

Reg. No. :

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

Question Paper Code: 41003

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

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)

- Ultra sonics are sound waves having frequency.
 - Less than 20 Hz
 - Greater than 20000 Hz
 - Between 20 Hz and 20000 Hz
 - Greater than 20 Hz
- SONAR stands for
 - Sound Noise and Reduction
 - Sound Navigation and Reduction
 - Sound Navigation and Ranging
 - Sound Noise and Ranging
- The rate of stimulated emission is equal to _____
 - $R_{21}(ST) = B_{21} N_1 N_2$
 - $R_{21}(ST) = B_{21} \rho \gamma N_1$
 - $R_{21}(ST) = B_{21} \rho \gamma N_2$
 - none of these
- The principle of semi conductor laser is
 - Forward biased
 - Reverse biased
 - Energy of photons
 - None of these
- The principle of propagation of light through optical fibre is
 - Total Internal Reflection
 - Refraction
 - Diffraction
 - 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° (b) 90° (c) 180° (d) 120°
8. In electron microscope the focussing effect is due to
- (a) Lens (b) Electromagnetic field
(c) Prism (d) Aperture
9. The co-ordination number of BCC structure is
- (a) 6 (b) 8 (c) 12 (d) 16
10. In BCC structure the packing density of crystal is equal to
- (a) $\frac{\sqrt{3}\pi}{8}$ (b) $\frac{\sqrt{3}}{8}\pi$ (c) $\frac{\sqrt{3}\pi}{8}$ (d) none of these

PART - B (5 x 2 = 10 Marks)

11. Mention any two applications of SONAR.
12. Define Laser welding.
13. What is meant by fibre optic sensor?
14. State Plank's radiation law.
15. Define: Bravais Lattice.

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) Find the depth of a submerged submarine if an ultrasonic wave is received after 0.33 sec from the time of transmission. Given: The velocity of ultrasonic waves in sea water = 1440 m/s. (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) Explain the modes of vibrations of CO_2 molecules. Describe the construction and working of CO_2 laser with necessary energy level diagrams. (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) Derive planks law of radiation and hence deduce Wien's displacement law and Rayleigh Jeans law. (16)

Or

- (b) Define Compton effect. Derive an expression for the wavelength of the scattered photon and explain its experimental verification. (16)
20. (a) Describe HCP structure. Give details about number of atoms per unit cell, coordination number, atomic radius, axial ratio and packing factor. (16)

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)

