Instructions:
- Each question has four choices (A), (B), (C) and (D) out of which ONLY ONE is correct.
- Each question carries 2 Marks. There is no negative marking.

1. On dividing a natural number by 13, the remainder is 3 and on dividing the same number by 21, the remainder is 11. If the number lies between 500 and 600, then the remainder on dividing the number by 19 is
   A. 4
   B. 6
   C. 9
   D. 13

2. The polynomial \(a^3 + 3a^2 + a + 2\) is divided by a polynomial \(g(a)\). The quotient and remainder obtained are \((a - 2)\) and \((-2a + 3)\) respectively. Find \(g(a)\).
   A. \(a^2 + 2a + 1\)
   B. \(a^2 - 2a + 1\)
   C. \(a^2 - 2a - 1\)
   D. \(a^2 + 2a - 1\)

3. A man sold a chair and a table together for AED 1520 thereby making a profit of 25% on the chair and 10% on table. By selling them together for AED 1535 he would have made a profit of 10% on chair and 25% on table. Find the cost price of each
   A. AED 600, AED 700
   B. AED 6000, AED 7000
   C. AED 760, AED 768
   D. AED 900, AED 1000

4. For the equation \(3x^2 + px + 3 = 0\), if one of the roots is the square of the other then \(p=\ldots\).
   A. \(-\frac{1}{3}\)
   B. \(-1\)
   C. \(-6\)
   D. \(\frac{2}{3}\)
5. What is the sum to 'n' terms of the series \( \sqrt{5}, \sqrt{20}, \sqrt{45}, \sqrt{80} \ldots ? \)

A. \( \frac{n(n+1)\sqrt{5}}{2} \)

B. \( n(n+1)\sqrt{2} \)

C. \( \frac{n(n+1)}{2} \sqrt{5} \)

D. \( n(n+1)\sqrt{5} \)

6. If \( \tan^2 \theta = 1 - a^2 \), then \( \sec \theta + \tan^3 \theta \cosec \theta = (2 - a^2)^n \), where \( n = \)

A. 2

B. \( \frac{3}{2} \)

C. 1

D. \( \frac{2}{9} \)

7. If the roots of the equation \( x^2 + 2cx + ab = 0 \) are real and unequal, then the equation

\( x^2 - 2(a + b)x + a^2 + b^2 + 2c^2 = 0 \)

has _______ roots.

A. Real

B. Equal

C. No Real

D. Can't be determined

8. A bag contains tickets marked with numbers


A ticket is drawn at random. Find the probability that the ticket drawn has an even digit at ten’s place

A. \( \frac{7}{19} \)

B. \( \frac{3}{20} \)

C. \( \frac{7}{20} \)

D. \( \frac{6}{19} \)

9. In a shop there were 4 dolls of different heights A, B, C and D. D is neither as tall as A nor as short as C. B is shorter than D but taller than C. If Fatima wants to purchase the tallest doll, which one should she purchase?

A. Only A

B. Only D

C. Either A or D

D. Either B or D
10. If \( \frac{x}{a} \cos \theta + \frac{y}{b} \sin \theta = 1, \frac{x}{a} \sin \theta - \frac{y}{b} \cos \theta = 1 \), then _____.

A. \( x^2 + y^2 = a^2 + b^2 \)

B. \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 2 \)

C. \( a^2x^2 + b^2y^2 = 1 \)

D. \( x^2 - y^2 = a^2 - b^2 \)

11. A number x is selected from the numbers 1, 2, 4 and then a second number y is selected from the numbers 1, 4, 10. What is the probability that the product \( xy \) of the two selected numbers is less than 10?

A. \( \frac{4}{9} \)

B. \( \frac{5}{9} \)

C. \( \frac{7}{9} \)

D. 1

12. If the sum of the deviations of a set of values \( x_1, x_2, x_3, x_4, \ldots, x_n \) measured from 50 is \((-10)\) and the sum of deviations of the values 46 is 70. Then, the mean is

A. 49

B. 49.5

C. 49.75

D. 50

13. P and Q are the centers of two circles whose radii are 5 cm and 11 cm, respectively. If the direct common tangent to the circles meets PQ in M. Then, M divides PQ in the ratio

A. 5:11 internally

B. 11:5 internally

C. 5:11 externally

D. 11:5 externally

14. A car has wheels having 56 cm as diameter. How many complete revolutions does each wheel make in 10 min when the car is travelling at a speed of 66 km/hr?

A. 6250

B. 6000

C. 6500

D. 7250
15. If \( \sin 17^\circ = \frac{x}{y} \) then the value of \( \sec 17^\circ - \sin 73^\circ \) will be

A. \( \frac{y^2}{x \sqrt{y^2 - x^2}} \)

B. \( \frac{x^2}{y \sqrt{y^2 - x^2}} \)

C. \( \frac{x^2}{y \sqrt{x^2 - y^2}} \)

D. \( \frac{y^2}{x \sqrt{x^2 - y^2}} \)

16. A triangle with sides 12 units and 5 units inscribed in a circle with BC as diameter, then \( \sin^2 \theta + \cos^2 \theta - 1 \) will be

A. 1

B. 2

C. 0

D. \( \frac{13}{5} \)

17. The greatest among the following is

A. \( \sqrt[3]{1.728} \)

B. \( \frac{\sqrt{3} - 1}{\sqrt{3} + 1} \)

C. \( \left( \frac{1}{2} \right)^{-2} \)

D. \( \frac{17}{8} \)

18. Find "a" and "b" in order that \( x^3 - 6x^2 + ax + b \) may be exactly divisible by \( x^2 - 3x + 2 \).

A. \( a = 11, b = -5 \)

B. \( a = 11, b = -6 \)

C. \( a = -11, b = -5 \)

D. \( a = 11, b = 6 \)
19. The equation \( \sqrt{x} + 4 - \sqrt{x - 3} + 1 = 0 \) has
   A. no root
   B. one real root
   C. one real root and one imaginary root
   D. two imaginary roots

20. If \( a = b = c \), then the roots of the equation \( (x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0 \) are
   A. Real and unequal
   B. imaginary
   C. real and equal
   D. None of these

21. If the first term of an infinite geometric series is a positive integer, the common ratio is the reciprocal of a positive integer, and the sum of the series is 4, then the sum of the first two terms of the series is _______.
   A. \( \frac{1}{3} \)
   B. \( \frac{2}{3} \)
   C. 3
   D. 2

22. If \( \sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = 2 \frac{1}{6} \), the values of \( x \) are
   A. \( \frac{9}{13} \)
   B. \( \frac{7}{13} \)
   C. \( \frac{5}{13} \)
   D. \( \frac{6}{13} \)

23. Write the least number of terms of \( \text{AP} \) 56, 52, 48, ........ required to make the sum 420.
   A. 13
   B. 14
   C. 15
   D. 16
24. Two poles of height $a$ and $b$ meters $(b > a)$ are $c$ meters apart. The height (in meters) of the intersection of the lines, joining the top of each pole to the foot of the opposite pole is

A. $\frac{a+b}{ab}$
B. $\frac{a}{ab}$
C. $\frac{1}{a} + \frac{1}{b}$
D. $\frac{1}{c}$

25. A small island is in the middle of a 100 m wide river and a tall tree stands on the island. P and Q are points directly opposite to each other on the two banks. The angles of elevation of the top of the tree from P and Q are $30^\circ$ and $45^\circ$. The height of the tree is

A. $50(\sqrt{3} - 1)$ m
B. $50(\sqrt{3} + 1)$ m
C. $50\sqrt{3}$ m
D. 150 m

26. If point Q divides line segment PR in the ratio $m: n$, then which of the following is incorrect?

A. $nPQ = mQR$
B. $(m + n)PR = mPQ$
C. $(m + n)PQ = mPR$
D. $nPQ = (m + n)QR$

27. A man goes 10 m due south and then 24 m due west. How far is he from the straight point?

A. 26 m
B. 25 cm
C. 27 cm
D. None of these

28. Find the area of the triangle formed by the line $5x - 3y + 15 = 0$ with coordinate axes.

A. $15 cm^2$
B. $5 cm^2$
C. $8 cm^2$
D. $\frac{15}{2} cm^2$

29. A bucket is raised from a well by the means of a rope which is wound round a wheel of a diameter 77 cm. Given that the bucket ascends in 1 minute 28 seconds with a uniform speed of 1.1 m/s. What is the number of complete revolutions the wheel makes in raising the bucket?

A. 60
B. 50
C. 30
D. 40
30. The inner and outer surface area of a spherical shell are $324 \pi \text{cm}^2$ and $576 \pi \text{cm}^2$. What is the thickness of the shell?

A. 6 cm  
B. 3 cm  
C. 2 cm  
D. 4 cm