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: 2 hour Max. Marks: 60

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Q.1 **30 Marks**	**Choose the correct option for the following questions. All the Questions are compulsory and carry equal marks.**
1.	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
2.	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
3.	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
4.	The shape of the fringes observed in interference is _____
Option A:	Straight
Option B:	Circular
Option C:	Hyperbolic
Option D:	Elliptical
5.	Calculate V number of an Optical fiber having numerical aperture 0.25 and core diameter 20 µm if its operated at 1.55 µm
Option A:	5.1
Option B:	10.1
Option C:	15.1
Option D:	20.1
6.	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
7.	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
8.	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
9.	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
10.	In holographic data storage, the information is stored in _____
Option A:	Pendrives
Option B:	Cells
Option C:	Crystals
Option D:	Diode
11.	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
12.	During Population inversion, which of the following processed is dominant?
Option A:	Stimulated Absorption
Option B:	Stimulated Emission
Option C:	Spontaneous Emission
Option D:	Spontaneous Absorption
13.	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
14.	Electron beam is deflected in _____

Option A:	1 direction
Option B:	4 directions
Option C:	3 directions
Option D:	2 directions
15.	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
Q.2 15 marks	**Solve any 3 out of 5** **5 Marks each**
A	In Newton's ring experiment, the diameter of the 10^{th} 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?
B	Explain the use of grating in determination of wavelength of light.
C	A fiber cable has an acceptance angle of 30º and core index of R.I 1.4. Calculate R.I of cladding.
D	Write a short note on Holography.
E	Derive Maxwell's first equation Integral and differential form.

Q.3 15 marks	**Solve any 3 out of 5** **5 Marks each**
A	Derive a formula for condition for maxima for reflected light for thin film.
B	Derive a formula for acceptance angle.
C	Convert P (10, $\pi/6$, $\pi/3$) in cylindrical co-ordinate.
D	Explain the formation of multiple spectra with grating.
E	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 Å are incident on the slit?