Dead line : 93/1/17

1:

a) write the exact differential conditions for equation below:

F=F(x,y) →dF = (${}^{\partial F}/_{\partial x}$)$_y dx$+ (${}^{\partial F}/_{\partial y}$)$_x dy$ = $F_x dx$ + $F_y dy$

b) check those conditions for this differential and show that is it exact or not dF = (x2 + y)dx + 2x dy

C) show that if dF is exact differential then: $\oint F.dr$ = 0

2:

The time independent form of schrodinger equation is :

$\frac{-\hbar^2}{2\mathrm{m}}\nabla^2\psi = \mathrm{E}\psi$, (ψ *is called wave function*)

a) use separation of variable in spherical coordinate,

b) do above in cylindrical coordinate,

c) do above in cartesian coordinate,

d) Solve the equation part C for these boundary conditions:

The wave function is required to vanish at "each" surface of rectangular box of side a , b & c

{ This condition imposes constraints on the separation constant and therefor on the energy “E” . show the smallest value of” E” for which such a solution can be obtain?

$E = \frac{\hbar^2\pi^2}{2m}\left(\frac{1}{a^2}+\frac{1}{b^2}+\frac{1}{c^2}\right)$ }

9.2.2/9.2.3

9.3.1/9.3.8

9.5.9/9.5.10

10.1.2/10.1.3/10.1.5/10.1.7/10.1.11

10.2.1/10.2.3/10.2.4/10.2.4

10.3.1/10.3.3/10.3.4