

# University of Mumbai

## Examination 2020

Program: First Year Engineering

Curriculum Scheme: REV- 2016

Examination: First Year Semester II

Course Code: FEC202 and Course Name: Applied Physics-II

Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	If instead of monochromatic light white light is used for interference of light, what would be the change in the observation?
Option A:	The pattern will not be visible
Option B:	The shape of the pattern will change from hyperbolic to circular
Option C:	Colored fringes will be observed with a white bright fringe at the center
Option D:	The bright and dark fringes will change position
Q2.	Which of the following is an example of optical pumping?
Option A:	Nd:Yag laser
Option B:	Helium-Neon laser
Option C:	Semiconductor laser
Option D:	Dye laser
Q3.	Find the divergence of the vector $y_i + z_j + x_k$ .
Option A:	-1
Option B:	0
Option C:	1
Option D:	3
Q4.	The principle of generation of the wavefront from an object from a hologram can be used for _____
Option A:	Data Storage
Option B:	Transient Microscopy
Option C:	Interferometry
Option D:	Pattern recognition
Q5.	The color of the nano gold particles is _____
Option A:	$10^{-5}$
Option B:	$10^{-9}$
Option C:	$10^{-6}$
Option D:	$10^{-8}$
Q6.	A fibre cable has an acceptance angle of $30^\circ$ and core index of R.I 1.4. Calculate R.I of cladding.
Option A:	1.3
Option B:	1.6
Option C:	1.7
Option D:	1.8

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Q7.	Find the area of rectangle in $z=5$ plane with $-1 \leq x \leq 3$ and $0 \leq y \leq 5$
Option A:	$10 \text{ m}^2$
Option B:	$15 \text{ m}^2$
Option C:	$20 \text{ m}^2$
Option D:	$25 \text{ m}^2$
Q8.	A thin layer of colorless oil is spread over water in a container ( $\mu = 1.4$ ). If the light of wavelength 640 nm is absent in the reflected light, what is the minimum thickness of oil layer?
Option A:	179.6 nm
Option B:	198.3 nm
Option C:	207.6 nm
Option D:	214.3 nm
Q9.	C.R.O gives _____
Option A:	many characteristics of a signal can be measured
Option B:	only a few characteristics of a signal can be measured
Option C:	no characteristics of a signal can be measured
Option D:	signal can only be displayed
Q10.	In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of _____
Option A:	Light Collection
Option B:	Light Scattering
Option C:	Light Dispersion
Option D:	Light Polarization
Q11.	The shape of the fringes observed in interference is _____
Option A:	Straight
Option B:	Circular
Option C:	Hyperbolic
Option D:	Elliptical
Q12.	Calculate V number of an Optical fiber having numerical aperture 0.25 and core diameter $20 \mu\text{m}$ if its operated at $1.55 \mu\text{m}$
Option A:	5.1
Option B:	10.1
Option C:	15.1
Option D:	20.1
Q13.	The relation between vector potential and field strength is given by
Option A:	Gradient
Option B:	Divergence
Option C:	Curl
Option D:	Del operator

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Q14.	If size of nano particle reduces, surface to volume ratio will _____
Option A:	Increases
Option B:	Decreases
Option C:	Remains same
Option D:	Become zero
Q15.	How shall a diffraction pattern change when white light is used instead of a monochromatic light?
Option A:	The pattern will no longer be visible
Option B:	The shape of the pattern will change from hyperbolic to circular
Option C:	The colored pattern will be observed with a white bright fringe at the center
Option D:	The bright and dark fringes will change position
Q16.	Curl of gradient of a vector is
Option A:	Unity
Option B:	Zero
Option C:	Null vector
Option D:	Depends on the constants of the vector
Q17.	The brightest spot, on a cathode ray screen, occurs at
Option A:	The centre
Option B:	The outer periphery
Option C:	Midway between centre and outer periphery of screen
Option D:	Brightness is same all over the screen
Q18.	In Newton's ring experiment, the diameter of the 10 <sup>th</sup> ring changes from 1.40 to 1.23 cm when a liquid is introduced between the lens and glass plate. What is the refractive index of the liquid?
Option A:	1.05
Option B:	1.15
Option C:	1.25
Option D:	1.35
Q19.	In holographic data storage, the information is stored in _____
Option A:	Pendrives
Option B:	Cells
Option C:	Crystals
Option D:	Diode
Q20.	Which are the synthesis method of nanotechnology?
Option A:	Top-down
Option B:	Bottom -UP
Option C:	Both a and b
Option D:	Induced absorption
Q21.	During Population inversion, which of the following processes is dominant?
Option A:	Stimulated Absorption
Option B:	Stimulated Emission

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Option C:	Spontaneous Emission
Option D:	Spontaneous Absorption
Q22.	If the Fresnel's distance is $a$ , then what should be the distance of the screen from the slit, $d$ , such that ray optics is no longer valid?
Option A:	$d > a$
Option B:	$d < a$
Option C:	$d = a$
Option D:	No relation between $d$ and $a$
Q23.	Electron beam is deflected in _____
Option A:	1 direction
Option B:	4 directions
Option C:	3 directions
Option D:	2 directions
Q24.	Divergence of gradient of a vector function is equivalent to
Option A:	Laplacian operation
Option B:	Curl operation
Option C:	Double gradient operation
Option D:	Null vector
Q25.	A screen is placed 2m away from the lens to obtain the diffraction pattern in the focal plane of the lens in a single slit diffraction experiment. What will be the slit width if the first minimum lies 5 mm on either side of the central maximum when plane light waves of wavelength $4000 \text{ \AA}$ are incident on the slit?
Option A:	0.16 mm
Option B:	0.26 mm
Option C:	0.36 mm
Option D:	0.46 mm