

SECOND EXAM
 APAS 1110 SECTION 001
 November 6, 2000

Possibly Useful Information:

$$\begin{array}{llll}
 c=3 \times 10^{10} & G=6.7 \times 10^{-8} & h=6.6 \times 10^{-27} & \sigma=5.7 \times 10^{-5} \\
 1 \text{ pc}=3 \times 10^{18} \text{ cm} & 1 \text{ AU}=1.5 \times 10^{13} \text{ cm} & M_{\odot}=2 \times 10^{33} \text{ g} & R_{\odot}=7 \times 10^{10} \text{ cm} \\
 \mathbf{In} = c & E = h\nu & L = \mathbf{sAT}^4 & F = ma & \mathbf{IT} = 3 \times 10^7 & x = vt & v = at \\
 P = \frac{2pr}{v} & P = 2p\sqrt{\frac{r^3}{GM}} & v = \sqrt{\frac{2GM}{r}} & \frac{v}{c} = \frac{dl}{I_0} & R = \frac{2GM}{c^2}
 \end{array}$$

MULTIPLE CHOICE (4 points each). Do all 25 – Mark answers on scantron sheet.

1. Which is the weakest force of nature?
 a) gravity b) electromagnetic c) weak nuclear d) strong nuclear
2. The escape velocity from the Moon is approximately:
 a) 55mph b) 100 km/hr c) 2 km/s d) 650km/s e) 300,000 km/s
3. Which of the bands has the shortest wavelength?
 a) infrared b) x-rays c) visible d) gamma-rays e) radio
4. If the Sun were to double its surface temperature without changing size, by what factor would its luminosity increase?
 a) 2 b) 4 c) 8 d) 16 e) no change
5. On which planet is the largest mountain in the solar system?
 a) Venus b) Earth c) Mars d) Uranus e) Pluto
6. Olympus Mons is near:
 a) Ishtar Terra b) Beta Regio c) Mare Orientale d) Athens e) Tharsis Bulge
7. You are standing on the rim of a great canyon. Behind you looms a dormant volcano. Suddenly a giant sand storm kicks up. You take off your mask to see better and asphyxiate. Where were you?
 a) Venus b) Earth c) Mars d) Mercury e) Moon
8. Which body in the solar system looks the most like our Moon?
 a) Mercury b) Venus c) Mars d) Titan e) Charon
9. Which body other than Earth has polar caps?
 a) Mercury b) Venus c) Mars d) Moon e) Ganymede
10. How many fundamental forces of nature do we know of?
 a) 1 b) 2 c) 3 d) 4 e) 5

11. Wien's Law relates the
- a) temperature and luminosity of an object
 - b) color and temperature of an object
 - c) energy and wavelength of a photon
 - d) wavelength and velocity of an object
12. Which part of the Moon is the oldest?
- a) maria
 - c) crater floors
 - d) highlands
 - c) rille areas
13. Which spacecraft landed on Mars?
- a) Viking
 - b) Pioneer
 - c) Voyager
 - d) Surveyor
 - e) Mariner
14. What holds atomic nuclei together?
- a)electromagnetic force
 - b)electroweak force
 - c)strong nuclear force
 - d)gravity
 - e)none of these
15. Deimos has a radius 1000 times smaller than the Earth. Its mass is ten billion (10000000000) times smaller. Using the fact that the escape velocity from the Earth is 11 km/sec, find the escape velocity from Deimos.
- a) 11cm/s b) 3.5m/s c) 11km/s d) 356,000km/s
16. The loosely packed layer of rock fragments which covers the Moon's surface is called:
- a) silt b) magnetite c) regolith d) detritus e) sandstone
17. The frequency of a 1000\AA photon is:
- a) 10^{-3}Hz b) $3 \times 10^5\text{Hz}$ c) 10^8Hz d) $3 \times 10^{15}\text{Hz}$
18. The InfraRed Astronomy Satellite detected an emission peak from the star Vega at $600,000\text{\AA}$. What is the temperature of the emitting material?
- a) 10K b) 50K c) 300K d) $3 \times 10^4\text{K}$
19. The giant canyons on Mars are thought to be caused by:
- a) lava flows b) meteor impacts c) water flows d) little green men

20. An astronomer observing a star in the constellation Scorpius discovers that in January the star is receding at 30km/sec but in July it is approaching at 30 km/sec. She should conclude that:

- a) there is a problem with her telescope.
- b) the star is a binary.
- c) the star is being accelerated.
- d) she is measuring the motion of the Earth.

21. When a rocket expels exhaust backward, it moves forward. This is an example of:

- a) Newton's third law
- b) Keplers first law
- c) Newton's Law of Gravitation
- d) Archimede's Principle

22. If the mass of the sun were to be increased by a factor of four, what would be the period of a planet at 1AU?

- a) 16 years
- b) 4 years
- c) 1 year
- d) 6 months
- e) 3 months

23. A rocketship communicates with Earth via a laser which emits a lab wavelength of 6328Å. On Earth the radiation is seen to have a wavelength of 6334Å. The rocket is:

- a) approaching at 300km/s
- b) receding at 300km/s
- c) approaching at 300km/hr
- d) receding at 300km/hr

24. Chemical composition of a planet can be studied remotely by measuring:

- a) Doppler shift
- b) parallax
- c) absorption lines
- d) magnitude variations

25. The gravity on the surface of Mars compared to Earth is:

- a) twice
- b) equal
- c) one third
- d) one tenth

Answers: 1a, 2c,3d,4d,5c,6e,7c,8a,9c,10d,11b,12d,13a,14c,15b,16c,17d,18b,19c
20d,21a,22d,23b,24c,25c