18PYB103J- Semiconductor Physics Model Practical Questions MCQ

* Required

18PYB103J- Semiconductor Physics Model Practical Exam

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY, Ramapuram Campus
DEPARTMENT OF PHYSICS
MODEL PRACTICAL EXAMINATION QUESTION PAPER

Subject Code and Title : 18PYB103J- Semiconductor Physics Time: 45 Minutes
Marks: 25

Applications of Hall effect (I) The probes are often used as magnetometers, i.e. to measure magnetic fields, or inspect materials (such as tubing or pipelines) using the principles of magnetic flux leakage. These devices produce a very low signal level and thus require amplification. (II) This converts mechanical energy into electrical energy, which is why it's useful during a power outage. This is when a current flows through a coil on a stovetop, which produces a magnetic field. (III) These sensors are used to time the speed of wheels and shafts. These are used to detect the position of permanent magnet in brushless electric DC motors. The sensors are embedded in digital electronic devices along with linear transducers. (IV) This can be used to solve complex electrostatic problems involving unique symmetries like cylindrical, spherical or planar symmetry. This can be used to simplify evaluation of electric field. * 1 point

- ( ) Both III and IV are correct
- ( ) Both I and III are correct
- (•) All the four correct
- ( ) Both II and III are correct

The capacitance of a reverse biased PN junction * 1 point

- ○ Increases as reverse bias is increased
- ◉ Decreases as reverse bias is increased
- ○ Increases as reverse bias is decreased
- ○ Is insignificantly low

For a PN junction diode, the current in reverse bias may be ---------- * 1 point

- ○ Few miliamperes
- ○ Between 0.2 A and 15 A
- ○ Few amperes
- ◉ Few micro or nano amperes

The lattice parameter “a” for a cubic crystal * 1 point

- ◉ λ /2sinθ (h2+k2+l2)1/2 Å
- ○ λ /sinθ (h2+k2+l2)1/2 Å
- ○ λ /2sinθ (h2+k2+l2) Å
- ○ λ /2 (h2+k2+l2)1/2 Å

An iPhone light shines at 40 watts from 6 meters away. What is the intensity of light at 2 meters away? * 1 point

- ○ 120 watts
- ○ 160 watts
- ◉ 360 watts
- ○ 720 watts

The interplanar distance "d" for a cubic crystal is ------- * 1 point

The interplanar distance “d” for a cubic crystal

a) $a / (h^2+k^2+l^2)^{1/2}$ Å

b) $a^2 / (h^2+k^2+l^2)^{1/2}$ Å

c) $a / (h^2+k^2+l^2)^{1/2}$ Å

d) $a / (h^2+k^2+l^2)$ Å

- ○ Option A
- ○ Option B
- ◉ Option C
- ○ Option D

Merit of four point probe method of determining resistivity is that * 1 point

- ○ It needs very small current
- ○ It gives the average resistivity of the sample
- ◉ It gives the resistivity at a localized region of the sample
- ○ It injects excess minority carriers

The formula for Numerical aperture is ..... * 1 point

a) $W/\sqrt{2L^2+W^2}$

b). $W/\sqrt{4L^2+W^2}$

c). $W/\sqrt{4+W^2}$

d). $W/\sqrt{4L^2+3}$

- ○ Option A
- ◉ Option B
- ○ Option C
- ○ Option D

Which one of the following is not used as apparatus in particle size experiment? * 1 point

- (●) Grating
- ( ) Glass plate
- ( ) Laser
- ( ) Screen

Maximum Power of the solar Cell is calculated as ---------- * 1 point

- ( ) Pmax = Maximum power = Imp / Vmp
- ( ) Pmax = Maximum power = Vmp / Imp
- ( ) Pmax = Maximum power =(Imp) 2x Vmp
- (●) Pmax = Maximum power = Imp x Vmp

The energy gap of the semiconductor is given by _____ * 1 point

- (●) E = 2k(2.303 log R)/(1/T)
- ( ) E = 2k(2.303 log R)/T
- ( ) E = 2kT(2.303 log R)
- ( ) E = 2k(2.303 log T)/(1/R)

Efficiency of solar cell is calculated as ---------- * 1 point

- η = [Pmax A/Io] x 100
- η = [Pmax/AIo] x 100
- η = [Pmax AIo] x 100
- η = [Pmax Io/A] x 100

As a PN junction is forward biased * 1 point

- Holes as well as electrons tend to drift away from the junction
- The depletion region decreases
- The barrier tends to breakdown
- The depletion region increases

For a P-N diode, the number of minority carriers crossing the junction depends on * 1 point

- Forward bias voltage
- Potential barrier
- Rate of thermal generation of electron hole pairs
- Reverse bias voltage

Solar cells are ---------- energy sources * 1 point

- [x] Renewable
- [ ] Non-renewable
- [ ] Conventional
- [ ] Depleted

In particle size determination formula, the term D refers _____ * 1 point

- [x] The distance between the screen and the glass plate
- [ ] The distance between the source and the glass plate
- [ ] The distance between the screen and the source
- [ ] The distance between the screen and the wall

A requirement of four point probe method of determining resistivity is * 1 point

- [ ] The current must be low
- [ ] The current must be high
- [ ] Cross-section along the sample must be constant
- [x] Current source is connected to two inner probes

To convert the Celsius into Kelvin temperature the factor to be added to the Celsius degree is _____ * 1 point

- ○ 373
- ○ 173
- ◉ 273
- ○ 473

The Inverse Square Law does not work for which of these? * 1 point

- ○ Sound
- ○ Light
- ◉ Laser beams
- ○ Electrical force
- ○ Gravity

An electron in the conduction band * 1 point

- ◉ Has higher energy than the electron in the valence band
- ○ Has lower energy than the electron in the valence band
- ○ Loses its charge easily
- ○ Jumps to the top of the crystal

Numerical aperture refers to the ..... angle at which the light incident on the fiber * 1 point

- ○ Minimum
- ○ Wide
- ○ Narrow
- ◉ Maximum

In the four point probe method of determining resistivity * 1 point

- ○ One probe point must inject minority carriers
- ○ Current flow in only a small area of the sample
- ○ Current source is connected to the two inner probes
- ◉ The sample must be extrinsic

A PN junction * 1 point

- ○ Has low resistance in forward as well as reverse directions
- ○ Has high resistance in forward as well as reverse directions
- ◉ Conducts in forward direction only
- ○ Conducts in reverse direction only

When a PN junction is reverse-biased * 1 point

- ○ Holes and electrons tend to concentrate towards the junction
- ○ The barrier tends to break down
- ◉ Holes and electrons tend to move away from the junction
- ○ Holes and electrons are equal

The Hall coefficient of sample (A) of a semiconductor is measured at room temperature. The hall coefficient of (A) at room temperature is 4x10-4 m3 coulomb-1. The carrier concentration in sample A at room temperature is * 1 point

- ◉ ~ 1021 m−3
- ○ ~ 1020 m−3
- ○ ~ 1022 m−3
- ○ ~ 1023 m−3

Back Submit