

Physics 1306, Exam 1 Sample Questions

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For all questions there may be more than one correct answer or there may be NO correct answers. Mark all correct answers on the answer sheet with a number 2 pencil. You will be graded RIGHT MINUS WRONG, answer by answer, not question by question! (i.e., You will receive one point for each correct answer marked and have one subtracted from your score for each incorrect answer marked. You will receive neither penalty nor bonus for any answer left blank.) DO NOT GUESS!!!!

1. Young's interference experiment (the experiment that showed that light shining through 2 small holes produces a pattern of dark and bright bands):
 - (a) suggests that light must have particle-like properties.
 - (b) suggests that light must have wave-like properties.
 - (c) demonstrates wave interference.
 - (d) demonstrated that the nucleus of the atom is very small.
 - (e) demonstrated that the electrons in atoms are confined to orbits with specific energies.

2. Two objects that have the same surface area are radiating blackbody spectra. Object A has a spectrum that peaks at 500 nm, and object B has a spectrum that peaks at 1000 nm. From this, what else can you conclude?
 - (a) Object A has a temperature of 6000 K.
 - (b) The temperature of A is 0.5 times the temperature of B.
 - (c) The temperature of B is 0.5 times the temperature of A.
 - (d) The total energy emitted by A is 16 times that emitted by B.
 - (e) The total energy emitted by B is 16 times that emitted by A.

3. An emission line of hydrogen occurs at a rest wavelength of 21 cm. This line is observed in a particular galaxy, with a wavelength of 22 cm. From this, we can conclude:
 - (a) The galaxy is moving toward us.
 - (b) The galaxy is moving away from us.
 - (c) The galaxy is moving neither toward or away from us.
 - (d) The radial velocity of the galaxy is approximately (rounded to 2 digits) 14000 km/s .
 - (e) The radial velocity of the galaxy is approximately (rounded to 2 digits) -14000 km/s .
4. A star is observed to have a parallax angle of $0.06''$. From this we can conclude:
 - (a) The apparent magnitude of the star will be a larger number than its absolute magnitude.
 - (b) The apparent magnitude of the star will be a smaller number than its absolute magnitude.
 - (c) The apparent and absolute magnitudes of the star are equal.
 - (d) The distance to the star is (rounded to 2 digits) 17 pc.
 - (e) The distance to the star is (rounded to 2 digits) 6.0 pc.
5. Two stars (let's call them A and B) have the same spectral type. Star A has an apparent magnitude of 2.3, and an absolute magnitude of 2.8, while star B has an apparent magnitude of 14.5, and an absolute magnitude of -2.7 . From this we can conclude:
 - (a) Star A is closer than 10 pc to the sun.
 - (b) Star B is closer than 10 pc to the sun.
 - (c) Star A is more luminous than star B.
 - (d) Star B is more luminous than star A.
 - (e) Star B has a larger radius than star A.

6. Two telescopes (let's name them Thrakkorzog and Susan) have the following properties: Susan has an objective with focal length 150 cm and diameter 12 cm, and an eyepiece with a focal length of 0.5 cm. Thrakkorzog has an objective with a focal length of 120 cm and a diameter 8 cm, and an eyepiece with a focal length 0.4 cm. Which of the following is true about these telescopes?
 - (a) Thrakkorzog has a better angular resolution than Susan (assuming they both are observing light of the same wavelength.)
 - (b) Thrakkorzog has a greater light gathering power than Susan.
 - (c) Thrakkorzog has a magnification of 16 times.
 - (d) Thrakkorzog has a magnification of 15 times.
 - (e) Thrakkorzog has a magnification of 300 times.
7. In Bohr's model for the atom:
 - (a) the mass of the atom was uniformly spread through the atom.
 - (b) the position of the electrons was described by an "electron cloud".
 - (c) electrons continuously spiraled into the nucleus.
 - (d) Bohr justified his model by arguing that the orbits of the electrons were standing waves of the electron.
 - (e) only certain, specific energy orbits were allowed for the electrons.
8. Which of the following are types of electromagnetic radiation?
 - (a) X rays.
 - (b) Infrared radiation.
 - (c) Visible light.
 - (d) Protons.
 - (e) electrons.