MCQ's Fibre Optics

Q.1.   Light transmittion through fibre optics is based on the principle of.......

(a)   Total internal reflection

(b)   Refraction

(c)   Reflection

(d)   Diffraction

Ans .   Total internal reflection

Q.2.   Fibre optics was invented by ....

(a)   Thomas mensah

(b)   Thomas edison

(c)   John henry holmes

(d)   None of the above

Ans .   Thomas mensah

Q.3.   Which of the following is described by the concept of numerical aperture in an optical fibre?

(a)   Light scattering

(b)   Light collection

(c)   Light dispersion

(d)   Light polarisation

Ans .   Light collection

Q.4.   Which component provides additional strength and prevents the fibre from any damage?

(a)   Core

(b)   Cladding

(c)   Buffer coating

(d)   None of the above

Ans .   Buffer coating

Q.5.   Which component provides strength and prevents the fibre from any damage?

(a) Core

(b) Cladding

(c) Buffer coating

(d) None of the above

Ans .   Cladding

Q.6.   An optical fibre consists of a core μ1 surrounded by a cladding of $\mu_2 < \mu_1$. A beam of light enters from the air at an angle of α with the axis of the fibre. The highest α for which ray can be travelled through fibre is-

(a) $\cos^{-1}\sqrt{\mu_2^2 - \mu_1^2}$

(b) $\sin^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

(c) $\tan^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

(d) $\sec^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

Ans . $\sin^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

Q.7.   A ray of light will undergo total internal reflection if it

(a) Goes from rarer medium to denser medium

(b) Incident at an angle less than the critical angle

(c) Strikes the interface normally

(d) Incident at an angle greater than the critical angle

Ans .   Incident at an angle greater than the critical angle

Q.8.   Which of the following is not due to total internal reflection of light?

(a) Brilliance of diamond

(b) Mirage formation

(c)   Optical fibre working

(d)   Rainbow formation

Ans .   Rainbow formation

Q.9.   **The fibres not used nowadays for optical fibre communication system are**

(a)   Single-mode fibre

(b)   Multimode fibre

(c)   Coaxial cable

(d)   Multimode graded-index fibres

Ans .   Single-mode fibre

Q.10.   When a ray of light enters from denser medium to rare medium it bends

(a)   Towards normal

(b)   Away from normal

(c)   Perpendicular to normal

(d)   Parallel to normal

Ans .   Away from normal

Q.11.   The critical angle of water when refracted angle is 90 ° and refractive index for water and air is 1.33 and 1 is

(a)   48.8 °

(b)   49.1 °

(c)   50 °

(d)   51 °

Ans .   49.1 °

Q.12.   The outer concentric shell in Fibre optic is called

(a)   Cladding

(b)   Core

(c)   Coat

(d)   Mantle

Ans .   Cladding

Q.13.   The snell's law is given by

(a) $M_1 \sin \theta_i = \mu_2 \sin \theta_t$

(b) $M_2 \sin \theta_i = \mu_1 \sin \theta_t$

(c) $\sin \theta_i = \sin \theta_t$

(d) $M_1 \cos \theta_i = \mu_2 \cos \theta_t$

Ans . $M_1 \sin \theta_i = \mu_2 \sin \theta_t$

Q.14.   The critical angle for two media with permittivities of 16 and 9 respectively is

(a)   48.59

(b)   54.34

(c)   60

(d)   45

Ans .   48.59

Q.15.   Optical fibres are made up of

(a)   Glass

(b)   Plastic

(c)   Metal

(d)   Can be glass or plastic

Ans .   Can be glass or plastic

Q.16.   Numerical aperture (na) is expressed as the

(a) $Na = \sin \theta a$

(b) $Na = \cos \theta a$

(c) $Na = \tan \theta a$

(d) $Na = \sec \theta a$

Ans . $Na = \sin \theta a$

Q.17.   For total internal reflection to occur, which condition must be satisfied?

(a) $M_1 = \mu_2$

(b) $M_1 > \mu_2$

(c) $M_1 < \mu_2$

(d) $M_1 \times \mu_2 = 1$

Ans . $M_1 > \mu_2$

Q.18.   How does the refractive index vary in graded index fibre?

(a)   Tangentially

(b)   Radially

(c)   Longitudinally

(d)   Transversely

Ans .   Radially

Q.19.   Which of the following has more distortion?

(a)   Single step-index fibre

(b)   Graded index fibre

(c)   Multimode step-index fibre

(d)   Glass fibre

Ans .   Multimode step-index fibre

Q.20.   In which of the following there is no distortion?

(a)   Single step-index fibre

(b)   Graded index fibre

(c)   Multimode step-index fibre

(d)   Glass fibre

Ans .   Graded index fibre

Q.21.   What causes microscopic bend?

(a)   Uniform pressure

(b)   Non-uniform volume

(c)   Uniform volume

(d)   Non-uniform pressure

Ans .   Non-uniform pressure

Q.22.   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.

(a)   0.55677

(b)   55.77

(c)   0.2458

(d)   0.647852

Ans .   0.55677

Q.23.   Acceptance angle is defined as the _____ angle of incidence at the endface of an optical fibre, for which the ray can be propagated in the optical fibre is.

(a)   Maximum

(b)   Minimum

(c)   Either a or b

(d)   None of the above

Ans .   Maximum

Q.24.   The core diameter of single mode step index fibre is about:

(a)   60 to 70 μm

(b)   8 to 10 μm

(c)   100 to 250 μm

(d)   50 to 200 μm

Ans .   8 to 10 μm

Q.25.   In multimode graded index fibre, light rays travel _____ in different parts of the fibre.

(a)   At different speeds

(b)   With same speed

(c)   Both a and b

(d)   None of the above

Ans .   At different speeds

Q.26.   The minimum angle of incidence at which the light ray may strike the interface of two media and result in an angle of refraction of 90 degrees or greater.

(a)   Optimum angle

(b)   Angle of refraction

(c)   Refracted angle

(d)   Critical angle

Ans .   Critical angle

Q.27.   The higher the index number

(a)   The higher the speed of light

(b)   The lower the speed of light

(c)   Has no effect on the speed of light

(d)   The shorter the wavelength propagation

Ans .   The lower the speed of light

Q.28.   The three major groups of the optical system are

(a)   The components, the data rate and the response time

(b)   The source, the link and the receiver

(c)   The transmitter, the cable and the receiver

(d)   The source, the link and the detector

Ans .   The source, the link and the detector

Q.29.   A type of index of an optical Fibre that has no cladding and whose
        central core has a non-uniform refractive index.

(a)   Graded index

(b)   Multimode

(c)   Single mode

(d)   Step-index

Ans .   Graded index

Q.30.   Type of bend that occurs as a result of differences in thermal contraction
        rates between the core and the cladding material.

(a)   Macro-bending

(b)   Micro-bending

(c)   Quad bending

(d)   Constant-radius bending

Ans .   Micro-bending

Q.31.   Which type of Fibre optic cable is best for very high speed data?

(a)   Single-mode step-index

(b)   Multimode step-index

(c)   Single-mode graded-index

(d)   Multimode graded-index

Ans .   Single-mode step-index