20. Which of the following would best be described as cumulative zoning?

(A) Euclidian zoning
(B) zoning with areas restricted solely to a single use type
(C) zoning with areas restricted to one use type plus any other less-intense uses
(D) inclusionary zoning

21. Which of the following would be a characteristic of an exclusionary zoning ordinance?

(A) restricts “cluster” type subdivisions
(B) does not allow transitional zoning
(C) specifically prohibits a particular use
(D) tries to expand access for households of low and moderate income

22. Global positioning system (GPS) heights are typically which of the following?

(A) ellipsoidal heights
(B) geoidal heights
(C) orthometric heights
(D) the differences between the orthometric height and the ellipsoidal height

23. Assuming a 5% interest rate and performing a comparative analysis of the present worth of the following two alternatives, which alternative is most nearly economically superior, and by how much?

alternative 1: buying new equipment for $80,000 with a payback of $24,000 per year for 5 years

alternative 2: investing in bonds for $80,000 with a return of $120,000 after 5 years

(A) Alternative 1 is economically superior by about $6000.
(B) Alternative 1 is economically superior by about $10,000.
(C) Alternative 2 is economically superior by about $6000.
(D) Alternative 2 is economically superior by about $10,000.

24. If the coordinates of sta 1 are N = 10,000 ft and E = 10,000 ft and the bearing for line 1-2 is south, what are the coordinates for sta 3?

(A) N = 9910 ft, E = 10,654 ft
(B) N = 9911 ft, E = 10,622 ft
(C) N = 9917 ft, E = 10,630 ft
(D) N = 9922 ft, E = 10,639 ft

25. If the elevation of sta 1 is 100 ft, what is most nearly the elevation of sta 3?

(A) 100 ft
(B) 140 ft
(C) 180 ft
(D) 290 ft

26. What is most nearly the area of the figure formed by sta 1, sta 2, and sta 3?

(A) 4.3 ac
(B) 4.4 ac
(C) 4.5 ac
(D) 5.0 ac

27. When subdividing a U.S. Public Land Survey section, in what direction should the east-west centerline be run?

(A) in a cardinal direction (east or west) from either the east or west quarter-section corner
(B) from the quarter-section corner on either the east or west side to the corresponding corner on the opposite side
(C) parallel to the north line from either the east or west quarter-section corner
(D) parallel to the average of the north and south lines from either the east or west quarter-section corner
geodetic distance = \left( \frac{\text{radius to ellipsoid}}{\text{radius to surface}} \right) \times (\text{measured distance at surface})

= \left( \frac{20,906,000 \text{ ft}}{20,906,000 \text{ ft} + 1500 \text{ ft}} \right) (2640 \text{ ft})

= 2639.81 \text{ ft} (2640 \text{ ft})

The answer is (D).

15. The monthly payment for a $100,000 five-year loan with an annual interest of 6% is calculated using the capital recovery factor.

\[ A = P \left( \frac{1}{1 + i^n} \right) \]

\[ = \left( \frac{100,000}{1 + 0.06^5} \right) \]

\[ = \frac{100,000}{1.06} \]

\[ = 9345.79 \]

The answer is (A).

16.

The geoid is the equipotential surface that best fits, in a least-squares sense, mean sea level. Therefore, where the earth’s surface is considerably lower than the geoid, the area is probably below sea level.

The answer is (C).

17. In a Lambert projection, the mapping angle varies with longitude.

The answer is (B).

18. For a $100,000 two-year single-payment loan, the repayment amount can be calculated using the equation for a single payment compound amount.

\[ F = P(1 + i)^n = (100,000)(1 + 0.10)^2 = 121,000 \]

The answer is (C).

19. The area of the southeast quarter of the southeast quarter of a standard public lands section is 40 ac.

\[ A_{\text{right of way}} = L \left( \frac{1 \text{ ac}}{43,560 \text{ ft}^2} \right) \]

\[ = (4700 \text{ ft})(80 \text{ ft}) \left( \frac{1 \text{ ac}}{43,560 \text{ ft}^2} \right) \]

\[ = 8.6 \text{ ac} \]

\[ A_{\text{countable}} = A_{\text{total}} - A_{\text{right of way}} \]

\[ = 40 \text{ ac} - 8.6 \text{ ac} \]

\[ = 31.4 \text{ ac} \]

yield = \left( A_{\text{countable}} \right) (\text{density})

\[ = (31.4 \text{ ac}) \left( \frac{3 \text{ lots}}{\text{ac}} \right) \]

\[ = 94 \text{ lots} \]

The answer is (C).

20. Cumulative zoning is zoning with areas restricted to one land use type plus other less-intense uses.

The answer is (C).

21. An exclusionary zoning ordinance specifically prohibits a particular land use.

The answer is (C).

22. GPS heights are typically ellipsoidal heights.

The answer is (A).

23. Calculate and compare the present worth of each alternative. Using the uniform series present worth factor for alternative 1, the present worth is

\[ P_1 = A \left( \frac{1}{1 + i} \right) \]

\[ = \left( \frac{100,000}{1 + 0.05} \right) \]

\[ = \frac{100,000}{1.05} \]

\[ = 94,737 \]

Using the single payment present worth factor for alternative 2, the present worth is

\[ P_2 = F \left( \frac{1}{1 + i} \right) \]

\[ = \frac{120,000}{1 + 0.05} \]

\[ = 114,023 \]

Therefore, alternative 1 has a present worth that is $94,737 – $114,023 = $9884 ($10,000) greater than the present worth of alternative 2.

The answer is (B).