Answer all Questions

Time : 01Hour

01) a) Explain:
  (i) Black body radiation
  (ii) Photoelectric effect

b) Derive the de-Broglie equation for matter and identify all the symbols in it.

(20 marks)

c) What is the wave length of a particle (mass 7.5×10^{-30} kg) moving with a velocity of 5×10^5 ms^{-1} ? (h = 6.626176×10^{-34} Js)

(20 marks)

d) Normalize the function $Cos(n\pi x / a)$ over the interval $-a < x < a$.

(20 marks)

e) If the wave functions ψ_1 and ψ_2 are the solutions of the Schrodinger equation, then show that the combination $\psi = a\psi_1 + b\psi_2$ is also a solution of that Schrodinger equation. (Assume that ψ_1 and ψ_2 are degenerate wave functions and a,b are constants)

(20 marks)

02) a). (I) What do you mean by "Metallurgy"?
  (II) Define the following terms as used in Metallurgy
    (i) Minerals
    (ii) Ores

(15 marks)

b). Give three most important properties of Portland cement.

(15 marks)

c). Briefly describe the wet process of manufacture of Portland cement.

(25 marks)

d). Explain briefly the hydration of Portland cement.

(25 marks)

e). Outline the main gradients used in the Manufacture of Glass.

(20 marks)