Name : _____
Student # : _____

STUDENT NAME _____

STUDENT ID NUMBER _____

LAKEHEAD UNIVERSITY
Examination Cover Page

SUBJECT	COURSE NUMBER	SECTION	DEPARTMENT
GSCI	2310	FDE	Physics

COURSE TITLE	INSTRUCTOR NAME
Astronomy I	Wolfe Wall

EXAM DATE			EXAM TIME & DURATION
December 15, 2018			6 PM (2 hours)

TYPE OF EXAMINATION Please choose one: ☐ Midterm ☑ Final ☐ Special

Examination Information

- one page of handwritten notes is permitted
- Time: 2 hours
- This exam paper may NOT leave the examination room

This examination question paper MAY NOT be taken from the examination room.

STUDENTS PLEASE NOTE:

YOU MUST count the number of pages in this examination question paper **BEFORE** beginning to write. Report **ANY** discrepancy immediately to your instructor/invigilator.

There are 8 pages in total.
(Including this cover page)

Name : _____
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Answer all questions on the Computer Answer Sheets provided

(don't forget to completely fill in your Name and Seven digit student Number)

1. **Which event will occur next in our calendar, starting today?**
   - *A. equator*
   - *B. solstice*
   - *C. equinox*
   - *D. ecliptic*

2. **The Autumnal equinox is that time of the year when**
   - *A. the sun crosses the equatorial plane, moving North*
   - *B. the Earth is at its closest point to the sun*
   - *C. the sun crosses the equatorial plane, moving South*
   - *D. the sun crosses the ecliptic plane*

3. **The Azimuth and Altitude of an object located due East and on the horizon are**
   - *A. azimuth 0 degrees, altitude 90 degrees*
   - *B. azimuth 90 degrees, altitude 90 degrees*
   - *C. azimuth 180 degrees, altitude 0 degrees*
   - *D. azimuth 90 degrees, altitude 0 degrees*
   - *E. azimuth 0 degrees, altitude 0 degrees*

4. **A waxing gibbous moon in September could set at which of the following azimuths**
   - *A. azimuth 185 degrees*
   - *B. azimuth 265 degrees*
   - *C. azimuth 275 degrees*
   - *D. azimuth 175 degrees*

5. **On the day of the Winter Solstice, (approximately December 21st each year), which of the following conditions holds?**
   - *A. the sun follows the celestial meridian across the sky*
   - *B. day and night are each almost exactly 12 hours long at all locations on the Earth*
   - *C. the length of daylight is longest on this day*
   - *D. the sun rises at its most Southerly point on the horizon on this day*

6. **Kepler's third law points out that, among the planets in the solar system, the farther a planet is from the sun, then the**
   - *A. more inclined is its orbit.*
   - *B. more eccentric is its orbit.*
   - *C. slower its orbital speed.*
   - *D. faster its orbital speed.*

7. **Which of the following never occurs during the orbit of a planet.**
   - *A. Acceleration is perpendicular to velocity*
   - *B. Acceleration is in the same direction as velocity*
   - *C. Acceleration is angled opposite to velocity*
   - *D. Acceleration is angled in the same direction as velocity*

8. **Retrograde motion of a superior planet occurs when the planet is ...**
   - *A. in conjunction with the Moon.*
   - *B. dimmer than average*
   - *C. brighter than everage*
   - *D. near the Autumnal equinox.*
   - *E. near a solstice*

9. **Which of the following is not true concerning atomic spectra**
   - *A. Emmission lines occur only at particular frequencies*
   - *B. For any atom, the frequencies of the absorbtion lines are also the frequencies of the emmission lines*
   - *C. Emmission lines occur at frequencies at which light is emmitted from an electron*
   - *D. Atoms emmit photons when their electrons move from the lowest energy state to an exited state*

10. **Which of the following types of light has the lowest frequency**
    - *A. Ultraviolet light*
    - *B. Green light*
    - *C. Red light*
    - *D. Infrared light*

11. **The most important factor determining the light-gathering power of a refracting telescope is...**
    - *A. The focal length of the eyepiece*
    - *B. The diameter of the objective lens*
    - *C. The length of the casing*
    - *D. The material the lens is made of*

12. This planet is nearest to the Sun:

- ***A. Jupiter***
- ***B. Venus***
- ***C. Mercury***
- ***D. Saturn***

13. The four largest moons of Jupiter were discovered by:

- **A. Newton**
- **B. Eratosthenes**
- **C. Copernicus.**
- **D. Tycho Brahe**
- **E. Galileo**

14. The surface temperature at night (i.e. on the dark side) on Venus is _____ that on the bright side.

- ***A. much hotter than***
- ***B. nearly as hot as***
- ***C. much cooler than***
- ***D. a little hotter than***
- ***E. The answer depends on the season of the year.***

15. Which of the following is closest to the declination of a planet having a Right Ascension of 16 hours ?

- ***A. +70 degrees***
- ***B. +20 degrees***
- ***C. -20 degrees***
- ***D. -70 degrees***
- ***E. not enough information is given to estimate the declination of the planet***

16. The overall shape of the orbits of most of the planets in the solar system is

- ***A. perfectly circular***
- ***B. elliptical, very elongated***
- ***C. parabolic***
- ***D. slightly elongated, or elliptical, but nearly circular***

17. Compared to the Jovian planets, on the average, terrestrial planets are

- ***A. more dense and more massive.***
- ***B. more dense and less massive.***
- ***C. less dense and more massive.***

18. The largest of the terrestrial planets is

A. Venus
B. Jupiter
C. Earth
D. Mars

19. Which of the following statements is true of all of the planets?

A. their axes point toward Polaris.
B. they rotate on their axes and revolve around the sun.
C. they rotate about their axes in the same sense
D. they revolve about the Sun in the same sense
E. they have at least one moon.
F. more than one of the above are true of all the planets.

20. Why does Mercury have so many craters and the Earth so few?

A. Mercury is far more volcanically active than the Earth.
B. Mercury's iron core and its resulting strong magnetic field have attracted impacting bodies.
C. Mercury is much more massive than the Earth and therefore attracted more impacting bodies.
D. The Sun has heated Mercury's surface to the boiling point of rock and the resulting bubbles left craters
E. Erosion and plate tectonic activity have destroyed most of the craters on the Earth.

21. One explanation of why the planets near the Sun are composed mainly of rock and iron is that

A. The Sun's magnetic field attracted all the iron in the young Solar System into the region around the Sun.
B. The statement is false. The planets nearest the Sun contain large amounts of hydrogen gas and subsurface water.
C. The Sun is made mostly of iron. The gas ejected from its surface is therefore iron so that when it cooled and condensed it formed iron-rich planets near the Sun.
D. The Sun's heat made it difficult for other substances such as ices and gases to condense near it.
E. The Sun's gravitational attraction pulled iron and other heavy material inward and allowed the lighter material to float outward.

22. What object was located at the centre of Aristarchus's model of the Solar System

A. The central fire
B. The Sun
C. The Earth
D. The Moon

23. The numerous craters we see on the solid surfaces of so many Solar System bodies are evidence that

A. they were so hot in their youth that volcanoes were widespread.
B. all the planets were once part of a single, very large and volcanically active mass that subsequently broke into many smaller pieces.
C. the Sun was so hot that it melted all these bodies and made them boil.
D. these bodies were originally a mix of water and rock. As the young Sun heated up, the water boiled, creating hollow pockets in the rock.
E. they were bombarded in their youth by many solid objects.

24. According to nebular theories, the planets formed from material which was

A. part of the collapsing cloud which formed the sun
B. pulled from the sun during a collision with another star
C. ejected from the sun by an explosion
D. captured by the sun from interstellar space

25. What will be the reading on the star clock at 10 PM local time on February 21 as seen from Thunder Bay ?

- *A. 14 O'clock*
- *B. 4 O'clock*
- *C. 2 O'clock*
- *D. 10 O'clock*
- *E. 12 O'clock*

26. What will be the reading on the star clock at 5 AM local time on July 21 as seen from Thunder Bay ?

- *A. 13 O'clock*
- *B. 7 O'clock*
- *C. 6 O'clock*
- *D. 9 O'clock*
- *E. 12 O'clock*

27. When it is August 21 and the star clock reads 10 O'clock as seen from Ottawa, what is local time ?

- *A. 8 am*
- *B. 1 pm*
- *C. 6 pm*
- *D. 11 am*

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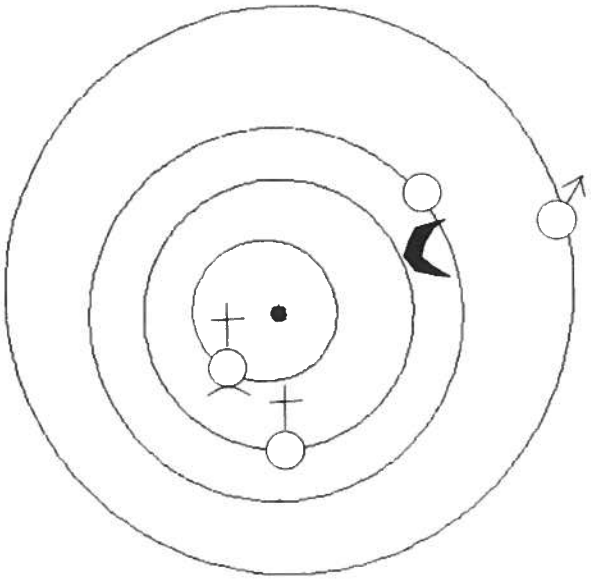
The Remaining Questions Refer to the God's Eye View Below...



28. Which of the following could be the date

- ***A. December 7***
- ***B. January 7***
- ***C. June 7***
- ***D. July 7***

29. What is the phase of the moon

- ***A. Waxing Crescent***
- ***B. Waning Gibbous***
- ***C. Waxing Gibbous***
- ***D. Waning Crescent***

30. Which planets will be seen from Earth to move in a retrograde sense

- ***A. Venus and Mars***
- ***B. Mercury and Mars***
- ***C. Mars only***
- ***D. Mercury only***