

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

**MRE 301 ENGINEERING MATHEMATICS III**  
(Prior to 2013 scheme)

Time : 3 Hours

Maximum Marks : 100

(5 × 20 = 100)

- I. (a) What do you mean by sampling distribution? Write the sampling distribution of mean and variance. (10)
- (b) A random sample of size 40 is taken from a normal population with mean 25 and SD 8. Find the probability that sample mean is less than 0.5. (10)

OR

- II. (a) Fit a straight line to the following data. (10)

$x:$	1	2	3	4	5
$y:$	10	20	35	42	18

- (b) Find the regression lines of the following data. (10)  
 $\Sigma x = 12, \Sigma y = 20, \Sigma x^2 = 122, \Sigma y^2 = 150, \Sigma xy = 250, n = 10$

- III. (a) Define NAND gate, NOR gate, exclusive OR and exclusive NOR gates. (10)
- (b) Write the Boolean expression  $ABC + \overline{BCD} + \overline{ABC}$  (10)

OR

- IV. (a) Design a combinational circuit for  $(x_1 \vee x_2) \wedge x_1$  (10)
- (b) Write short notes on error detecting codes and error correcting codes. (10)

- V. (a) Prove that: (8)

(i)  $\Delta = E - 1$

(ii)  $\nabla = 1 - E^{-1}$

(iii)  $\mu = \frac{E^{1/2} + E^{-1/2}}{2}$

(iv)  $\delta = E^{1/2} - E^{-1/2}$

- (b) Solve :

(i)  $y_{n+2} - 3y_{n+1} + 4y_n = 3^n$  (2×6=12)

(ii)  $y_{n+2} - 4y_{n+1} + 5y_n = n^2 - 1$

OR

- VI. (a) Find the missing term in the following table. (10)

$x:$	0	1	2	3	4
$y:$	1	3	9	-	81

- (b) Evaluate  $\Delta \tan^{-1} x$  (10)

(P.T.O.)

- VII. (a) Using Lagrange's interpolation formula evaluate  $y(10)$  using the table below. (10)

$x:$	5	6	9	11
$y:$	12	13	14	16

- (b) Find  $y(22)$  and  $y(42)$  from the following table. (10)

$x:$	20	25	30	35	40	45
$y:$	354	332	291	260	231	204

OR

- VIII. (a) Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  by numerical methods (10)

- (b) Find the first and second derivatives at  $x = 2$  from the following table. (10)

$x:$	2	4	6	8	10
$y:$	105	42.7	25.3	16.7	13

- IX. (a) Design an algorithm to evaluate  $e^x$  (10)

- (b) Write an algorithm to find Fibonacci sequence. (10)

OR

- X. (a) What do you mean by Linear Search problem? (10)

- (b) Design an algorithm to evaluate  $\sin x$  (10)