Chapter 25 flashcard test answers

Find the frequency of X-rays of wavelength 1 Å = 10-10 m. a.! 3 × 1018 Hzb.! 3 × 1010 MHzc.! 6 × 109 Hzd.! 3 × 108 Hze.! 3 × 1020 Hza.! 3 × 1018 Hz

Green light has a wavelength of 5. 4 × 10-7 m. What is the frequency of this EMwave in air? a.! 5. 55 × 1014 Hzb.! 6. 00 × 1011 Hzc.! 9. 00 × 108 Hzd.! 3. 00 × 1010 MHze.! 1. 80 × 1015 Hza.! 5. 55 × 1014 Hz

A 100-kW radio station emits EM waves in all directions from an antenna on top of a mountain. What is the intensity of the signal at a distance of 10 km? a.! 8 × 10-5 W/m2b.! 8 × 10-6 W/m2c.! 3 × 10-3 W/m2d.! 0. 8 W/m2e.! 2. 5 × 10-5 W/m2a.! 8 × 10-5 W/m2

How much electromagnetic energy is contained in each cubic meter near the Earth’s surface if the intensity of sunlight under clear skies is 1000 W/m2? a.! 3. 3 × 10-6 Jb.! 3. 3 Jc.! 0. 003 Jd.! 10-4 Je.! 3. 0 × 105 Ja.! 3. 3 × 10-6 J

A solar cell has a light-gathering area of 10 cm2 and produces 0. 2 A at 0. 8 V (DC) when illuminated with S = 1000 W/m2 sunlight. What is the efficiency of the solar cell? a.! 16%b.! 7%c.! 23%d.! 4%e.! 32%a.! 16%

The intensity of radiation reaching the earth from the sun is 1350 W/m2. The earth’s radius is 6. 4 × 106 m. How big a force does this radiation exert on the earth? (Assume it is all absorbed.)a.! 5. 8 × 108 Nb.! 1. 2 × 109 Nc.! 2. 3 × 109 Nd.! 4. 6 × 109 Ne.! 1. 7 × 1017 Na.! 5. 8 × 108 N

Two identical silver spheres of mass m and radius r are placed a distance R (sphere 1) and 2R (sphere 2) from the sun respectively. The ratio of the

pressure of solar radiation on sphere 2 to that on sphere 1 isa.! 0. 25. b.! 0. 50. c.! 1. 0. d.! 2. 0. e.! 4. 0. a.! 0. 25.

If the radiant energy from the sun comes in as a plane EM wave of intensity 1340 W/m2, calculate the peak values of E and B. a.! 300 V/m, 10-4 Tb.! 1000 V/m, 3. 35 × 10-6 Tc.! 225 V/m, 1. 6 × 10-3 Td.! 111 V/m, 3 × 10-5 Te.! 711 V/m, 2. 37 × 10-6 Tb.! 1000 V/m, 3. 35 × 10-6 T

Find the force exerted by reflecting sunlight off a reflecting aluminum sheet in space if the area normal to the sunlight is 10 000 m2 and the solar intensity is 1350 W/m2. a.! 0. 72 Nb.! 0. 09 Nc.! 9 Nd.! 45 Ne.! 0. 18 Nb.! 0. 09 N

At a distance of 10 km from a radio transmitter, the amplitude of the E-field is 0. 20 volts/meter. What is the total power emitted by the radio transmitter? a.! 10 kWb.! 67 kWc.! 140 kWd.! 245 kWe.! 21 kWb.! 67 kW

If the maximum E-component of an electromagnetic wave is 600 V/m, what is the maximum B-component? a.! 1. 4 Tb.! 1. 8 × 10-5 Tc.! 2. 0 × 10-6 Td.! 1. 0 × 10-3 Te.! 1. 6 × 10-10 Tc.! 2. 0 × 10-6 T

What is the maximum radiation pressure exerted by sunlight in space (S = 1350 W/m2) on a highly polished silver surface? a.! 1. 4 × 10-2 Pab.! 0. 12 Pac.! 9. 0 × 10-6 Pad.! 4. 5 × 10-5 Pae.! 2. 3 × 10-6 Pac.! 9. 0 × 10-6 Pa

An FM radio station broadcasts at 98. 6 MHz. What is the wavelength of the radiowaves? a.! 60. 8 mb.! 6. 08 mc.! 3. 04 md.! 0. 314 me.! 0. 33 cmc.! 3. 04 m

Two identical silver spheres of mass m and radius r are placed a distance R (sphere 1) and 2R (sphere 2) from the sun respectively. The ratio of the gravitational force exerted by the sun on sphere 1 to the pressure of solar radiation on sphere 1 is T1

the ratio for sphere 2 is T2. The ratio of T2 to T1 isa.! 0. 25. b.! 0. 50. c.! 1. 0. d.! 2. 0. e.! 4. 0. c.! 1. 0.

What is the average value of the magnitude of the Poynting vector S at 1 meter from a 100-watt lightbulb radiating in all directions? a.! 1 W/m2b.! 4 W/m2c.! 2 W/m2d.! 8 W/m2e.! 12 W/m2d.! 8 W/m2

What is the maximum radiation pressure exerted by sunlight in space (S = 1350 W/m2) on a flat black surface? a.! 2. 25 × 10-5 Pab.! 0. 06 Pac.! 7 × 10-4 Pad.! 4. 5 × 10-6 Pae.! 9. 0 × 10-6 Pad.! 4. 5 × 10-6 Pa

What should be the height of a dipole antenna (of dimensions 1/4 wavelength) if it is to transmit 1200 kHz radiowaves? a.! 11. 4 mb.! 60 cmc.! 1. 12 md.! 62. 5 me.! 250 md.! 62. 5 m

High frequency alternating current is passed through a solenoid that contains a solid copper core insulated from the coils of the solenoid. Which statement is correct? a.! A copper core remains cool no matter what the frequency of the current in the solenoid is. b.! The copper core remains cool because the induced emf is parallel to the solenoid axis and fluctuates rapidly. c.! The copper core heats up because an emf parallel to the solenoid axis is induced in the core. d.! The copper core heats up because circular currents around its axis are induced in the core. e.! The copper core heats up

because the electric field induced in the copper is parallel to the magnetic field produced by the solenoid. d.! The copper core heats up because circular currents around its axis are induced in the core.

Magnetic fields are produced bya.! constant electric currents. b.! electric currents that vary sinusoidally with time. c.! time-varying electric fields. d.! all of the above. e.! only (a) and (b) above. d.! all of the above.

At every instant the ratio of the magnitude of the electric to the magnetic field in an electromagnetic wave in vacuum is equal toa.! the speed of radio waves. b.! the speed of light. c.! the speed of gamma rays. d.! all of the above. e.! only (a) and (b) above. d.! all of the above.

You can raise the temperature of an object witha.! microwaves. b.! infrared waves. c.! ultraviolet rays. d.! all of the above. e.! only (a) and (b) aboved.! all of the above.

In the atmosphere, the shortest wavelength electromagnetic waves are calleda.! microwaves. b.! infrared waves. c.! ultraviolet waves. d.! X-rays. e.! gamma rays. e.! gamma rays.

An open circuit consists of a 12 μF parallel plate capacitor charged to 200 V and a 10 Ohm resistor. At the instant when a switch closes the circuit (with no battery in it) the displacement current between the plates of the capacitor isa. 1. 2 μAb. 2. 4*10^-4 Ac. 2. 4 mAd. 10 Ae. 20 Ae. 20