

6. An assassinee is an important person killed by someone; whereas, a martyr is any person killed because of their political beliefs. Abbune was killed on the cause of freedom, whereas, President Safi was shot dead in broad light. From this we can conclude that: (1)
- A. When Abbune is an assassinee, Safi is a martyr.
 - B. Both Safi and Abbune are assassinees.
 - C. ✓ **When Saji is an assassinee, Abbune is a martyr.**
 - D. Both Saji and Abbune are martyrs.

Answer: C

An assassinee is an important person killed (like President Safi), and a martyr is someone killed for their beliefs (like Abbune, killed for freedom). Thus, Safi is an assassinee and Abbune is a martyr.

7. People who speak French can also speak English. Alex is French and Tom is American. To be an American, one should be able to speak English. Which of the following is, therefore, necessarily true? (1)
- A. Tom speaks both French and English.
 - B. ✓ **Tom speaks English.**
 - C. Alex speaks French.
 - D. Alex speaks both French and English.

Answer: B

Since to be an American one must speak English, and Tom is American, it logically follows that Tom speaks English.

8. In a pseudo language called Vandu, dvt means work, gnafu means drives. gnafye means drivers. dvty means worker. gnadfaa means drove. What does dvtye gnadfaa mean in Vandu? (1)
- A. Worker drives.
 - B. Drivers drove.
 - C. Driver drives.
 - D. ✓ **Workers drove.**

Answer: D

The root 'dvt' means work, and suffix '-ye' denotes plural agent (workers). 'gnadfaa' means drove, so 'dvtye gnadfaa' means 'Workers drove.'

9. Based on the data in question 13, the past tense form of work in Vandu is: (1)
- A. dvted
 - B. ✓ **dvtaa**
 - C. dvtu
 - D. dvtya

Answer: B

The past tense in Vandu is marked by the ending '-aa' as seen in 'gnadfaa' (drove) from root 'gnaf', so 'dvt' (work) becomes 'dvtaa'.

10. Based on the data in question 13, if kont means girl, its plural form will be: (1)
- A. konty
 - B. konts
 - C. ✓ **kontye**
 - D. konte

Answer: C

In Vandu, the plural form of an agent/noun is made by appending '-ye' to the root, so 'kont' (girl) becomes 'kontye' (girls).

11. Which of the following is a word in English formed from three consecutive letters? (1)
- A. ✓ **feed**
 - B. face
 - C. bead
 - D. bad

Answer: A

The word 'feed' contains the letters F, E, and D, which are three consecutive letters of the alphabet (D, E, F).

12. Learning to swim was not easy for me, but in the end my ____; paid off. (1)
- A. strength
B. experience
C. tolerance
D. ✓ **persistence**

Answer: D

The sentence describes overcoming a difficult task through continued effort, making 'persistence' the most appropriate choice.

13. He was charged with carrying an offensive _____. (1)
- A. thought
B. ✓ **weapon**
C. speech
D. belief

Answer: B

'Carrying an offensive weapon' is a standard English legal collocation referring to carrying an item intended for use as a weapon.

14. I work a minimum of 35-hours a week to put myself through school without ___ to the temptation of a student loan. (1)
- A. falling
B. combating
C. ✓ **succumbing**
D. surviving

Answer: C

The phrasal verb collocation 'succumbing to' means failing to resist pressure or temptation.

15. The skyscraper rose ___ at the center of the town. Every visitor loves to explore it. (1)
- A. thickly
B. brightly
C. ✓ **proudly**
D. highly

Answer: C

Buildings and skyscrapers are frequently described as rising 'proudly' in descriptive English writing.

16. On bad days I even felt ____; I just wanted to kill myself. (1)
- A. ✓ **suicidal**
B. poisoned
C. causal
D. pleased

Answer: A

Desiring to end one's own life is the definition of feeling 'suicidal'.

17. DISPENSE (1)
- A. spoil
B. ✓ **distribute**
C. expend
D. destroy

Answer: B

This section asks for synonyms. To 'dispense' means to distribute or give out to a number of people.

18. ERRAND (1)
- A. rider
B. passenger
C. brand
D. ✓ **messenger**

Answer: D

An 'errand' is a short journey to deliver a message or task, which is the defining role of a 'messenger'.

19. GRACEFUL (1)

- A. dominant B. great
C. grateful D. ✓ **attractive**

Answer: D

'Graceful' refers to showing elegance, beauty, and movement, which is synonymous with 'attractive'.

20. EQUIVOCALLY (1)

- A. clearly B. uniquely
C. ✓ **ambiguously** D. equally

Answer: C

To speak 'equivocally' means to speak in a way that is open to multiple interpretations, which is synonymous with 'ambiguously'.

21. CALCULATE: BALANCE; ____: paragraph. (1)

- A. construct B. ✓ **compose**
C. describe D. combine

Answer: B

The relationship is verb-to-noun: we calculate a balance, and we compose a paragraph.

22. AIRCRAFT: JET; ____: truck. (1)

- A. train B. airbus
C. ✓ **vehicle** D. taxi

Answer: C

The analogy is general-to-specific: a jet is a type of aircraft, and a truck is a type of vehicle.

23. ____ : soldier; GOWN: PHYSICIAN. (1)

- A. ✓ **uniform** B. tent
C. gun D. army

Answer: A

The analogy is item of clothing worn by a profession: a physician wears a gown, and a soldier wears a uniform.

24. Remote: ____; WIDE: NARROW. (1)

- A. distant B. control
C. television D. ✓ **accessible**

Answer: D

The relationship is antonymous: 'wide' is the opposite of 'narrow', and 'remote' (meaning isolated or distant) is the opposite of 'accessible'.

25. Which of the following is synonymous with the word intimidating in paragraph 2, line 2? (1)

- A. frustrating B. annoying
C. ✓ **frightening** D. disappointing

Answer: C

The word 'intimidating' means causing fear or loss of confidence, which is synonymous with 'frightening'.

26. If -3, 0 and 1 are zeros of a polynomial function $p(x)$ of degree 3, then which one of the following is true about $p(x)$? (1)

A. $p(-1) = 0$.
B. ✓ **x is a factor of $p(x)$.**
C. $x - 3$ is a factor of $p(x)$.
D. $p(x) = x^3 + 3x$.

Answer: B

According to the factor theorem, if c is a zero of a polynomial $p(x)$, then $x - c$ is a factor of $p(x)$. Since 0 is given as a zero of $p(x)$, $x - 0 = x$ must be a factor of $p(x)$.

27. Which one of the following is equal to $\sum_{n=1}^{48} \frac{5}{(n+1)(n+2)}$? (1)

A. 1.5
B. 1.2
C. ✓ **2.4**
D. 2.5

Answer: C

Using partial fraction decomposition, the term can be written as $5\left(\frac{1}{n+1} - \frac{1}{n+2}\right)$. Summing this telescoping series from $n = 1$ to 48 yields $5\left(\frac{1}{2} - \frac{1}{50}\right) = 5(0.5 - 0.02) = 2.4$.

28. If $(\sqrt[3]{x})^{-\frac{1}{3}} = 2^{-1}$, then which one of the following is the value of x ? (1)

A. ✓ **512**
B. $\frac{1}{512}$
C. -512
D. $-\frac{1}{512}$

Answer: A

Rewriting the equation gives $(x^{1/3})^{-1/3} = 2^{-1}$, which simplifies to $x^{-1/9} = 2^{-1}$. Raising both sides to the power of -9 gives $x = 2^9 = 512$.

29. What is a possible value of t in the sequence 100, 98, 94, 86, t , 38, ...? (1)

A. 78
B. ✓ **70**
C. 82
D. 54

Answer: B

The differences between consecutive terms are 2, 4, 8, ..., which are successive powers of 2. Following this pattern, the next difference is 16, so $t = 86 - 16 = 70$. This is confirmed by the subsequent term, as $70 - 32 = 38$.

30. Let $\{a_n\}$ be a sequence defined by $a_1 = 3$, $a_2 = 2$ and for each $n \geq 2$, $a_{n+1} = na_{n-1} - a_n$. Which one of the following is equal to a_6 ? (1)

A. 14
B. 56
C. -14
D. ✓ **-4**

Answer: D

Computing the sequence step-by-step: $a_3 = 2a_1 - a_2 = 4$; $a_4 = 3a_2 - a_3 = 2$; $a_5 = 4a_3 - a_4 = 14$; and $a_6 = 5a_4 - a_5 = 10 - 14 = -4$.

31. How many different arrangements of the digits of the number "234523" are there? (1)

A. ✓ **180**
B. 720
C. 360
D. 256

Answer: A

The number of permutations of the 6-digit number "234523" containing repeated digits is given by $\frac{6!}{2!2!} = \frac{720}{4} = 180$.

32. In which quadrant does the terminal side of angle -710° belong? (1)
- A. Second
B. Fourth
C. ✓ First
D. Third

Answer: C

To find the quadrant of -710° , we add multiples of 360° to find a coterminal angle in $[0^\circ, 360^\circ)$. Thus, $-710^\circ + 2(360^\circ) = 10^\circ$, which lies in the first quadrant.

33. If two six faced fair dice are rolled, what is the probability of getting a pair of numbers whose sum is either 6 or 12? (1)
- A. $\frac{5}{36}$
B. $\frac{2}{9}$
C. ✓ $\frac{1}{6}$
D. $\frac{7}{36}$

Answer: C

The total number of outcomes is 36. The outcomes that sum to 6 are $(1, 5), (2, 4), (3, 3), (4, 2), (5, 1)$ (5 outcomes), and the outcome that sums to 12 is $(6, 6)$ (1 outcome). The probability is $\frac{5+1}{36} = \frac{6}{36} = \frac{1}{6}$.

34. If today is Monday, then what is the day after 57 days starting from today? (1)
- A. Wednesday
B. Sunday
C. Monday
D. ✓ Tuesday

Answer: D

We compute $57 \pmod{7}$, which is 1. Therefore, 57 days from today is equivalent to 1 day after Monday, which is Tuesday.

35. A box contains 4 black, 5 white and 3 red balls of the same size. If a ball is drawn at random, what is the probability that the ball is neither black nor red? (1)
- A. ✓ $\frac{5}{12}$
B. $\frac{2}{3}$
C. $\frac{7}{12}$
D. $\frac{3}{4}$

Answer: A

The total number of balls is $4 + 5 + 3 = 12$. A ball that is neither black nor red must be white, of which there are 5, giving a probability of $\frac{5}{12}$.

36. A person deposited money in a microfinance that pays a simple interest rate of 12% per year. After three years, he/she received a total amount of Bir 163,200. Which one of the following was the initial amount in Bir deposited by the person? (1)
- A. 140,000
B. ✓ 120,000
C. 100,000
D. 280,000

Answer: B

Using the simple interest formula, $A = P(1 + rt)$, we have $163,200 = P(1 + 0.12 \times 3) = 1.36P$. Solving for P gives $P = \frac{163,200}{1.36} = 120,000$ Bir.

37. What is the value of k , if $\sum_{n=1}^{\infty} 5^{nk} = \frac{1}{4}$? (1)
- A. 2
B. -2
C. 1
D. ✓ -1

Answer: D

The infinite geometric series $\sum_{n=1}^{\infty} (5^k)^n$ converges to $\frac{5^k}{1-5^k} = \frac{1}{4}$ if $|5^k| < 1$. Cross-multiplying yields $4 \cdot 5^k = 1 - 5^k$, which simplifies to $5 \cdot 5^k = 5^{k+1} = 1$, hence $k = -1$.

38. Let x and y be real numbers such that $x > y$. Quantity A Quantity B $x^2 + y^2$ $2xy$ (1)
- A. Quantity B is greater than quantity A. B. The relationship cannot be determined.
C. ✓ **Quantity A is greater than quantity B.** D. The two quantities are equal.

Answer: C

For any distinct real numbers x and y , $(x - y)^2 > 0$ holds. Expanding this inequality gives $x^2 - 2xy + y^2 > 0$, which simplifies to $x^2 + y^2 > 2xy$. Therefore, Quantity A is strictly greater than Quantity B.

39. Quantity A Quantity B 20% of 80 30% of 60 (1)
- A. ✓ **Quantity B is greater than quantity A.** B. The relationship cannot be determined.
C. Quantity A is greater than quantity B. D. The two quantities are equal.

Answer: A

Quantity A is 20% of $80 = 16$, while Quantity B is 30% of $60 = 18$. Thus, Quantity B is greater than Quantity A.

40. The water bill for a past month of a certain family was Bir 200. The bill consisted of a fixed charge of Bir 20 plus a charge of Bir 2 per cubic meter for the water used in the month. How many cubic meters of water did the family consumed for the past month? (1)
- A. ✓ **90** B. 180
C. 110 D. 100

Answer: A

The total water bill of Bir 200 is composed of a fixed charge of Bir 20 plus Bir 2 per cubic meter. Setting up the equation: $20 + 2x = 200$, we find $2x = 180$, which gives $x = 90$ cubic meters.

41. Which of the following pairs of numbers are twin primes? (1)
- A. 3 and 11 B. ✓ **41 and 43**
C. 2 and 3 D. 19 and 23

Answer: B

Twin primes are pairs of prime numbers that differ by exactly 2. Among the choices, 41 and 43 are both prime numbers and $43 - 41 = 2$.

42. Which of the following is true about $x^2 + 3x - 4 = 0$? (1)
- A. It has only one solution. B. It has no real solution.
C. It has no solution. D. ✓ **It has two solutions.**

Answer: D

The quadratic equation $x^2 + 3x - 4 = 0$ can be factored as $(x + 4)(x - 1) = 0$, which yields two distinct real solutions, $x = -4$ and $x = 1$.

43. At a certain fruit shop, one mango is being sold for Bir 10 and one banana is being sold for Bir 5. If 30 fruits of mangos and bananas were purchased from the fruit shop for Bir 200, how many of the fruits were bananas? (1)
- A. 25 B. 15
C. 10 D. ✓ **20**

Answer: D

Let m be the number of mangoes and b be the number of bananas. From the system of equations $m + b = 30$ and $10m + 5b = 200$, we can substitute $m = 30 - b$ into the cost equation to get $10(30 - b) + 5b = 200$, simplifying to $5b = 100$, which gives $b = 20$ bananas.

- 44.** A lady wants to surprise her boyfriend on his birthday by inviting him and their friends a buffet dinner at a hotel. The maximum budget for the dinner was Bir 8,000. The hotel charges Bir 300 per person for the buffet including tax. If the lady wants to give a tip of Bir 50, then which of the following models the situation assuming that x is the total number of people? (1)
- A. $300x + 50 \geq 8000$ B. $300x - 50 \geq 8000$
- C. ✓ **$300x + 50 \leq 8000$** D. $300x - 50 \leq 8000$

Answer: C

The total cost of the buffet dinner for x people at Bir 300 per person plus a Bir 50 tip is represented by $300x + 50$. Since this total cost must be within the maximum budget of Bir 8,000, the correct inequality is $300x + 50 \leq 8000$.

- 45.** If a tree casts a shadow of 20 meters long and at the same time a pole of 3 meters casts a shadow of 5 meters long, which of the following is the height of the tree in meters? (1)
- A. 8 B. 16
C. 4 D. ✓ 12

Answer: D

Using similar triangles, the ratio of height to shadow length is constant: $\frac{h}{20} = \frac{3}{5}$. Solving for h gives $h = 20 \times \frac{3}{5} = 12$ meters.

46. What is the height of a building in meters, if the angle of elevation of the top of the building from a point 10 meters away from the ground floor of the building is 60° ?
- A. $\frac{10\sqrt{3}}{3}$ B. 5
- C. $10\sqrt{3}$ D. $5\sqrt{3}$

Answer: C

Using the trigonometric tangent ratio for the right triangle formed by the building, the ground, and the line of sight, $\tan(60^\circ) = \frac{\text{height}}{10}$. Since $\tan(60^\circ) = \sqrt{3}$, the height of the building is $10\sqrt{3}$ meters.

— END OF MARKING KEY —