Course Code: FEC 202   **Course Name: Applied Physics -II**
Time: 1 hour   Max. Marks: 50

===

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

Q1.	Consider a multimode step index fibre with μ_1 = 1.53, μ_2 = 1.50 and λ= 1 µm. If the core radius is 50 µm, calculate the number of guided modes.
Option A:	5600
Option B:	**4484**
Option C:	3800
Option D:	6800
Q2.	In Newton's Ring experiments , the diameter of bright rings is proportional to
Option A:	**Square root of Odd Natural numbers**
Option B:	Natural Number
Option C:	Even Natural Number
Option D:	Square root of natural number
Q3.	Which of the following loss occurs inside the fibre?
Option A:	Radiative loss
Option B:	**Scattering**
Option C:	Absorption
Option D:	Attenuation
Q4.	Nanomaterials are the materials with at least one dimension measuring less than _____
Option A:	1 nm
Option B:	10 nm
Option C:	**100 nm**
Option D:	1000 nm
Q5.	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.
Option A:	1.47°
Option B:	**15.07°**
Option C:	2.18°
Option D:	24.15°
Q6.	Antireflection coating is helps in which case of the following?

Option A:	**Minimizing the reflection of light from top surface**
Option B:	To absorb and control the amount of light entering into the medium
Option C:	To allow maximum light to reflect from top surface
Option D:	To allow minimum light to enter into the medium
Q7.	The divergence of which quantity will be zero?
Option A:	E
Option B:	D
Option C:	H
Option D:	**B**
Q8.	An electron enters a uniform magnetic field B= 0.23 x 10^{-2} wb/m^2 at 45° angle to B. Determine pitch of helical path Assume electron speed to be 3 x 10^7 m/sec
Option A:	**3.29 mm**
Option B:	8.90 mm
Option C:	6.75 mm
Option D:	4.65 mm
Q9.	Which of the following laws do not form a Maxwell equation?
Option A:	**Planck's law**
Option B:	Gauss's Law
Option C:	Faraday's law
Option D:	Ampere's Law
Q10.	During TEM, a vacuum is created inside the _____
Option A:	room of operation
Option B:	specimen
Option C:	**column**
Option D:	ocular system
Q11.	Find the gradient of t = x2y+ ez at the point p(1,5,-2)
Option A:	i + 10j + 0.135k
Option B:	**10i + j + 0.135k**
Option C:	i + 0.135j + 10k
Option D:	10i + 0.135j + k
Q12.	An electron is accelerated through a potential difference of 18 kv in a colur TV cathode ray tube. Calculate the kinetic energy of the electron
Option A:	40 x 10^{-16} J
Option B:	**28.8 x 10^{-16} J**
Option C:	15.67 x 10^{-16} J
Option D:	39.67 x 10^{-16} J
Q13.	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.
Option A:	**0.55677**

Option B:	55.77
Option C:	0.2458
Option D:	0.647852
Q14.	To find prominent diffraction , the size of diffraction object should be
Option A:	greater than wavelength of light used
Option B:	**comparable to order of wavelength of light**
Option C:	less than wavelength of light used
Option D:	none of these
Q15.	Which of the following is the application of nanotechnology to food science and technology?
Option A:	Agriculture
Option B:	Food safety and biosecurity
Option C:	Product development
Option D:	**All of the above**
Q16.	Determine the divergence of F = 30 i + 2xy j + 5xz2 k at (1,1,-0.2) and state the nature of the field.
Option A:	1, solenoidal
Option B:	**0, solenoidal**
Option C:	1, divergent
Option D:	0, divergent
Q17.	Which of the following theorem use the curl operation?
Option A:	Green's theorem
Option B:	Gauss Divergence theorem
Option C:	**Stoke's theorem**
Option D:	Maxwell equation
Q18.	Find the Maxwell law derived from Ampere law.
Option A:	Div(I) = H
Option B:	Div(H) = J
Option C:	**Curl(H) = J**
Option D:	Curl(B) = D
Q19.	Which of the following can be used for the generation of laser pulse?
Option A:	Ruby laser
Option B:	Carbon dioxide laser
Option C:	Helium neon laser
Option D:	**Nd- YAG laser**
Q20.	Image formation in electron microscope is based on _____
Option A:	column length
Option B:	electron number

Option C:	**differential scattering**
Option D:	specimen size
Q21.	The condition for minima in Fraunhofer diffraction for single slit is $a\sin\theta = m\lambda$ What is 'θ'?
Option A:	Angle of incidence of incident rays at the slit
Option B:	Angle at which diffracted rays strikes the screen
Option C:	Angle between slit and screen
Option D:	**Angle of diffraction at which rays are diffracted at slit**
Q22.	What is the principle of fibre optical communication?
Option A:	Frequency modulation
Option B:	Population inversion
Option C:	**Total internal reflection**
Option D:	Doppler Effect
Q23.	What are the approaches used in making nano systems?
Option A:	Top down
Option B:	Bottom up.
Option C:	**Both a and b**
Option D:	Neither a nor b.
Q24.	The fringe width and the angle of wedge are related to
Option A:	**$\beta=\lambda/2\theta$**
Option B:	$\theta =\lambda/2\ \beta$
Option C:	$\beta=\lambda/\theta$
Option D:	$\lambda= \beta/2\theta$
Q25.	Find the Maxwell equation derived from Faraday's law.
Option A:	Div(H) = J
Option B:	Div(D) = I
Option C:	**Curl(E) = -dB/dt**
Option D:	Curl(B) = -dH/dt