Exam PHYSICS 2Bb SPRING 2010 QUIZ 3

Name_Professor S.K. Sinha_____

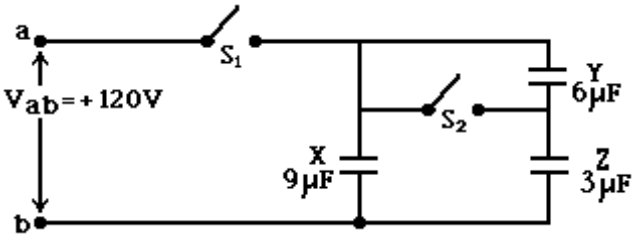
epsilon0 = 8.85 . 10^-12 C2/N.m2 Coulomb's Constant k = 9 . 10^9 N.m2/C2 electron charge = -1.6 . 10^-19 C
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Situation 25.1

Each plate of a parallel-plate air capacitor has an area of 0.0040 $m^2$, and the separation of the plates is 0.030 mm. An electric field of 1.5 x $10^6$ V/m is present between the plates.

1) In Situation 25.1, the energy density between the plates is closest to:
A) 25 J/$m^3$ B) 10 J/$m^3$ C) 20 J/$m^3$ D) 15 J/$m^3$ E) 30 J/$m^3$

Figure 25.3




The network shown is assembled with uncharged capacitors X, Y, and Z, and open switches, $S_1$ and $S_2$. A potential difference $V_{ab}$ = +120 V is applied between points a and b. After the network is assembled, switch S1 is closed, but switch $S_2$ is kept open.

2) In Figure 25.3, the energy stored in capacitor X, in mJ, is closest to:
A) 22 B) 7 C) 12 D) 65 E) 37

3) An air filled parallel plate capacitor is connected to a battery and allowed to charge up. Now a slab of dielectric material is placed between the plates of the capacitor while the capacitor is still connected to the battery. After this is done one would find that
A) the voltage across the capacitor had increased.
B) the energy stored in the capacitor had decreased.
C) the charge on the capacitor had not changed.
D) the charge on the capacitor had increased.
E) None of these is true.

Situation 26.2

The voltage and power ratings of a light bulb, which are the normal operating values, are 110 V and 60 W. Assume the filament resistance of the bulb is constant and is independent of operating conditions.

4) In Situation 26.2, the light bulb is operated at a reduced voltage and the power drawn by the bulb is 36 W. The operating voltage of the bulb is closest to:
A) 72 V B) 85 V C) 66 V D) 90 V E) 78 V