07/08_EP-II_FE_Sem II (R-19)_Inst Name

University of Mumbai

* Required

Sub_PART-A

1. *

Grating element of a diffraction grating is defined as the_____

Mark only one oval.

- sum of slit width and opaque space width
- difference of slit width and opaque space width
- square of the slit width
- opaque space width

2. *

	A parallel beam of monochromatic light of wavelength $5000A^0$ is normally incident on a single slit. If the angle at which the first order minima observed is 30^0 ,What is the width of the slit?
Option A:	$2.6X10^{-3}m$
Option B:	$2X10^{-4}cm$
Option C:	$3.5X10^{4}m$
Option D:	$1X10^{-4}cm$

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

3. *

Deduce the missing orders in a diffraction pattern through grating if the slit widths are 0.14mm and they are 0.7mm apart.

Mark only one oval.

- 3rd, 6th, 9th etc. order spectra
- 2th, 4th, 6th etc. order spectra
- 6th, 12th, 18th etc. order spectra
- 4th, 8th, 12th etc. order spectra

4. *

In holography, which of the following optical phenomena are involved?

Mark only one oval.

- interference, refraction
- interference, diffraction
- reflection, diffraction
- polarization, diffraction

5. *

In Graded index fibre, the refractive index of the core _____ from the axis of the fibre.

Mark only one oval.

- sharply increases
- abruptly changes
- gradually increases
- gradually decreases

6. *

	In an optical fibre, the core material has refractive index 1.6 and refractive index of clad material is 1.3. What is the value of critical angle?
Option A:	50.6^0
Option B:	54.3^0
Option C:	65.5^0
Option D:	53.4^0

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

7. *

The numerical aperture of an optical fibre is 0.5 and refractive index of the core is 1.54. Find the refractive index of cladding.

Mark only one oval.

- 1.457
- 2.623
- 1.007
- 1.892

8. *

	For a solenoidal vector point function, which one of the following is true?
Option A:	$\nabla \times \mathbf{V}=\mathbf{0}$
Option B:	$\nabla \times \mathbf{V}=\frac{\rho}{\xi_o}$
Option C:	$\nabla . \mathbf{V}=\frac{\rho}{\xi_o}$
Option D:	$\nabla . \mathbf{V}=0$

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

9. *

In Gauss law of magnetism, $\nabla . \mathbf{B}=0$ signifies that

Mark only one oval.

- there is no dipole in magnetism
- there is no monopole in magnetism
- there is no monopole in electrostatics
- there is no dipole in electrostatics

10. *

	If $\vec{D} = \rho_0 z\hat{k}$, the value of Charge density will be
Option A:	$\rho = 2\rho_0$
Option B:	$\rho = \rho_0^2$
Option C:	$\rho = \rho_0$
Option D:	$\rho = \rho_0 z$

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

11. *

The length of a rod in a moving frame will be _____ to the observer in a rest frame.

Mark only one oval.

- unchanged
- dilated
- contracted
- doubled

12. *

	At what speed the mass of an object will be three times of its value at rest.
Option A:	$v = 2.83 \times 10^{8}\ m/sec$
Option B:	$v = 1.67 \times 10^{8}\ cm/sec$
Option C:	$v = 3.92 \times 10^{7}\ m/sec$
Option D:	$v = 0.67 \times 10^{-8}\ m/sec$

Mark only one oval.

- Option A:
- Option B:
- Option C:
- Option D:

13. *

Which of the following is not an example for bottom-up approach of synthesizing nanomaterials?

Mark only one oval.

- Sol-gel
- Molecular self-assembly
- Ball milling
- chemical vapour deposition

14. *

AFM works under the principle of

Mark only one oval.

- Boltzmann distribution law
- Pyroelectric effect
- Hook's law
- magnetostriction effect

15. *

Compared to bulk material, nanomaterial has

Mark only one oval.

- high volume/surface ratio
- high surface/volume ratio
- high size/volume ratio
- high density/volume ratio