Reg. No. :

Question Paper Code : X 67602

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020
First Semester
Civil Engineering
HS 1102 – ENGINEERING PHYSICS – I
(Common to all Branches)
(Regulations 2008)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. Mention the disadvantages of magnetostriction oscillator.
2. What are the properties of ultrasonic waves ?
3. A laser beam has a bandwidth of 2800 Hz. Obtain the coherence length.
4. What are Einstein's coefficients ? Show that they are inter related.
5. What is the principle of propagation of light through optical fibres ? State the conditions to achieve it.
6. Differentiate step index and graded index fibres.
7. State Wien's law.
8. An electron is trapped in an one dimensional box length of 0.1 nm. Calculate the energy required to excite the electron from its ground state to the fifth excited state.
9. Lead is a FCC with an atomic radius of 1.746 Å. Find the spacing of (a) 200 planes and (b) 220 planes.
10. What are the procedures for finding Miller indices ?

PART – B **(5×16=80 Marks)**

11. a) Explain the principle, construction and working of a magnetostriction oscillator to produce ultrasonic waves.

(OR)

b) Explain in detail how SONAR is employed to locate objects. Also, detail the applications of ultrasonics in industries, engineering fields and in medicine.

12. a) Describe the principle, construction and working of heterojunction semiconducting laser with necessary diagram.

(OR)

b) Explain the principle of Holography. How will you create a hologram of an object and recreate the image of the original object.

13. a) i) Derive an expression for the propagation of light through optical fibers. **(8)**

ii) Discuss in detail the classification of optical fibres on the basis of materials, mode and refractive index profile. **(8)**

(OR)

b) i) Briefly describe the various losses encountered in optical fibres. **(8)**

ii) With a neat block diagram explain the salient features of a fiber optic communication system. **(8)**

14. a) Describe an expression for the Compton shift and how it can be verified experimentally.

(OR)

b) Derive the time independent Schrödinger wave equation and by using it, find the wave function a particle in 1-D box.

15. a) Explain the crystal structures of NaCl, ZnS and Diamond.

(OR)

b) Define packing factor and obtain the equation to find packing factor for HCP structure.

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