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***B. Tech. Degree III Semester Examination in  
Marine Engineering December 2016***

**MRE 1301 ENGINEERING MATHEMATICS III  
(2013 Scheme)**

Time: 3 Hours

Maximum Marks: 100

(5 × 20 = 100)

- I. (a) Define (i) Population (ii) Sample (iii) Parameter (iv) Statistic.  
(b) A random sample of size 12 is taken from a normal population with mean 24 and SD 5. Find the probability that sample mean is negative.

OR

- II. (a) Fit a straight line to the following data.

$x :$	5	10	15	20	25
$y :$	12	18	19	24	30

- (b) Calculate the coefficient of correlation between  $x$  and  $y$  from the following.

$x :$	1	2	3	4	5	6
$y :$	22	36	48	50	18	9

- III. (a) Find a root of the equation  $x^3 - 2x - 5 = 0$  by method of false position.  
(b) Distinguish between weighted and non-weighted binary codes.

OR

- IV. (a) Obtain a disjunctive normal form of  $(x \vee y)' \vee (x' \wedge z)$ .  
(b) Write  $x \downarrow y$  in terms of  $\uparrow$ .

- V. (a) Prove that (i)  $1 + \mu^2 \delta^2 = \left(1 + \frac{\delta^2}{2}\right)^2$ .

$$(ii) \nabla = \frac{\delta^2}{2} + 8 \sqrt{1 + \frac{\delta^2}{4}}$$

- (b) Find the missing term in the following.

$x :$	1	2	3	4	5	6	7
$y :$	2	4	8	-	32	64	128

OR

(P.T.O.)

VI. Solve the difference equations

(i)  $y_{n+2} - 7y_{n+1} + 8y_n = x(x-1)2^x$ .

(ii)  $y_{n+2} - 4y_{n+1} + 3y_n = 2^n + 3^n$ .

VII. (a) Apply Stirling's formula to evaluate  $y(35)$  from the following table.

x :	20	30	40	50
y :	512	439	346	243

(b) Find  $f(6)$  using Newton's divided difference interpolation formula.

x :	1	2	7	8
$f(x)$ :	1	5	5	4

**OR**

VIII. (a) Find the first derivative at  $x = 0.6$  from the following table.

x :	0.4	0.5	0.6	0.7	0.8
y :	1.5836	1.7974	2.0442	2.3275	2.6511

(b) Evaluate  $\int_1^{1.3} \sqrt{x} dx$  by trapezoidal rule. Take  $h = 0.05$ .

IX. (a) Design an algorithm for the factorial of a positive integer.

(b) Write the algorithm to find  $\sin x$ .

**OR**

X. (a) Write the algorithm for Fibonacci sequence generation.

(b) What do you mean by Bubble sort problem?