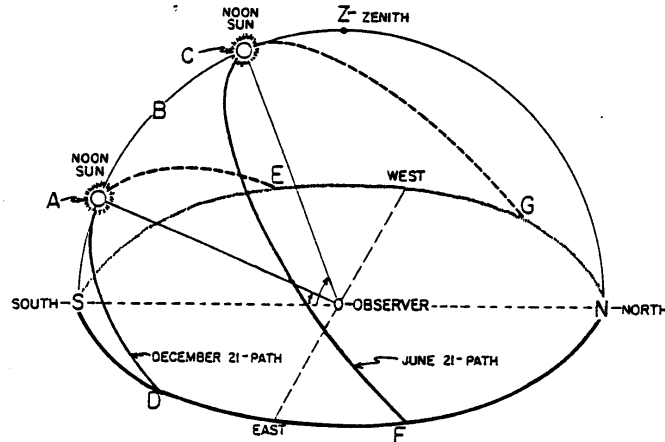


Name _____

Date _____

Topic IVB Practice Exam – Earth Motions

Base your answers to questions 1-3 on your knowledge of Earth Science and on the diagram below, which represents the apparent paths of the sun in New York State on the dates indicated. Write the number of the word or expression that best completes each statement or answers each question.



1. Based on the diagram which statement is true
 - 1 The Sun passes through the zenith on December 21st.
 - 2 The Sun rises due east and sets due west on December 21st.
 - 3 The Sun passes through the zenith on June 21st.
 - 4 The Sun rises north of east and sets north of west on June 21st.

2. On which date will the noon Sun be nearest to position B ?
 - 1 September 23
 - 2 November 21
 - 3 December 21
 - 4 January 21

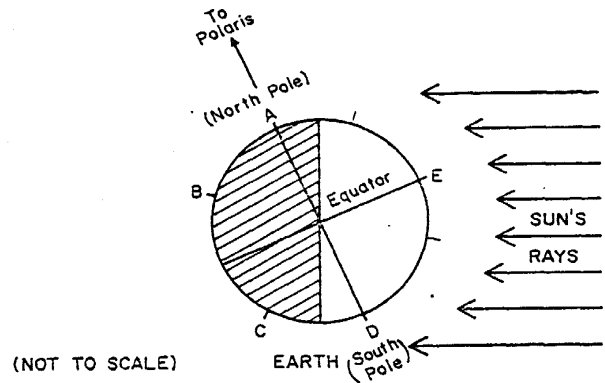
3. What causes the Sun's path to be different on December 21 from the Sun's path on June 21 ?
 - 1 the Sun's revolution and tilt of the Earth's axis
 - 2 the Sun's rotation and the tilt of the Earth's axis
 - 3 the Earth's rotation and the tilt of the axis of the Sun
 - 4 the Earth's revolution and tilt of the axis

4. A rocket is fired from the North Pole directly at point A. To an observer at point X on the Earth's surface, the rocket's path appears to curve and it misses point A. This is evidence that
 - 1 the gravitational attraction varies over the surface of the Earth
 - 2 the Earth rotates on its axis
 - 3 the Earth orbits around the Sun in an elliptical path
 - 4 differences in air pressure exist between the North Pole and point A.

Use the diagram to the right to answer questions 5-6.

5. During which month is the Earth in the position shown in the diagram?

- 1 March
- 2 September
- 3 June
- 4 December

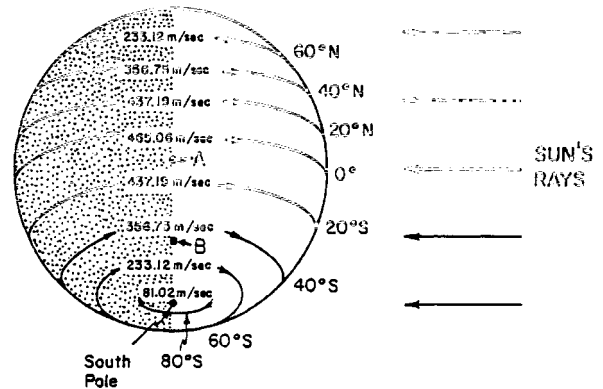


6. At which location would an observer on the surface of the Earth not be able to observe the sun at any time during the next 24 hours?

- | | |
|-----|-----|
| 1 A | 3 D |
| 2 B | 4 E |

7. During which month would the Sun's rays strike the Earth, as shown in the diagram?

- | | |
|----------|-------------|
| 1 June | 3 September |
| 2 August | 4 December |



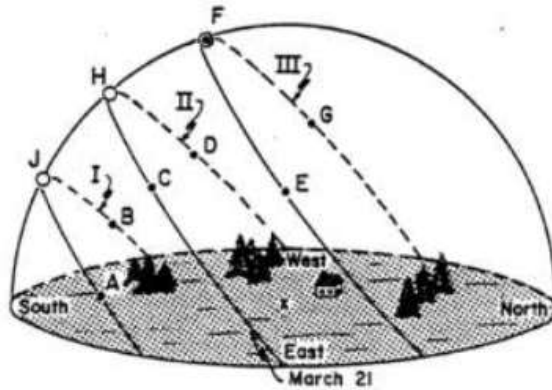
8. Some constellations (star patterns) observed in the summer skies in New York State are different from those observed in the winter skies. The best explanation for this observation is that

- 1 the Earth revolves around the Sun
- 2 the Earth rotates on its axis
- 3 constellations are moving away from the Earth
- 4 constellations revolve around the Earth

9. On the Earth, a freely swinging pendulum gradually shows a change in the direction of its swing. This change is evidence that the Earth

- | | |
|---------------------------|------------------------------------|
| 1 has an elliptical orbit | 3 is an orbiting natural satellite |
| 2 rotates on its axis | 4 revolves around the Sun |

Base your answers to questions 10-14 on your knowledge of earth science and the diagram below. The diagram represents the apparent path of the Sun at three different dates during the year as it appears to an observer in New York State. The paths are labeled I, II, III and letters A through G are points on the paths. Path II occurs on March 21.



10. Which statement explains the apparent daily motion of the Sun across the sky along path II?
 - 1 The Earth rotates on its axis.
 - 2 The Earth revolves around the Sun.
 - 3 The Earth's axis is inclined to its orbit.
 - 4 The Earth's orbit is elliptical.

11. The angular distance along path II between points C and D is measured to be 90° . Approximately how much time would be required for the Sun to move this distance?

1 1 hour	3 4 hours
2 2 hours	4 6 hours

12. What would be the position of the Sun at 3 p.m. in December?

1 A	3 E
2 B	4 G

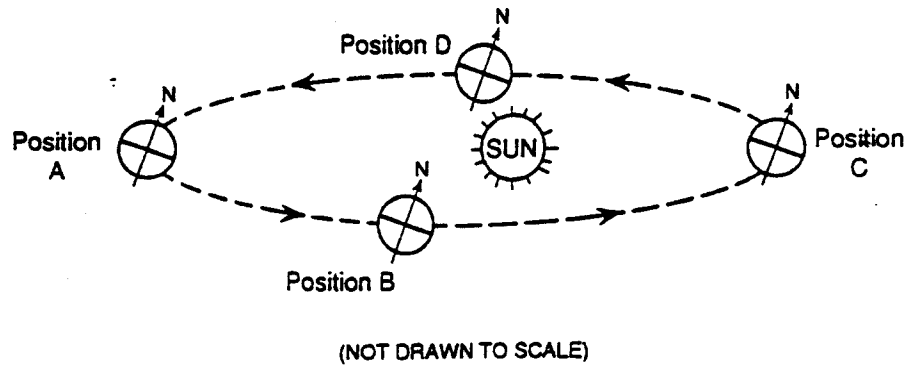
13. Which would be the approximate length of the daylight period for the observer when the Sun travels along the entire length of path I?

1 9 hours	3 15 hours
2 12 hours	4 18 hours

14. The Sun is at point F, which is the maximum altitude of the Sun for the year. A vertical stick is placed at location X, and the stick's shadow is measured each noon for the next 30 days. During this time, the length of the shadow will
 - 1 become shorter
 - 2 become longer
 - 3 remain the same

15. For an observer at $23\frac{1}{2}^{\circ}$ N. latitude, on what date would the Sun be directly overhead?
- | | |
|----------------|---------------|
| 1 September 23 | 3 December 21 |
| 2 June 21 | 4 January 21 |

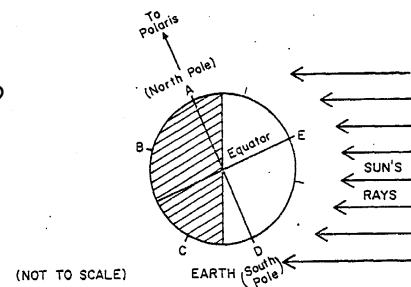
Base your answers to questions 16-17 on the diagram below which shows four positions of the Earth in its orbit around the Sun. The diagram indicates relative positions of the Earth to the Sun, last the diagram has not been drawn to scale.



16. When the Earth is at position D, where will the Sun appear to rise anywhere in New York State?
- | | |
|---------------------|---------------------|
| 1 due west | 3 due east |
| 2 north of due east | 4 south of due east |
17. Which point in the diagram represents the first day of summer in the Northern Hemisphere?
- | | | | |
|-----|-----|-----|-----|
| 1 A | 2 B | 3 C | 4 D |
|-----|-----|-----|-----|
18. Which correctly pairs the Earth motion with its supporting evidence?
- | | |
|--|-----------------------------------|
| (1) rotation: seasonal constellations vary | (3) rotation: deflection of winds |
| (2) revolution: star trails | (4) revolution: parallelism |

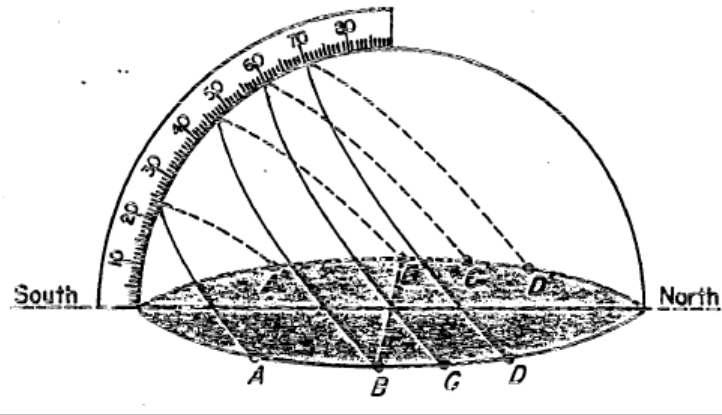
Base your answers to **questions 19 and 20** on the diagram below.

19. Which latitude on Earth is receiving the Sun's direct rays at noon?
- | |
|-------------------------|
| (1) the Equator |
| (2) Tropic of Cancer |
| (3) Tropic of Capricorn |
| (4) New York |



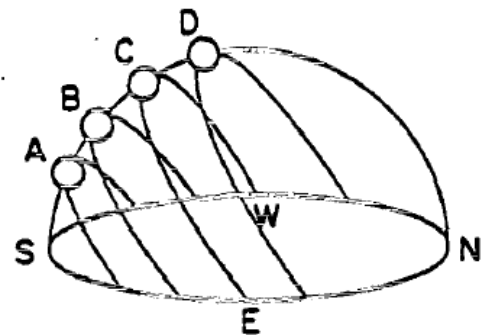
20. As an observer travels from the Equator to the South Pole, the daylight hours he would experience would
- | |
|---------------------|
| (1) increase |
| (2) decrease |
| (3) remain the same |

Questions 21 and 23: The diagram below represents a plastic hemisphere upon which lines have been drawn to show the apparent paths of the Sun on four days at a location in New York State. Two of the days are December 21 and June 21. The protractor is placed over the north-south line.



21. On which two dates could the Sun have followed path C-C'?
- | | |
|--------------------------------|-------------------------------|
| (1) October 22 and November 28 | (3) May 7 and August 1 |
| (2) January 27 and August 21 | (4) September 9 and January 7 |
22. Which path was recorded on a day that had twelve hours of daylight and twelve hours of darkness?
- | | |
|----------|----------|
| (1) A-A' | (3) C-C' |
| (2) B-B' | (4) D-D' |
23. An observer is watching the Sun rise on December 21st in this location. What direction will that observer's shadow point just as the Sun rises above the horizon?
- | | |
|---------------|---------------|
| (1) due north | (3) northeast |
| (2) due west | (4) northwest |

Use the diagram to the right to answer questions 24 and 25.



24. What would be the altitude of the Sun at noon in June?
- | | |
|---------|---------|
| (1) 15° | (3) 45° |
| (2) 22° | (4) 72° |
25. For which path would the daylight hours be the shortest?
- | | |
|-------|-------|
| (1) A | (3) C |
| (2) B | (4) D |
26. The time it takes for one Earth revolution is
- | | |
|---------------|----------------|
| (1) one day | (3) one year |
| (2) one month | (4) one decade |

27. The diagram below shows the noontime shadows cast by a student and a tree.



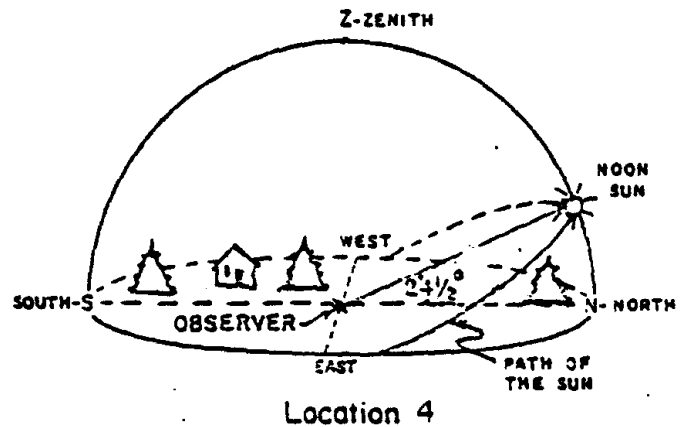
If the time is solar noon and the student is located in New York State, in what direction is the student facing?

- (1) south
(2) north
(3) east
(4) west
28. If Earth's axis were tilted 35° instead of 23.5° , the average temperatures in New York State would most likely
- (1) decrease in both summer and winter
(2) increase in summer and decrease in winter
(3) decrease in summer and increase in winter
(4) increase in both summer and winter

29. The celestial sphere to the right represents a location on the Earth.

At which latitude could the observations of the Sun have been made?

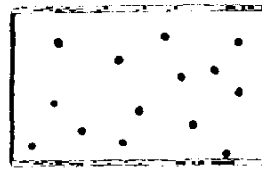
- (1) 41°N latitude
(2) 41°S latitude
(3) 90°N latitude
(4) 0° latitude



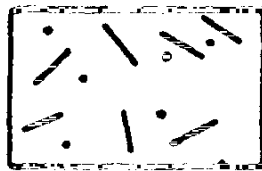
30. How would a three hour time exposure photograph of stars in the northern sky appear as a result of Earth's rotation?



(1)



(3)



(2)



(4)