Sub Code:RBT103

Paper Id: 154107 Roll No: | | | | | | | | | | | | | |

B. TECH
(SEM-I) THEORY EXAMINATION, 2019-20
ELEMANTARY MATHEMATICS-I

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION-A

1. Attempt **All** questions in brief. 7× 2=14

a. Solve $3x + 8 > 2$ when x is an integer.

b. Check whether the equation $(x+1)^2 = 2(x-3)$ is quadratic?

c. Find the sum of $1+2+3+4+.....+10$.

d. Write the first two terms of sequence whose n^{th} term is $a_n = 2^n$

e. Find the slope of a line passing through the two points (6, 12) and (-9, 15).

f. Find the rate of change of the area of a circle with respect to its radius r when r = 2 cm.

g. Evaluate $\lim_{x\to 1} \frac{x^{10}+x^5+1}{x-1}$.

SECTION B

2. Attempt any three parts of the following: **7 x 3 = 21**

a. Solve the inequality and represent it on the number line

$5x - 3 \geq 3x - 5$

b. The arithmetic mean of two numbers is 34 and their geometric mean is 16. Find the numbers.

c. Find the equation of a line passing through the point (6, 9) and parallel to the line

$6x - 15y + 18 = 0$.

d. Find the derivative of $\frac{2}{x+1} - \frac{x^2}{3x-1}$.

e. Find the equation of the tangent to the curve $y = \sqrt{3x-2}$ which is parallel to the line

$4x - 2y + 5 = 0$

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SECTION C

3. Attempt any one parts of the following: 1 x 7 = 7

a. Solve the inequality in two dimensional planes:

$y + 8 \geq 2x$.

b. Solve the equation: $x^2 + x - 11 = 0$.

4. Attempt any one parts of the following: 1 x 7 = 7

a. The product of first three terms of a G.P. is 1000. If we add 6 to its second term and 7 to its third term, the three form an A.P. Find the terms of G.P.

b. Find the sum of odd integers from 1 to 2001

5. Attempt any one parts of the following: 1 x 7 = 7

a. Find the equation of the circle with radius 3 whose centre lies on x-axis and passes through the point (4, 6).

b. Find the equation of the parabola that satisfies the following conditions: vertex(0, 0), passing through (10, 4) and symmetric with respect to y-axis.

6. Attempt any one parts of the following: 1 x 7 = 7

a. Find the derivative of $\frac{x^n - a^n}{x - a}$ for some constant a.

b. If $f(x) = \begin{cases} \frac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$ then test the continuity of $f(x)$ at $x = 0$.

7. Attempt any one parts of the following: 1 x 7 = 7

a. Find the least value of a, such that the function f given $f(x) = x^2 + ax + 1$ is strictly increasing on (1, 2).

b. The radius of an air bubble is increasing at the rate of ½ cm/s. At what rate is the volume of the bubble increasing when the radius is 1cm?