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***B.Tech. Degree III Semester Examination in  
Marine Engineering December 2015***

**MRE 1301 ENGINEERING MATHEMATICS III**

Time: 3 Hours

Maximum Marks: 100

(5 × 20 = 100)

- I. (a) Derive the sampling distribution of mean of samples taken from a normal population. (12)  
(b) Distinguish between the sampling with replacement and without replacement. (8)

OR

- II. (a) Calculate the Pearson's correlation coefficient for the following data. (10)

x	:	5	10	15	20	25	30
y	:	11	18	22	36	15	4

- (b) Fit a straight line of the form  $y = ax + b$  to the following data. (10)

x	:	1	2	3	4	5	6
y	:	18	28	39	42	5	1

- III. (a) Define absolute error, relative error and percentage error. (6)  
(b) Find a root of the equation  $x^2 + 3x - 5 = 0$  by method of false position. (14)

OR

- IV. (a) Distinguish between weighted and non-weighted binary codes. (8)  
(b) Express  $z(x' + y) + y'$  in complete sum - of - products form. (12)

- V. (a) Prove that (a)  $\Delta = E - 1$  (3+3+4=10)  
(b)  $\nabla = 1 - E^{-1}$

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

- (b) Calculate the difference table for the following data. (10)

x	:	20	30	40	50	60	70
y	:	22	58	65	76	89	42

OR

- VI. Solve the difference equations. (10)  
(a)  $y_{n+2} - 4y_{n+1} + 5y_n = n.3^n$ . (10)

(b)  $y_{n+2} - 3y_{n+1} + 4y_n = \sin \frac{n}{2}$ . (10)

- VII. (a) Apply Lagrange's interpolation formula to evaluate  $f(9)$  from the following table. (12)

$x$	:	5	7	8	10	12
$f(x)$	:	22	14	15	16	2

- (b) Evaluate  $\int_0^6 \frac{dx}{x}$  using trapezoidal rule. (8)

**OR**

- VIII. (a) Find the first and second derivative at  $x = 1.5$  from the following table. (10)

$x$	:	1	1.5	2	2.5	3
$y$	:	20	25	31	42	50

- (b) Apply Stirling's formula to evaluate  $y_{35}$  from the following table. (10)

$x$	:	20	30	40	50	60
$y$	:	215	238	315	432	510

- IX. (a) Design an algorithm to find  $e^x$  correct to 5 decimal places. (10)

- (b) Distinguish between bubble sort problem and merging problem. (10)

**OR**

- X. (a) Write the algorithm for Fibonacci sequence generation. (10)

- (b) What do you mean by linear search problem? Evaluate its computational complexity. (10)