For a Photo-diode, which of the following statement is TRUE?

(a) The reverse saturation current is a function of light falling on the junction.
(b) The reverse saturation current is a function of the temperature of the junction.
(c) The reverse saturation current is a function of both light falling on the junction and the junction temperature.
(d) The reverse saturation current is independent of both light falling on the junction and the junction temperature.

Accepted Answers:
(c) The reverse saturation current is a function of both light falling on the junction and the junction temperature.

Photons of energy $1.58 \times 10^{-19}$ J are incident on a photodiode which has responsivity 0.69 A/W. The optical power level of the diode is 10 microW. Determine the reverse saturation current generated.

(a) 6.9 microA
(b) 3.45 microA
(c) 13.8 microA
(d) 0 microA

Accepted Answers:
(a) 6.9 microA

A photo-detector as an active area of 20 mm$^2$ and a responsivity of 0.5 A/W. It is illuminated by light of intensity 1 mW/cm$^2$. A voltage output is obtained by connecting 100 kΩ load resistor in series with the detector. Determine the output voltage across the load.

(a) 15 V
(b) 5 V
(c) 20 V
(d) 10 V

Accepted Answers:
(d) 10 V
Find the current developed in a photodiode with a quantum efficiency of 75%. The photodiode is illuminated with a light of wavelength 1300 nm and radiant power 70 microWatt (Plank’s constant $h = 6.62 \times 10^{-34}$ Joule-second, charge on electron $e = 1.602 \times 10^{-19}$ C, velocity of light $c = 3 \times 10^8$ m/s)

- (a) 82.5 microA
- (b) 55 microA
- (c) 27.5 microA
- (d) 110 microA

Accepted Answers:
(b) 55 microA

5) An optical fibre is characterized by-

- (a) Refractive Index (RI) of the core material is less than that of the cladding.
- (b) Total Internal Reflection.
- (c) Refractive Index (RI) of the core material is greater than that of the cladding.
- (d) Both (b) and (c).

Accepted Answers:
(d) Both (b) and (c).

6) For the fibre optic based displacement sensor as shown in Fig. 1, the output light intensity does not depend on-

- (a) Numerical aperture of both the fibres.
- (b) Length L of the fibres.
- (c) Distance d.
- (d) Reflectivity of the mirror.

Accepted Answers:
(b) Length L of the fibres.

7) The refractive indices of glass and water are 1.5 and 1.35 respectively. If the glass immersed in water, its relative refractive index will be-

- (a) 1.111
- (b) 2.222
- (c) 1.8
- (d) 1.5
8) Relative permittivity ($\varepsilon_r$) of an optical medium is 2.8. The refractive index of the medium is:

- (a) 0.7
- (b) 1.4
- (c) 1.67
- (d) Can not be determined from the given data.

Accepted Answers:
(c) 1.67

9) The numerical aperture of a step index fibre in air (i.e., R.I. = 1) is 0.39. The fibre immersed in liquid of R.I. 1.255. The angle of acceptance (AA) is closest to:

- (a) 15 deg
- (b) 9.05 deg
- (c) 36.2 deg
- (d) 18.10 deg

Accepted Answers:
(d) 18.10 deg

10) What is the loss in an optical fibre, when an optical signal after traversing a distance of 500 m in the fibre, has lost 70% of its input power?

- (a) 10.45 dB/km
- (b) 20.90 dB/km
- (c) 5.23 dB/km
- (d) None of these.

Accepted Answers:
(a) 10.45 dB/km