University Question Bank (MCQ Set)

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

Ans interference, diffraction

2] By observing the diffraction-pattern, the two spectral-lines are said to be just resolved when

Ans ~~interference~~, ~~diffraction~~ the central maxima of one coincides with the first minimum of the other.

3] A step-index fibre has a numerical-aperture of 0.26, a core refractive-index of 1.5 and a core diameter of 100 μm. Calculate the acceptance-angle.

Ans 15.07 degree

4] Find the divergence of the field $\vec{F} = 3\hat{i} + 2xy\hat{j} + 5xz\hat{k}$ in Cartesian co-ordinates

Ans $2x(1+5z)$

5] Which ratio decides the efficiency of nano substances?

Ans surface area/volume

6] _____ transformation are replaced by the Lorentz transformation which confirms the postulate of relativity.

Ans Galilean.

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7] Maximum number of orders available with a grating is
Ans Independent of grating element

8] In holography.
Ans both phase and amplitude get recorded.

9] Find the value of "a" for which the vector $3i + 2j + 9k$ and $i + aj + 3k$ are perpendicular
Ans -15

10] Calculate acceptance-angle for an optical-fibre whose core R.I is 1.48 & cladding R.I is 1.39.
Ans $30.5°$

11] An object whose length is 60m moves at a speed of 0.6c. What is the length of the object according to a stationary observer?
Ans 48m

12] Scanning Electron Microscope (SEM) produces
Ans 3-dimensional image

13] What is the principle of fibre-optics communication?
Ans Total Internal Reflection

14] The radiation-emission process (emission of a photon at frequency) can occur in _____ ways.
Ans Two.

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15] Which property of nanoparticles provide a driving-force for diffusion?

Ans High surface area to volume-ratio

16] If 'a' is the width of the slits and 'b' the distance between the slits, then a+b is called as _____

Ans Grating constant

17] Which of the following is not an example of bottom-up approach for the preparation of nanomaterials?

Ans Mechanical grinding

18] A beam of monochromatic-light is incident on a plane transmission grating having 5000 lines/cm and the second-order spectral line is found to be diffracted at 30°. The wavelength of the light is _____

Ans 5000 A°

19] The length of a rod in a moving frame will be _____

Ans contracted

20] Which type of pumping is used in Nd:Yag Laser?

Ans Optical pumping

21] A frame of reference has four co-ordinates, x, y, z, and t is referred to as the _____

Ans space-time reference.

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22] The total electric-flux through any closed-surface surrounding charges is equal to the amount of charge enclosed. The above statement is associated with

Ans Gauss's law

23] Maxwell's equation derived from Faraday's Law is

Ans $\vec{\nabla} \times \vec{E} = -dB/dT$

24] A vector V is irrotational if

Ans $\vec{\nabla} + V = 0$

25] According to Einstein theory of relativity, _____ in vacuum is the same in every inertial-frame.

Ans the speed of light

26] Which of the following Einstein's coefficient represents stimulated emission.

Ans B_{21}

27] What is the effective distance between the source of light and the screen in Fraunhofer Diffraction?

Ans Infinite.

28] Pumping is done in order to achieve

Ans Population Inversion

29] The Maxwell's Equation, $\vec{\nabla} \cdot \vec{B} = 0$ signifies.

Ans Non-existence of a mono-pole

30] Nanomaterials are the materials with at least one dimension measuring less than

Ans 100 nm.

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31] What is the meaning of grating-element for a diffraction grating?

Ans It is the distance between two slits

32] Which of the following is an example of top-down approach for the preparation of nanomaterials?

Ans Ball-milling

33] The numerical-aperture of a fibre if the angle of acceptance is 15 degrees, is

Ans 0.26

34] According to Einstein special theory of relativity, law of physics can be formulated based on.

Ans Non-Inertial Frame of Reference.

35] Maximum number of modes supported in step-index fibre is ____

Ans $V^2/2$

36] Which type of fibre can overcome multimode-dispersion?

Ans graded index fibre

37] Which of the following is Einstein's mass energy relation?

Ans $E = mc^2$

38] What is the region enclosed by the optical-cavity called?

Ans Optical-Resonator

39] Which of the following is not a property of emitted-light in stimulated-emission?

Ans incoherent

40] In semiconductor diode laser, the lasing-action takes place when the diode is _____

Ans forward-biased.

x-x.