

Due: Monday, November 25, 2019 by 12:15 p.m. Please show **ALL** your work.

Please print this sheet & handwrite / complete on actual sheet. Thank you

$$\lambda = h c / E_p$$

h = Planks Constant

c = speed of light

E_p = (energy band gap) * (1 eV)

$$1 \text{ eV} = 1.602 \times 10^{-19} \text{ J}$$

9.1 Eq. (9.2) Find the wavelength of radiation whose photons have: energy equal to the: band gap of:

a. cuprous sulfide (Cu₂S) cell = (1.80 eV),

b. compounds of cadmium sulfide (CdS) cell = (2.42 eV),

c. gallium arsenide (GaAs) cell = (1.40 eV).

9.6 A PV system is required to produce: **96 Watts at: 12 V.**

The solar cells have an: I_{max} equal to 250 A/m²

The solar cells have an: V_{max} : equal to: **0.4 V**

Design the PV panel, working at the maximum power point, if each cell is: **80 cm²** in area.

a. Find the area of each cell = _____ m²

b. Eq. (9.5) $P_{max} = (I_{max}) \times (area) \times (V_{max})$

c. To get: **12 V** you will need: _____ cells in series. ($\Delta V / V_{max}$)

d. To get: **96 W** you will need: _____ cells. (required power / P_{max})

- 9.7 Using graph paper estimate the: **daily load** required by a PV system that has the following equipment connected:
To find the peak power a time-schedule diagram is required.
Use Power (W) watts on the Y axis, and Time (24 hours) on the x axis.

1. Four lamps,	15 W each,	operated from”	1800 hrs.	to	2300 hrs.
2. Television,	80 W,	operated from:	1800 hrs.	to	2300 hrs.
3. Computer,	150 W,	operated from:	1600 hrs.	to	1900 hrs.
4. Radio,	25 W,	operated from:	1100 hrs.	to	1800 hrs.
5. Water pump,	50 W,	operated from:	0700 hrs.	to	1000 hrs.