

NAMAKKAL DISTRICT

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THIRD REVISION TEST, MARCH - 2020 STANDARD - X

Time : 3.00 hrs

MATHS

Marks: 100

Part - I

14×1=14

Note: i) Answer all the 14 questions.

ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer.

- 1) If the ordered pairs $(a+2, 4)$ and $(5, 2a+b)$ are equal then (a, b) is
 a) $(2, -2)$ b) $(5, 1)$ c) $(2, 3)$ d) $(3, -2)$
- 2) If $f: A \rightarrow B$ is a bijective function and if $n(B)=7$, then $n(A)$ is equal to
 a) 7 b) 49 c) 1 d) 14
- 3) Given $F_1=1$, $F_2=3$ and $F_n=F_{n-1}+F_{n-2}$ then F_8 is
 a) 3 b) 5 c) 8 d) 11
- 4) The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$ is
 a) $\frac{1}{24}$ b) $\frac{1}{27}$ c) $\frac{2}{3}$ d) $\frac{1}{81}$
- 5) $y^2 + \frac{1}{y^2}$ is not equal to
 a) $\frac{y^4+1}{y^2}$ b) $(y+\frac{1}{y})^2$ c) $(y-\frac{1}{y})^2+2$ d) $(y+\frac{1}{y})^2-2$
- 6) For the given matrix $A = \begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ then order of the matrix $(AT)^T$ is
 a) 2×3 b) 3×2 c) 3×4 d) 4×3
- 7) A tangent is perpendicular to the radius at the
 a) centre b) point of contact c) infinity d) chord
- 8) If $(5, 7)$, $(3, P)$ and $(6, 6)$ are collinear then the value of P is
 a) 3 b) 6 c) 9 d) 12
- 9) $(2, 1)$ is the point of intersection of two lines
 a) $x-y-3=0$; $3x-y-7=0$ b) $x+y=3$; $3x+y=7$
 c) $3x+y=3$; $x+y=7$ d) $x+3y-3=0$; $x-y-7=0$

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- 10) If $x = a \tan \theta$ and $y = b \sec \theta$ then
 a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ c) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$
- 11) The height of a right circular cone whose radius is 5cm and slant height is 13cm will be
 a) 12cm b) 10cm c) 13cm d) 5cm
- 12) The total surface area of a hemi-sphere is how much times the square of its radius
 a) π b) 4π c) 3π d) 2π
- 13) If the standard deviation of x, y, z is P then the standard deviation of $3x+5, 3y+5, 3z+5$ is
 a) $3P+5$ b) $3P$ c) $P+5$ d) $9P+15$
- 14) If a letter is chosen at random from the English alphabets $\{a, b, \dots, z\}$ then the probability that the letter chosen precedes x
 a) $\frac{12}{13}$ b) $\frac{1}{13}$ c) $\frac{23}{26}$ d) $\frac{3}{26}$

Part - II

Answer Ten questions. Question No. 28 is compulsory. 10×2=20

- 15) $B \times A = \{(-2,3), (-2,4), (0,3), (0,4), (3,3), (3,4)\}$ Find A and B .
- 16) $f(x) = 2x+1$ and $g(x) = x^2-2$ find $f \circ g$ and $g \circ f$
- 17) 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$ find 'a' and 'b'.
- 18) If $1^3+2^3+3^3+\dots+k^3=44100$ then find $1+2+3+\dots+k$
- 19) Find the square root of $\frac{400x^4y^{12}z^{16}}{100x^6y^4z^4}$
- 20) Define Diagonal matrix.
- 21) State menelaus theorem.
- 22) Find the equation of a line passing through the points $(3, -4)$ and having slope $\frac{-5}{7}$
- 23) Find the slope of the straight line $5y-3=0$
- 24) Find the angle of elevation of the top of a tower from a point on the ground, which is 30M away from the foot of a tower of height $10\sqrt{3}$ M.
- 25) The volume of a solid right circular cone is 11088cm^3 . If its height is 24cm then find the radius of the cone.

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- 26) i) Volume of a hollow cylinder = _____
 ii) Volume of a sphere = _____
- 27) Find the standard deviation of first 21 natural numbers.
- 28) Two unbiased dice are rolled once. Find the probability of getting a doublet.

Part - III

Answer 10 questions. Question No. 42 is compulsory: 10×5=50

- 29) Let $A = \{1, 2, 3, 4\}$ and $B = \{2, 5, 8, 11, 14\}$ be two sets. Let $f: A \rightarrow B$ be a function given by $f(x) = 3x - 1$. Represent this function i) by arrow diagram ii) in a table form iii) as a set of ordered pairs iv) in a graphical form.

- 30) A function $f: [-5, 9] \rightarrow \mathbb{R}$ is defined as follows

$$f(x) = \begin{cases} 6x+1 & \text{if } -5 \leq x < 2 \\ 5x^2-1, & \text{if } 2 \leq x < 6, \\ 3x-4 & \text{if } 6 \leq x \leq 9 \end{cases} \quad \text{Find } \frac{2f(-2)-f(6)}{f(4)+f(-2)}$$

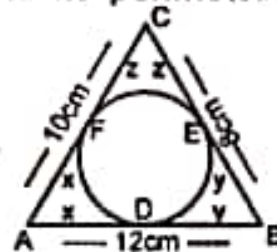
- 31) If $P_1^{x_1} \times P_2^{x_2} \times P_3^{x_3} \times P_4^{x_4} = 113400$ where P_1, P_2, P_3, P_4 are primes in ascending order and x_1, x_2, x_3, x_4 are integers. Find the value of P_1, P_2, P_3, P_4 and x_1, x_2, x_3, x_4 .

- 32) Find the sum of all natural numbers between 300 and 600 which divisible by 7.

- 33) Solve: $x+y+z=5$; $2x-y+z=9$; $x-2y+3z=16$

- 34) The hypotenuse of a right angled triangle is 25cm and its perimeter 56cm. Find the length of the smallest side.

- 35) A circle is inscribed in $\triangle ABC$ having sides 8cm, 10cm, 12cm as shown in figure, Find AD, BE and CF.



- 36) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).

- 37) Find the equation of a line passing through (6, -2) and perpendicular to the line joining the points (6, 7) and (2, -3)

- 38) If $\frac{\cos \alpha}{\cos \beta} = m$ and $\frac{\cos \alpha}{\sin \beta} = n$, then prove that $(m^2+n^2) \cos^2 \beta = n^2$.

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- 39) If the radii of the circular ends of a frustum which is 45cm height are 28cm and 7cm find the volume of the frustum.
- 40) A solid right circular cone of diameter 14cm and height 8cm is melted to form a hollow sphere. If the external diameter of the sphere is 10cm. Find the internal diameter.
- 41) In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that
- The student opted for NCC but not NSS
 - The student opted for NSS but not NCC
 - The student opted for exactly one of them.

42) $A = \begin{pmatrix} -2 \\ 4 \\ 5 \end{pmatrix}$ and $B = (1 \ 3 \ -6)$ show that $(AB)^T = B^T A^T$

Part - IV**Answer both questions:-****2×8=16**

- 43) Draw a triangle of radius 3cm. Take a point P on this circle and draw a tangent at P.

[or]

Construct a ΔPQR which the base $PQ=4.5\text{cm}$, $\angle R=35^\circ$ and the median from R to RG is 6cm.

- 44) Discuss the nature of the solutions of the following quadratic equations $x^2-8x+16=0$

[or]

Draw the graph of $y=x^2-5x-6$ and hence solve $x^2-5x-14=0$
