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Total No. of Pages : 02

Total No. of Questions : 08

B.Tech. (Bio Tech.) (2018 & Onwards) (Sem.-1)

**BASIC MATHEMATICS-I**

Subject Code : BTAM-107-18

M.Code : 75371

Time : 2 Hrs.

Max. Marks : 30

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt any FIVE question(s), each question carries 6 marks.

1. a) Find the number of different 8 letter arrangements that can be made from the letters of the word DAUGHTER, all vowels are together.  
b) Evaluate the middle term in the expansion of  $\left(3x - \frac{y^2}{6}\right)^7$ .
2. a) The income of a person is Rs. 3,00,000 in the first year and he receives an increase of Rs.10,000 to his income per year for the next 19 years. Find the total amount he received in 20 years.  
b) The sum of first three terms of a GP is  $\frac{13}{12}$  and their product is  $-1$ . Find the common ratio and the terms.
3. a) Find the value of  $\tan \frac{13\pi}{12}$ .  
b) Prove that  $\tan x \tan 2x \tan 3x = \tan 3x - \tan 2x - \tan x$ .
4. a) Solve  $\sin 2x - \sin 4x + \sin 6x = 0$ .  
b) Prove that  $\frac{\sin x - \sin y}{\cos x + \cos y} = \tan \frac{x-y}{2}$ .
5. a) If  $A = \begin{bmatrix} 3 & \sqrt{3} & 2 \\ 4 & 2 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$ , then verify that  $(A + B)' = A' + B'$ .  
b) Using properties of determinant, show that :

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c).$$

6. Solve using matrix method  $3x - 2y + 3z = 8$ ,  $2x + y - z = 1$ ,  $4x - 3y + 2z = 4$ .
7. a) Two lines are passing through the point (2, 3) and intersect each other at an angle of  $60^\circ$ . If the slope of one line is 2, find the equation of other line.
- b) Find Standard Deviation of the data :

$x$	2	5	6	8	10	12
$f$	2	8	10	7	8	5

8. Two regression equations of the variables  $x$  and  $y$  are  $x = 19.13 - 0.87y$  and  $y = 11.64 - 0.50x$ . Find (i) means of  $x$  and  $y$  (ii) correlation coefficient between  $x$  and  $y$ .

**Note:** Any student found attempting answer sheet from any other person(s), using incriminating material or involved in any wrong activity reported by evaluator shall be treated under UMC provisions.

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