

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 41013**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

First Semester

Civil Engineering

14UPH103 – ENGINEERING PHYSICS

(Common to ALL branches)

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 1 = 10 Marks)

1. Ultrasonic is basically

- |                             |                        |
|-----------------------------|------------------------|
| (a) a magnetic wave         | (b) an inaudible sound |
| (c) an electromagnetic wave | (d) an audible sound   |

2. SONAR stands for

- |                                  |                                    |
|----------------------------------|------------------------------------|
| (a) Sound Noise and Reduction    | (b) Sound Navigation and Reduction |
| (c) Sound Navigation and Ranging | (d) Sound Noise and Ranging        |

3. Optical resonators

- |                               |   |
|-------------------------------|---|
| (a) acts as pumping mechanism | (b) provide positive feedback and amplification |
| (c) provide feedback only     | (d) none of the above                           |

4. The principle of semi conductor laser is

- |                       |                    |
|-----------------------|--------------------|
| (a) Forward biased    | (b) Reverse biased |
| (c) Energy of photons | (d) None of these  |

5. The principle of propagation of light through optical fibre is

- |                               |                |
|-------------------------------|----------------|
| (a) Total Internal Reflection | (b) Refraction |
| (c) Diffraction               | (d) Reflection |

6. Joining of two fibres is called as
- (a) Welding                      (b) Soldering                      (c) Splicing                      (d) Sensor
7. In Compton scattering, at what angle of scattering, the wavelength of the scattered photon will be maximum
- (a)  $0^{\circ}$                       (b)  $90^{\circ}$                       (c)  $180^{\circ}$                       (d)  $120^{\circ}$
8. In electron microscope the focussing effect is due to
- (a) Lens    (b) Electromagnetic field  
(c) Prism    (d) Aperture
9. Which of the following has simple cubic structure?
- (a) Copper                      (b) Aluminium                      (c) Magnesium                      (d) Polonium
10. The primitives are equal and interfacial angles are equal to  $90^{\circ}$  is called
- (a) Cubic                      (b) mono clinic                      (c) Tri clinic                      (d) hexagonal

PART - B (5 x 2 = 10 Marks)

11. Name the methods of detection of Ultrasonics.
12. Define Laser welding.
13. What is meant by fibre optic sensor?
14. State Plank's radiation law.
15. Define the term unit cell.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) How Ultrasonic waves can be produced by using Piezo-electric Oscillator. Mention any two applications of Ultrasonics. (12)
- (ii) A quartz crystal of thickness  $2 \times 10^{-8} \text{m}$  is vibrating at resonance. Calculate the fundamental frequency of oscillation in a Piezo-electric oscillator if the Young's Modulus of the crystal is  $8.69 \times 10^{10} \text{N/m}^2$  and density of the crystal is  $2.65 \times 10^3 \text{Kg/m}^3$ . (4)

Or

- (b) (i) Describe the method of determining velocity of ultrasonic waves using Acoustic Grating. (10)
- (ii) Explain in detail various scanning methods using ultrasonic waves. (6)
17. (a) (i) Derive the relationship between probability of spontaneous emission and stimulated emission in terms of Einstein's coefficients. (6)
- (ii) With suitable energy level diagram describe the construction and working of CO<sub>2</sub> laser. (10)

Or

- (b) (i) Discuss the construction and working of the Homo Junction Semiconductor Laser. (10)
- (ii) What is Holography? Explain the construction and reconstruction of a Hologram. (6)
18. (a) Classify the optical fibers on the basis of Materials, Modes of propagation and Refractive Index difference. (16)

Or

- (b) (i) With a block diagram describe the Fiber Optic Communication system. (10)
- (ii) Discuss the working of a Fiber Optic Endoscope and mention its uses. (6)
19. (a) Arrive Schrodinger's time independent wave equation and apply the same for particle in one dimensional box to calculate Eigen value and Eigen function. (16)

Or

- (b) Define Compton effect. Derive an expression for the wavelength of the scattered photon and explain its experimental verification. (16)
20. (a) (i) Define Miller indices? What are the procedure to calculate the Miller Indices? Derive an expression for the interplanar spacing for (hkl) planes of a cubic structure. (10)
- (ii) Calculate the coordination number, atomic radius and atomic packing factor for Simple Cubic (SC) and Body Centered Cubic (BCC). (6)

Or

- (b) (i) Discuss the structure of HCP. Obtain the relation between  $c$  and  $a$  and hence calculate the atomic packing factor of HCP. (10)
- (ii) Discuss the line defect and surface defect of a crystal. (6)
-