Saturday, October 27, 2018

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 = **1.6021 x 10–9 C**

**P.P.1.2** i = dq/dt = d(20–15t–10e–3t)/dt = (–15–10(–3)e–3t) mA

At t = 1.0 sec, i = –15+30e–3 = –15+1.4936 = **–13.506 mA**

**P.P.1.3** q =

= 8 + 8(8–1)/3 = **26.67 C**

**P.P.1.4** (a) Vab = dw/dq = 100/5 = **20 V**

(b) Vab = dw/dq = 100/–10 = **–10 V**

**P.P.1.5** (a) v = 6 i = 30 cos (60 π t)

p = v i = 150 cos2 (60 π t)

At t = 5 ms, p = 150 cos2 (60 π 5x10-3) = 150 cos2 (0.3 π)

= **51.82 watts**



(b) v = 6 + 10 = 6 + cos (60 t) dt = 6 + sin (60 t)



p = vi = 5 cos (60 πt)[6 + (50/(60 π)) sin (60 π t)]

At t = 5 ms, p = 5 cos (0.3π){6 + (50/(60 π)) sin (0.3 π)}

=5(0.58779)(6+(0.26526)(0.80902)) = **18.264 watts**

**P.P.1.6** p = v i = 115 x 12 = 1380 watts; w = p x t

W = 1380x24 = **33.12 k watt-hours**

**P.P.1.7** p1 = 5(–45) = **–225 w**

p2 = 2(**45**) = **90 w**

p3 = 0.12xI(20) = 0.6(25)(20) = **60 w**

p4 = 3(25) = **75 w**

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 = 25 x 103 x (1.6 x 10-6) = **40 mW**

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

First 100 kWh @ $0.16/kWh = $16.00

Next 160 kWh @ $0.10/kWh = $16.00

Remaining 0 kWh @ $0.06/kWh = $0.00

Total Charge = $44.00

Average cost = $44/[100+160+0] = **16.923 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.