

University of Mumbai
Sample Question Paper
Examination – 2020 Semester-II

0212_R16_FE_II_FEC202_QP1

1) What is the half angular width of the central bright maximum in the Fraunhofer diffraction pattern of a slit of width $12 \times 10^{-7} \text{ m}$ when the slit is illuminated by monochromatic light of wavelength 6000 \AA .

- A. 20°
- B. 30°
- C. 40°
- D. 50°

2) The angular separation between the central maximum and first order minimum of the diffraction pattern due to a single slit of width 0.25 mm , when light of wavelength 5890 \AA is incident normally on the slit, is _____

- A. 7.1 minute
- B. 8.1 minute
- C. 9.1 minute
- D. 10.1 minute

3) Monochromatic light of wavelength 590 nm is incident normally on a plane diffraction grating having $4 \times 10^5 \text{ lines m}^{-1}$. An interference pattern is produced.

What is the highest order visible in this interference pattern?

- A. 2
- B. 3
- C. 4
- D. 5

4) A diffraction grating has 4000 lines per cm. The angle between the central maximum and the third order maximum is 36° . What is the wavelength of the light?

- A. 240 nm
- B. 490 nm
- C. 570 nm
- D. 620 nm

5) In multimode graded index fibre, light rays travel _____ in different parts of the fibre.

- A. at different speeds
- B. with same speed
- C. both a and b
- D. none of the above

6) In the population inversion

- A. The number of electrons in higher energy state is more than ground state
- B. The number of electrons in lower energy state is more than higher energy state
- C. The number of electrons in lower energy state and higher energy state are same
- D. None of them

7) Which of the laser have very low efficiency

- A. Ruby
- B. He- Ne
- C. Semiconductor
- D. Ammonia gas laser

8) The method of achieving population inversion in He- Ni Laser is

- A. Optical pumping
- B. inelastic Scattering
- C. forward biasing
- D. chemical reaction

9) In a semiconductor laser, the doping concentration is so high that the Fermi level in N type diode lies

- A. Center of energy gap
- B. Top of valence band
- C. Bottom of conduction band
- D. Inside the conduction band

10). If a hologram is illuminated by white light it will form

- A. Colorful image
- B. will not form image
- C. Single color image
- D. red image in black and white

11. . Nanobiotechnology deals with materials of the size _____ m.

- A. $1 / 100000000$
- B. $1 / 10000000$
- C. $1 / 1000000000$
- D. $1 / 10000000000$

12. What are the approaches used in making nano systems?

- A. Top down.
- B. Bottom up.

C. Both a and B.

D. Neither a nor b

13. TEM is _____.

A. Transmission Electron Microscope.

B. Transmit Electron Microscope.

C. Transmission Electrical Microscope.

D. Transmit Electrical Microscope.

14. The divergence of which quantity will be zero?

A. E

B. D

C. H

D. B

15 Find the Maxwell equation derived from Faraday's law.

A. $\text{Div}(\mathbf{H}) = \mathbf{J}$

B. $\text{Div}(\mathbf{D}) = \mathbf{I}$

C. $\text{Curl}(\mathbf{E}) = -\frac{d\mathbf{B}}{dt}$

D. $\text{Curl}(\mathbf{B}) = -\frac{d\mathbf{H}}{dt}$

16. Find the electric flux density of a material with charge density 16 units in unit volume.

A. 1/16

B. 16t

C. 16

D. 162

17. Interference of light is evidence that:

- A. the speed of light is very large
- B. light is a transverse wave
- C. light is electromagnetic in character
- D. light is a wave phenomenon

18. In a Young's double-slit experiment the center of a bright fringe occurs wherever waves from the slits differ in the distance they travel by a multiple of:

- A. a fourth of a wavelength
- B. a half a wavelength
- C. a wavelength
- D. three-fourths of a wavelength

19. In a Young's double-slit experiment, the slit separation is doubled. To maintain the same fringe spacing on the screen, the screen-to-slit distance D must be changed to:

- A. $D/2$
- B. $D/2$
- C. D^2
- D. $2D$