THE TALENT COACHING CENTRE, MAGUDANCHAVADI

TALENT UNIT TEST 1

10th Standard 2019 EM

Date : 20-Jul-19

Maths

Reg.No. : | | | | | | |

Time : 01:00:00 Hrs

Total Marks : 50

I. CHOOSE THE CORRECT ANSWER: 8 x 1 = 8

1) A={a,b,p}, B={2,3}, C={p,q,r,s} then n[(A U C) x B] is
(a) 8 (b) 20 (c) 12 (d) 16

2) If A={1,2}, B={1,2,3,4}, C={5,6} and D={5,6,7,8} then state which of the following statement is true..
(a) (A x C) ⊂ (B x D) (b) (B x D) ⊂ (A x C) (c) (A x B) ⊂ (A x D) (d) (D x A) ⊂ (B x A)

3) The range of the relation R ={(x,x^2) |x is a prime number less than 13} is
(a) {2,3,5,7} (b) {2,3,5,7,11} (c) {4,9,25,49,121} (d) {1,4,9,25,49,121}

4) Let n(A)= m and n(B) = n then the total number of non-empty relations that can be defined from A to B is
(a) m^n (b) n^m (c) 2^{mn}-1 (d) 2^{mn}

5) Let A={1,2,3,4} and B={4,8,9,10}. A function f: A ⟶ B given by f={(1,4), (2,8), (3,9), (4,10)} is a
(a) Many-one function (b) Identity function (c) One-to-one function (d) Into function

6) If f(x)=$2x^2$ and g(x)=$\frac{1}{3x}$, then f o g is
(a) $\frac{3}{2x^2}$ (b) $\frac{2}{3x^2}$ (c) $\frac{2}{9x^2}$ (d) $\frac{1}{6x^2}$

7) Let f and g be two functions given by
f={(0,1), (2,0), (3,-4), (4,2), (5,7)}
g={(0,2), (1,0), (2,4), (-4,2), (7,0)} then the range of f o g is
(a) {0,2,3,4,5} (b) {-4,1,0,2,7} (c) {1,2,3,4,5} (d) {0,1,2}

8) If g={(1,1), (2,3), (3,5), (4,7)} is a function givrn by g(x)=αx+ß then the values of α and ß are
(a) (-1,2) (b) (2,-1) (c) (-1,-2) (d) (1,2)

II. ANSWER ALL THE QUESTIONS: 5 x 2 = 10

9) Let X={1,2,,4} and Y={2,4,6,8,10} and R={(1,2),(2,4),(3,6),(4,8)} Show that R is a function and find its domain, co-domain and range?

10) Find f o g and g o f when f(x)=2x+1 and g(x)=x^2-2

11) Represent the function f(x)=$\sqrt{2x^2-5x+3}$ as a composition of two functions.

12) Find x if gff(x) = fgg(x), given f(x) = 3x+1 and g(x)=x+.

13) LetA= {1,2, 3, 4} and B = {-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} Let R = {(1, 3), (2, 6), (3, 10), (4, 9)} ⊆ A x B bea relation. Show that R is a function and find its domain, co-domain and the range of R.

III. ANSWER ALL THE QUESTIONS: 4 x 3 = 12

14) Let A = {1,2,3,4} and B ={2,5,8,11,14} be two sets. Let f: A ⟶ 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

15) Let A={1,2,3}, B={4,5,6,7}, and f={(1,4),(2,5),(3,6)} be a function from A to B. Show that f is one - one but not onto function.

16) Let f be a function from R to R defined by f(x)=x-5. Find the values of a a and b given that (a,4) and (1,b) belong to f.

17) A functionf: [-7,6) → R is defined as follows.

$$f(x)=\begin{cases} x^2+2x+1 & -7\le x<-5 \\ x+5 & -5\le x\le 2 \\ x-1 & 2<x<6 \end{cases}$$

find 2f(-4) + 3/(2)

IV. ANSWER ALL THE QUESTIONS: 4 x 5 = 20

18) A company has four categories of employees given by Assistants (A), Clerks (C), Managers (M) and an Executive Officer (E). The company provide Rs.10,000, Rs.25,000, Rs.50,000 and Rs.1,00,000 as salaries to the people who work in the categories A, C, M and E respectively. If A_1, A_2, A_3, A_4 and A5 were Assistants; C_1, C_2, C_3, C_4 were Clerks; M_1, M_2, M_3 were managers and E_1, E_2 were Executive officers and if the relation R is defined by xRy, where x is the salary given to person y, express the relation R through an ordered pair and an arrow diagram.

19) Let A ={x ∈ W | x < 2}, B={x ∈ N| < x ≤ 4} and C=(3,5). Verify that
A x (B ∩ C) = (A x B) ∩ (A x C)

20) A function f: [-5,9] ⟶ R is defined as follows:

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

Find $\frac{2f(-2)-f(6)}{f(4)+f(-2)}$.

21) Consider the functions f(x), g(x), h(x) as given below. Show that (f o g) o h = f o (g o h) in each case.
f(x)=x-4, g(x)=x^2 and h(x)=3x-5

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THE TALENT COACHING CENTRE, MAGUDANCHAVADI

TALENT UNIT TEST 2

10th Standard 2019 EM

Date : 20-Jul-19

MATHS

Reg.No. : | | | | | | |

Time : 01:00:00 Hrs

Total Marks : 50

I. CHOOSE THE CORRECT ANSWER: 8 x 1 = 8

1) Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are
   (a) 0, 1, 8 (b) 1, 4, 8 (c) 0, 1, 3 (d) 0, 1, 3
2) The sum of the exponents of the prime factors in the prime factorization of 1729 is
   (a) 1 (b) 2 (c) 3 (d) 4
3) $7^{4k} \equiv$ _____ (mod 100)
   (a) 1 (b) 2 (c) 3 (d) 4
4) Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1}+F_{n-2}$ then F5 is
   (a) 3 (b) 5 (c) 8 (d) 11
5) If 6 times of 6^{th} term of an A.P. is equal to 7 times the 7^{th} term, then the 13^{th} term of the A.P. is
   (a) 0 (b) 6 (c) 7 (d) 13
6) If $A = 2^{65}$ and $B = 2^{64}+2^{63}+2^{62}+...+20$ Which of the following is true?
   (a) B is 2^{64} more than A (b) A and B are equal (c) B is larger than A by 1 (d) A is larger than B by 1
7) If the sequence t_1,t_2,t_3...are in A.P. then the sequence t_6,t_{12},t_{18},....is
   (a) a Geometric Progression (b) an Arithmetic Progression (c) neither an Arithmetic Progression nor a Geometric Progression (d) a constant sequence
8) The value of $(1^3+2^3+3^3+...15^3)$ - (1+2+3+...+15)is
   (a) 14400 (b) 14200 (c) 14280 (d) 14520

II. ANSWER THE FOLLOWING: 5 x 2 = 10

9) Find the HCF of 396, 504, 636.
10) Solve $8x \equiv 1$ (mod 11)
11) Find the 8th term of the G.P 9,3,1,....
12) Find the sum of
    $1^2+2^2+...+19^2$
13) If l^{th} , n^{th} and nth terms of an A.P are x, y, z respectively, then show that
    $(x - y)n + (y + z)l + (z - x)m = 0$

III. ANSWER THE FOLLOWING: 4 x 3 = 12

14) How many terms of the series 1 + 5 +9 + ...must be taken so that their sum is 190?
15) Find the first term of a G.P. in which $S_6 = 4095$ and $r = 4$
16) Find the sum to n terms of the series 5 + 55 +555 +...
17) If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.

IV. ANSWER THE FOLLOWING: 4 x 5 = 20

18) If $13824 = 2^a \times 3^b$ then find a and b.
19) The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.
20) Kumar writes a letter to four of his friends. He asks each one of them to copy the letter and mail to four different persons with the instruction that they continue the process similarly. Assuming that the process is unaltered and it costs Rs. 2 to mail one letter, find the amount spent on postage when 8th set of letters is mailed
21) Find the sum of the following series
    $10^3+11^3+12^3+....+20^3$

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THE TALENT COACHING CENTRE, MAGUDANCHAVADI

TALENT UNIT TEST 3

10th Standard 2019 EM Date : 20-Jul-19

MATHS Reg.No. : | | | | | | |

Time : 01:00:00 Hrs Total Marks : 45

I. CHOOSE THE CORRECT ANSWER: 8 x 1 = 8

1) A system of three linear equations in three variables is inconsistent if their planes

(a) intersect only at a point (b) intersect in a line (c) coincides with each other (d) do not intersect

2) If (x - 6) is the HCF of x^2 - 2x - 24 and x^2 - kx - 6 then the value of k is

(a) 3 (b) 5 (c) 6 (d) 8

3) $y^2 + \frac{1}{y^2}$ is not equal to

(a) $\frac{y^2+1}{y^2}$ (b) $\left(y+\frac{1}{y}\right)^2$ (c) $\left(y-\frac{1}{y}\right)^2+2$ (d) $\left(y+\frac{1}{y}\right)^2-2$

4) The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to

(a) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$ (b) $16\left|\frac{y^2}{x^2z^2}\right|$ (c) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ (d) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

5) The values of a and b if $4x^4$ - $24x^3$ + $76x^2$ + ax + b is a perfect square are

(a) 100, 120 (b) 10, 12 (c) -120, 100 (d) 12, 10

6) The number of points of intersection of the quadratic polynomial x^2 + 4x + 4 with the X axis is

(a) 0 (b) 1 (c) 0 or 1 (d) 2

7) If number of columns and rows are not equal in a matrix then it is said to be a

(a) diagonal matrix (b) rectangular matrix (c) square matrix (d) identity matrix

8) Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$

(a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

II. ANSWER THE FOLLOWING: 5 x 2 = 10

9) Solve 2x − 3y = 6, x + y = 1

10) The product of Kumaran's age (in years) two years ago and his age four years from now is one more than twice his present age. What is his present age?

11) If α, β are the roots of the equation $3x^2$ + 7x - 2 = 0, find the values of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$

12) If $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 8 & 3 & 1 \\ 2 & 4 & 1 \\ 5 & 3 & 1 \end{bmatrix}$, find AB.

13) Solve $\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$

III. ANSWER THE FOLLOWING: 4 x 3 = 12

14) Find the GCD of $6x^3 - 30x^2 + 60x - 48$ and $3x^3 - 12x^2 + 21x - 18$.

15) Find the values of 'k', for which the quadratic equation $kx^2 - (8k + 4) + 81 = 0$ has real and equal roots?

16) Find the value of a, b, c, d, x, y from the following matrix equation.
$$\begin{bmatrix} d & 8 \\ 3b & a \end{bmatrix} + \begin{bmatrix} 3 & a \\ -2 & -4 \end{bmatrix} = \begin{bmatrix} 2 & 2a \\ b & 4c \end{bmatrix} + \begin{bmatrix} 0 & 1 \\ -5 & 0 \end{bmatrix}$$

17) A two digit number is such that the product of its digits is 12. When 36 is added to the number the digits interchange their places. Find the number.

IV. ANSWER THE FOLLOWING: 4 x 5 = 20

18) Simplify $\frac{\frac{1}{p}+\frac{1}{q+r}}{\frac{1}{p}-\frac{1}{q+r}} \times \left(1 + \frac{q^2+r^2-p^2}{2qr}\right)$

19) $A = \begin{pmatrix} 3 & 0 \\ 4 & 5 \end{pmatrix}$, $B = \begin{pmatrix} 6 & 3 \\ 8 & 5 \end{pmatrix}$, $C = \begin{pmatrix} 3 & 6 \\ 1 & 1 \end{pmatrix}$ find the matrix D, such that CD – AB = 0

20) Find the square root of the expression $\frac{x^2}{y^2} - \frac{10x}{y} + 27 - \frac{10y}{x} + \frac{y^2}{x^2}$

21) The roots of the equation $2x^2 - 7x + 5 = 0$ are α and β. Without solving for the roots, find $\frac{\alpha+2}{\beta+2} + \frac{\beta+2}{\alpha+2}$

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