



EASTERN UNIVERSITY, SRILANKA
DEPARTMENT OF CHEMISTRY

THIRD EXAMINATION IN SCIENCE 2002/2003

SECOND SEMESTER – 2004 (Proper)

CH 304 QUANTUM CHEMISTRY & INDUSTRIAL CHEMISTRY

Answer all Questions

Time : 01 Hour

- 01) a) Explain:
- (i) Black body radiation
 - (ii) Photoelectric effect
- (20 marks)
- 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} ? ($h = 6.626176 \times 10^{-34}$ Js)
- (20 marks)
- d) Normalize the function $\text{Cos}(\pi x / a)$ 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)