

# Dronacharya Group of Institutions, Gr. Noida

## Department of Applied Sciences (First Year)

Even Semester (2020-2021)

### Objective Question Bank

**Subject Name & Code:** ENGINEERING PHYSICS & KAS-201T

---

**Unit No.& Unit Name:** 5th & Fibre Optics & Laser

1. What is the full form of LASER?
  - a) Light Absorbent and Stimulated Emission of Radiations
  - b) Light Absorbing Solar Energy Resource
  - c) Light Amplification by Stimulated Emission of Radiations
  - d) Light Amplification of Singular Emission of Radiations
2. In Stimulated Absorption, what is the lifetime of atoms ground state?
  - a) 1 second
  - b) 1 minute
  - c) 1 hour
  - d) Infinity
3. Phonons are \_\_\_\_\_
  - a) Quanta of energy
  - b) Quanta of light waves
  - c) Quanta of sound waves
  - d) Quanta of heat
4. Which of the following is not a characteristic of LASERS?
  - a) Monochromatic
  - b) Coherent
  - c) Divergent
  - d) Intense
5. Laser is used in LIDAR for what purpose?
  - a) High-Speed Photography
  - b) Range finder
  - c) Optical Carrier signal
  - d) Drilling
6. The output of a laser has pulse duration of 30 ms and average output power of 1 W per pulse. How much energy is released per pulse if wavelength is 6600 Å?
  - a) 0.001 J

- b) 0.002 J
- c) 0.003 J
- d) 0.004 J

7. Laser light from a 2mW source of aperture diameter 1.5 cm and wavelength 5000 Å is focused by a lens of focal length 20 cm. The intensity of the image is \_\_\_\_\_

- a)  $1.57 \times 10^6 \text{ Wm}^{-2}$
- b)  $2.57 \times 10^6 \text{ Wm}^{-2}$
- c)  $3.57 \times 10^6 \text{ Wm}^{-2}$
- d)  $4.57 \times 10^6 \text{ Wm}^{-2}$

8. For an ordinary light source, the coherence time  $t = 10^{-10}$  s. The degree of Monochromaticity for a wavelength of 6000 Å is \_\_\_\_\_

- a)  $0.1 \times 10^{-4}$
- b)  $0.2 \times 10^{-4}$
- c)  $0.3 \times 10^{-4}$
- d)  $0.4 \times 10^{-4}$

9. Lasers are used for welding of wires because they can be focused onto a fine spot.

- a) True
- b) False

10. The information carrying capacity of laser is enormous due its large \_\_\_\_\_

- a) Coherence
- b) Bandwidth
- c) Directionality
- d) Intensity

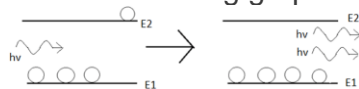
11. Which characteristic of LASER allows it to be used in holography?

- a) Coherency
- b) Directionality
- c) Intensity
- d) Monochromaticity

12. What is the region enclosed by the optical cavity called?

- a) Optical Region
- b) Optical System
- c) Optical box
- d) Optical Resonator

13. The following graph is pictorial representation of \_\_\_\_\_



- a) Spontaneous emission
- b) Spontaneous Absorption
- c) Stimulated emission
- d) Stimulated Absorption

14. Which of the following is a unique property of laser?

- a) Directional
- b) Speed

- c) Coherence
- d) Wavelength

15 Which of the following is an example of optical pumping?

- a) Ruby laser
- b) Helium-Neon laser
- c) Semiconductor laser
- d) Dye laser

16. When laser light is focussed on a particular area for a long time, then that particular area alone will be heated.

- a) True
- b) False

17. Calculate the number of photons, from green light of mercury ( $\lambda = 4961 \text{ \AA}$ ), required to do one joule of work.

- a)  $4524.2 \times 10^{18}/\text{m}^3$
- b)  $2.4961 \times 10^{18}/\text{m}^3$
- c)  $2.4961/\text{m}^3$
- d)  $2.4961/\text{m}$

18. Which of the following can be used for the generation of laser pulse?

- a) Ruby laser
- b) Carbon dioxide laser
- c) Helium neon laser
- d) Nd- YAG laser

19. What is the need to achieve population inversion?

- a) To excite most of the atoms
- b) To bring most of the atoms to ground state
- c) To achieve stable condition
- d) To reduce the time of production of laser

20. Laser is called as a non-material knife.

- a) False
- b) True

21. DVD uses the laser.

- a) True
- b) False

22. Which of the following is used in atomic clocks?

- a) Laser
- b) Quartz
- c) Maser
- d) Helium

23. Which of the following can be used in the vibrational analysis of structure?

- a) Maser
- b) Quarts
- c) Electrical waves
- d) Laser

24. Which of the following is a unique property of laser?

- a) Directional
- b) Speed
- c) Coherence
- d) Wavelength

25. Which of the following is an example of optical pumping?

- a) Ruby laser
- b) Helium-Neon laser
- c) Semiconductor laser
- d) Dye laser

## FIBRE OPTICS

1. What is the principle of fibre optical communication?

- a) Frequency modulation
- b) Population inversion
- c) Total internal reflection
- d) Doppler Effect

2. What is the other name for a maximum external incident angle?

- a) Optical angle
- b) Total internal reflection angle
- c) Refraction angle
- d) Wave guide acceptance angle

3. A single mode fibre has low intermodal dispersion than multimode.

- a) True
- b) False

4. How does the refractive index vary in Graded Index fibre?

- a) Tangentially
- b) Radially
- c) Longitudinally
- d) Transversely

5. Which of the following has more distortion?

- a) Single step-index fibre
- b) Graded index fibre
- c) Multimode step-index fibre
- d) Glass fibre

6. In which of the following there is no distortion?

- a) Graded index fibre
- b) Multimode step-index fibre
- c) Single step-index fibre
- d) Glass fibre

7. Which of the following loss occurs inside the fibre?

- a) Radiative loss
- b) Scattering
- c) Absorption
- d) Attenuation

8. What causes microscopic bend?

- a) Uniform pressure
- b) Non-uniform volume
- c) Uniform volume
- d) Non-uniform pressure

9. When more than one mode is propagating, how is it dispersed?

- a) Dispersion
- b) Inter-modal dispersion
- c) Material dispersion
- d) Waveguide dispersion

10. A fibre optic telephone transmission can handle more than thousands of voice channels.

- a) True
- b) False

11. Which of the following is known as fibre optic back bone?

- a) Telecommunication
- b) Cable television
- c) Delay lines
- d) Bus topology

12. Calculate the numerical aperture of an optical fibre whose core and cladding are made of materials of refractive index 1.6 and 1.5 respectively.

- a) 0.55677
- b) 55.77
- c) 0.2458
- d) 0.647852

13. A step-index fibre has a numerical aperture of 0.26, a core refractive index of 1.5 and a core diameter of 100micrometer. Calculate the acceptance angle.

- a)  $1.47^\circ$
- b)  $15.07^\circ$
- c)  $2.18^\circ$
- d)  $24.15^\circ$

14. Fiber optics was invented by .....

- a) Thomas Mensah
- b) Thomas Edison
- c) John Henry Holmes
- d) None of the above

Q15. Fiber optic cable operate at frequencies near

- a) 2 GHz
- b) 20 MHz
- c) 200 MHz
- d) 800 THz

Q16. Which is the most beneficial index profile in single mode fibers?

- a) Step index
- b) Coaxial cable
- c) Graded index
- d) Step and graded index

Q17. Which of the following statistics are used for calculations of strengths of optical fibers?

- a) Edwin statistics
- b) Gamma statistics
- c) Newton statistics
- d) Wei-bull statistics

Q18. The micro-bending losses are depend on .....

- a) Diameter
- b) Core material
- c) Refractive index
- d) Mode and wavelength

Q19. Which of the following can induce a considerable amount of attenuation in optical fibers?

- a. Dispersion
- b. Micro-bending
- c. Radiation Exposure
- d. Diffusion of hydrogen

Q20. .... categories exists in case of cable design.

- a. 2
- b. 3
- c. 4
- d. 5

Q21. Which of the following is described by the concept of numerical aperture in an optical fibre?

- a. Light scattering
- b. Light collection
- c. Light dispersion
- d. Light polarisation

Q22. .... are not used nowadays for optical fibre communication system.

- a. Coaxial cable
- b. Multimode fibre
- c. Single-mode fibre
- d. Multimode graded-index fibres

Q23. Which component provides additional strength and prevents the fiber from any damage?

- a. Core
- b. Cladding

- c. Buffer Coating
- d. None of the above

Q24. Which kind of dispersion phenomenon gives rise to pulse spreading in single mode fibers?

- a. Material
- b. Intermodal
- c. Intramodal
- d. None of the above

Q25. Which of the following is the width of the range of wavelengths emitted by the light source?

- a. Bandwidth
- b. Beamwidth
- c. Spectral width
- d. Chromatic Dispersion

Q26. When a beam of light enters one medium from another, ..... will not change?

- a. Speed
- b. Direction
- c. Frequency
- d. Wavelength