly explain its experimental verification.   (16)

(OR)

   b) Derive in time dependent Schrödinger wave equation and hence deduce the time independent Schrödinger wave equation.   (8 + 8)

14. a) i) Describe in detail the production of ultrasonic waves by Magnetostriction method.   (10)

   ii) Describe the method of determining the velocity of ultrasonic waves using acoustic grating.   (6)

(OR)

   b) Drive Sabine's formula for the reverberation time of an auditorium and explain how it can be used to determine the absorption coefficient of a material. (16)

15. a) Explain in detail how optical fibers are characterized according to the material, refractive index and modes of propagation.   (16)

(OR)

   b) Explain the construction and working of Nd : YAG laser with its advantages. (16)

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