ASTR469 - Midterm review concepts

Observing Basics
Steradian $\Omega \simeq \pi\theta^2$
Small angle formula $\theta \simeq D/d$
Motion of the night sky
Rough correlation between object rise/set locations with times above the horizon (would be given full equation)
Rough differences in stellar motion with latitude
Coordinate systems (including reason for J2000 and B1950 epochs)
Difference in stellar motion/visibility with declination/latitude
Zenith distance
Sidereal time
Hour angle
LST and very rough calculation HA = LST − RA
Atmosphere and air mass $X = \sec(z)$
Optical/NIR filters (designations, rough wavelengths)

Units in Observational Astronomy
Electromagnetic spectrum, astronomical designations
Planck function (memorize!)
Wien's Law $\lambda = 0.28\text{cm}/T$
Difference between intensity, flux, and luminosity
Magnitudes, including main formulae
Colors, focusing on $B - V$ and the connection between colors and rough temperature for a Black Body
Color-magnitude diagrams

Telescopes
Airy disk, telescope resolutions via Rayleigh criterion $\theta = 1.22\lambda/D$
Refracting vs reflecting telescopes
f-number and magnification $N = f/D$; $m = f_1/f_2$

Photometry and Spectroscopy
Emission/absorption lines
Kirchoff's Laws
Sources of (photometric) noise
Basics of how CCDs work
Normal (Gaussian) distribution
Poisson statistics
Signal to noise ratio, scaling with time, bright and faint source limits
Information from spectroscopy
Spectral line broadening mechanisms

Radio Astronomy
Radio astronomy basics
Rayleigh-Jeans limit
Radiometer equation $\sigma_{\mathrm{T}} = \frac{T_{\mathrm{noise}}}{\sqrt{n_p \Delta\nu t}}$

High Energy Astronomy
Detector Basics
Sources of high energy photons

Statistics
Error propagation
Gaussian, Poisson distributions
Fitting regressions, including goodness of fit