ASTRONOMY 5   MIDTERM EXAM PART I   FALL 2018

60 QUESTIONS – 50 POINTS: Part I of the midterm constitutes the "Take-Home" part of the entire Midterm Exam. Additionally, this "Take-Home" part is divided into two sub-parts.

The second sub-part of the "Take-Home" is given below with 40 questions for a total possible of 40 points (1 point per question). Clearly print the answers to these questions on the answer form provided. Return the answer form (separate sheet) to the White Box by NOON, Friday, October 19. [Note: Spelling and units count on this exam!!!]

Part II can be found in your *MasteringAstronomy* account and is labeled "Midterm – Online Portion". The questions asked there are directed at the first chapter listed in your reading assignment for Week 9 of the course (see your *General Schedule of Activities* document) and is conducted in the same manner as done with your weekly homework exercises where each question is worth 0.5 point. Therefore, this portion of the midterm has 20 questions for a total possible of 10 points. This is due by Thurs., October 18 at 11:59 pm.

IMPORTANT INFORMATION: Part III of the Midterm (worth 50 points) will be given in the week beginning October 15 in your scheduled 3rd hour. Part II of the midterm will require a Scantron 882 form and #2 pencil. Midterm parts I, II and II are worth 100 points total!

1. See FIGURE 'A'.   What is the name of this telescope?

2. See FIGURE 'B'.   In the Renaissance times, he proposed this model of the solar system (name this person).

3. See FIGURE 'C'.   What type of spectrum is depicted in the FIGURE?

4. See FIGURE 'D'.   Which solar system model, the heliocentric or the geocentric, did the person in the FIGURE support?

5. See FIGURE 'E'.   This person in the FIGURE discovered moons around which planet (name the planet)?

6. See FIGURE 'F'.   If an astronaut's mass at the surface of the Earth is 70 kg, what would her mass be on the surface of the object pictured in the FIGURE?

7. See FIGURE 'G'.   In this standard H-R diagram, 4 regions have been highlighted as likely regions where stars may be plotted. In which region (1, 2, 3, 4) will most of the stars fall?

8. In FIGURE 'G' again, which region(s) could reasonably contain M type stars?

9. See FIGURE 'H': What type of spectrum would this object (when heated up) emit?

10. See FIGURE 'I'. What is the planetary configuration of the planet Mars?

11. See FIGURE 'J'. In the FIGURE the planet goes around in a counterclockwise direction around the Sun. Give the letter of the point that represents perihelion.

12. See FIGURE 'K' What is the magnification power of this telescope?

13. What is the light gathering power of this telescope (FIGURE 'K') compared to the human eye (diameter of eye lens = 5 mm)?

14. Suppose you are riding in your car and approaching a red light. How fast would need to go in order to make the red light (λ_{rest} = 650. nm) appear to turn into a green light (λ_{shift} = 530. nm)? Give your answer in terms of km/sec.

15. An observer in Minneapolis, MN would observe the North Star at what altitude (nearest degree)?

16. Which of the following parts of the Sun has the highest temperature: the photosphere, the chromosphere or the corona?

17. Due to the precession of the Earth, in which constellation will the Vernal Equinox occupy next?

18. What constellation would the Full Moon occupy on May 5?

19. Which star map (SC001 or SC002) contains stars never seen in Seattle, Washington?

20. Is the ratio of sizes between Venus and Mercury larger or smaller than the ratio of sizes between Jupiter and Neptune?

21. The average distance from the Sun of a newly discovered celestial body is 49 AU. How long does it take to go around the Sun (in years)?

22. For an observer in Albuquerque, New Mexico what constellation would the Sun appear to occupy on March 10?

23. Which constellation could Mercury or Saturn <u>never</u> appear in: Gemini, Lyra, Virgo, or Libra?

For the following five questions, match the descriptions on the left to the people on the right (only put <u>the letter</u> corresponding to the person on the answer sheet; letters are not repeated):

24. Was the greatest "naked-eye" Astronomer
25. Developed the first predictive model of the solar system
26. Developed the Laws of planetary motion
27. Discovered the moons of Jupiter using a telescope
28. First person to accurately estimate the size of Earth

a) Ptolemy
b) Aristarchus
c) Galileo
d) Isaac Newton
e) Erastosthenes
f) Aristotle
g) Johannes Kepler
h) Nicolaus Copernicus
i) Tycho Brahe

Answer the following three questions (29-31) using the atomic energy diagram below:
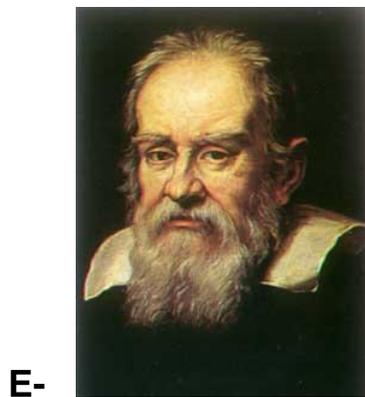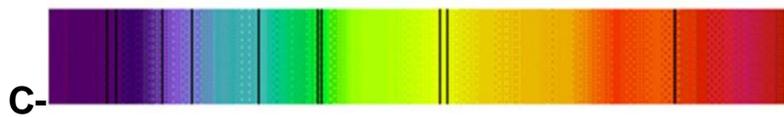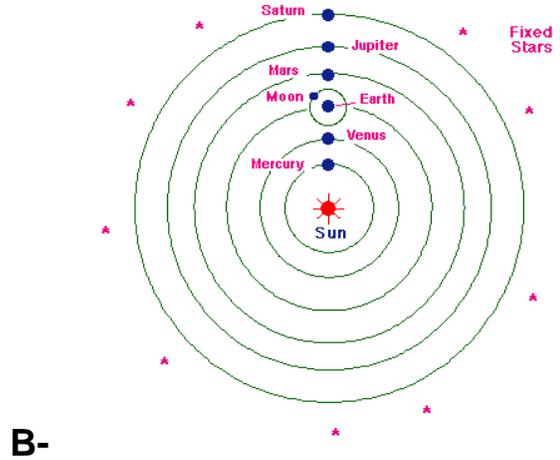
Energy Level
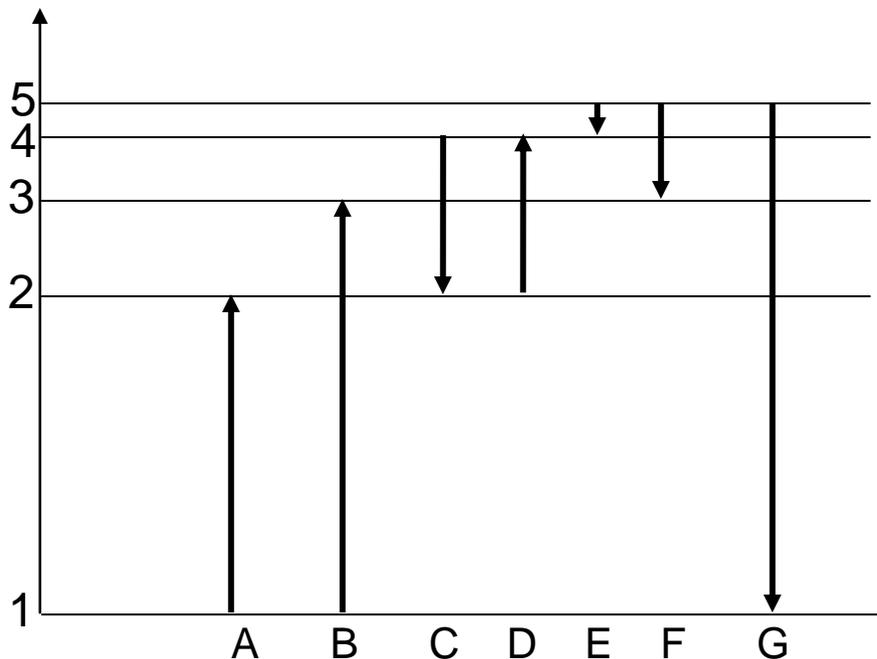
29. Which transition(s) (A,B,C,D,E,F,G) requires the absorption of a photon?

30. Which transition emits the most amount of energy?

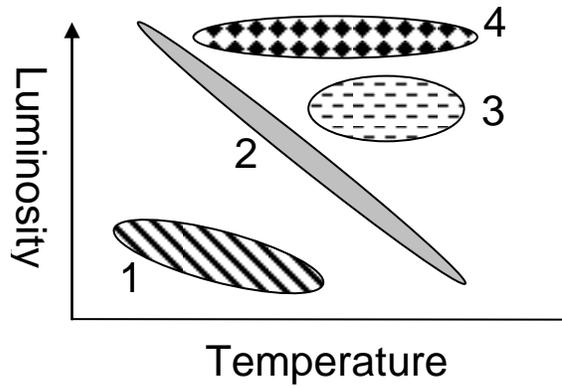31. Which transition absorbs the longest wavelength photon?

32. An object is observed from Earth to have its spectral lines blue-shifted. Is the object moving away from Earth or towards the Earth?

33. Which star is larger in radius: One with a spectral class of M2V or one with a spectral class K4III ?

34. If the Sun were 10 parsecs from the Earth, would it be visible, without the use of a telescope, in a dark, nighttime sky?

35. Which star is the brightest that could be seen in the night sky (from Rocklin)?

36. Suppose star A and star B are identical in stellar properties but lie at different distances from the Earth. If the brightness of star A is 10 magnitudes brighter than star B, how many times further away is star B as compared to star A?

37. What is the second most common element in a typical star?

38. Are the largest telescopes used by astronomers refractors or reflectors?

39. If the net force upon on object is 60 Newtons in the westward direction, can it have a zero acceleration?

40. If photon A has half the energy as photon B, and photon B is green (wavelength = 550 nm), what color or what wavelength regime is photon A?
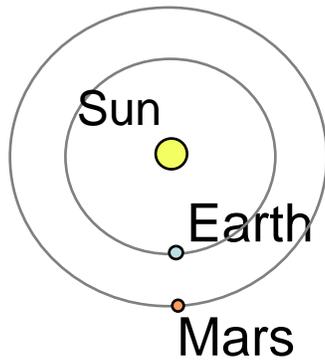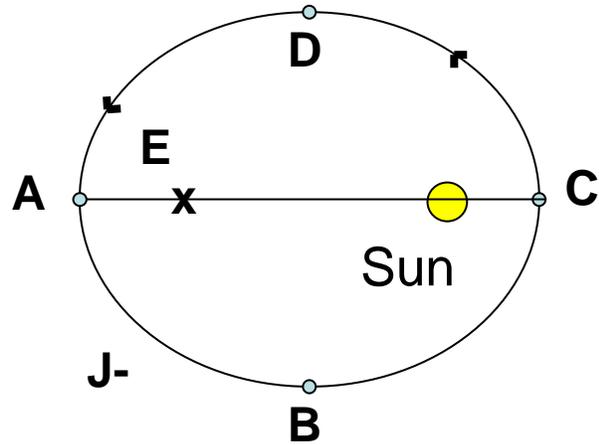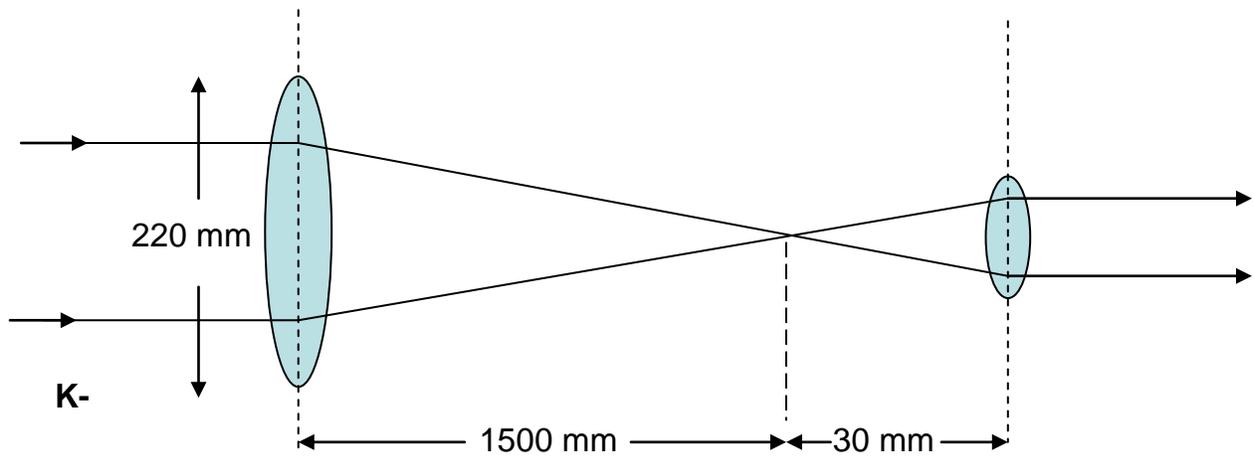
FIGURES PAGE

A-

B-

C-

D-

E-

F-

G-

Luminosity vs. Temperature

H-

I-

Sun
Earth
Mars

J-

D
E
A — X — C
Sun
B

K-

220 mm

1500 mm — 30 mm