Sunday November 9, 2014

CHAPTER 1

**P.P.1.1** A proton has1.602 x 10-19 C. Hence, 6.667 billion protons have

+1.602 x 10-19 x 6.667 x 109 = **1.0681 x 10–9 C**

**P.P.1.2** i = dq/dt = -10(–2)e-2t mA

At t = 1.0 sec, i = 20e–2 = **2.707 mA**

**P.P.1.3** q =  =  + 

= 4 + 28/3 = **13.333 C**

**P.P.1.4** (a) Vab = dw/dq = 25/5 = **5 V**

(b) Vab = dw/dq = 25/–10 = **–2.5 V**

**P.P.1.5** (a) v = 2 i = 10 cos (60 π t)

p = v i = 50 cos2 (60 π t)

At t = 5 ms, p = 50 cos2 (60 π 5x10-3) = 50 cos2 (0.3 π)

= **17.27 watts**



(b) v = 10 + 5 = 10 + cos 60 t dt = 10+60 t

p = vi = 5 cos (60 πt)[10 + (25/(60 π)) sin (60 π t)]

At t = 5 ms, p = 5 cos (0.3π){10 + (25/(60 π)) sin (0.3 π)}

= **29.7 watts**

**P.P.1.6** p = v i = 115 x 10 = 1150 watts; w = p x t

W = 1150x6 = **6.9 k watt-hours**

**P.P.1.7** p1 = 5(–9) = **–45w**

p2 = 2(9) = **18w**

p3 = 0.6xI(4) = 0.6(5)(4) = **12w**

p4 = 3(5) = **15w**

Note that all the absorbed power adds up to zero as expected.



**P.P.1.8** i = dq/dt = e = -1.6 x 10-19 x 1013 = –1.6 x 10-6 A

p = v0 i = 30 x 103 x (1.6 x 10-6) = **48mW**

**P.P.1.9** Minimum monthly charge = $12.00

First 100 kWh @ $0.16/kWh = $16.00

Next 200 kWh @ $0.10/kWh = $20.00

Remaining 50 kWh @ $0.06/kWh = $3.00

Total Charge = $51.00

Average cost = $51/[100+200+50] = **14.571 cents/kWh**

# P.P.1.10 This assigned practice problem is to apply the detailed problem solving technique to some of the more difficult problems of Chapter 1.