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SARDAR PATEL UNIVERSITY

M. Sc. Integrated Biotechnology (IGBT) 2nd Semester
Theory Exam – March 2019
PS02CIGB01 – Physics- II
Date: 18-03-2019 (Monday), 10:00 am to 01:00 pm **Maximum Marks: 70**

Note: (1) All the Questions are compulsory.
(2) Figures on the right indicate marks.

Q.1 Choose the correct option. 1x8= 8

(1) The permeability of Paramagnetic and ferromagnetic materials are.....
(a) greater than unity (b) less than unity (c) equal to unity (d) negative

(2) Tesla is the unit of.....
(a) flux density (b) field strength (c) flux (d) inductance

(3) The ratio of lateral contraction to longitudinal strain, when a body undergoes a linear tensile strain is known as .....
(a) Modulus of elasticity (b) Young's modulus
(c) Poisson's ratio (d) Bulk modulus

(4) The maximum intensity which ear can tolerate without sensation of pain is about .....
(a) 120dB (b) 80dB (c) 10^{-12} watt/m^2 (d) None of these

(5) With increase in temperature the heat will.....
(a) decreases (b)increases (c) remains constant (d)none of these

(6) The process of transmission of heat from one body to another body without heating the intervening medium is called.....
(a) conduction (b) convection (c) radiation (d) None of these

(7) The number of atoms per unit cell in simple cubic crystal structure is.....
(a) 2 (b) 4 (c) 1 (d) 6

(8) In P-type semiconductor materials, the majority charge carriers are .....
(a) electrons (b) holes (c) protons (d) neutrons

Q.2. Attempt any Seven of the following: 2x7= 14

(1) State the Coulomb's first and second law for electrostatic.
(2) Explain the properties of magnetic line of force.
(3) What do you mean by Hysteresis loop?
(4) Write a note on Hooke's law.
(5) Enlist the properties of sound absorbing materials.
(6) Define specific heat capacity and give its formula.
(7) State and explain second law of thermodynamics.
(8) Define Unit cell and Lattice of a crystal.
(9) Draw the plane for given Miller Indices (0 1 0).

Q.3 (A) Explain the properties of Paramagnetic and Diamagnetic substance. [06]

(B) Derive the formula of electrostatic potential at any point in space. [06]

OR

(B) What is Hall effect? Derive the formula of hall co-efficient. [06]

Q.4 (A) Derive general expression for the velocity of sound in Gaseous medium. [06]

(B) Explain Poisson's Ratio and Young Modulus of elasticity [06]

OR

(B) Discuss the effect of temperature and pressure on the speed of sound. [06]

Q.5 (A) Define co-efficient of thermal conductivity? Explain the Searle's method for determination of thermal conductivity. [06]

(B) Derive an expression for rectilinear flow of heat along a bar. [06]

OR

(B)(i)A very small hole in an electric furnace is used for treating metals acts nearly as a black body. If the hole has an area $100mm^2$ and it is desired to maintain the metal at 1500^oC, how much energy travels per second through the hole. $\sigma=5.67 \times 10^{-8} Wm^{-2}K$. [03]

(ii)State Stefan's Law. [03]

Q.6 (A) Explain pn-junction diode characteristics with suitable diagram. [06]

(B) Write a note on Light Emitting Diode and Photovoltaic cell. [06]

OR

(B) (1) Calculate the atomic packing factor for FCC crystal structure. [03]

(2) Write a note on types of semiconductors [03]

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(2)