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**B.Tech. Degree III Semester Examination in
Marine Engineering December 2018**

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

Time : 3 Hours

Maximum Marks : 100

(5 × 20 = 100)

- I. (a) A population is known to follow the normal distribution with mean 2 and standard deviation 3. Find the probability that the mean of a sample of size 16 taken from this population will be greater than 2.5. (10)
- (b) A random sample of size 15 from a normal population with mean 12 is formed to have variance $s^2 = 5$. Find the probability that the mean of the sample is less than 10. (10)

OR

- II. (a) In a partially destroyed laboratory record only the lines of regression of y on x and x on y are available as $4x-5y+33=0$ and $20x-9y=107$ respectively. Calculate \bar{x} , \bar{y} and the coefficient of correlation between x and y. (10)
- (b) Fit a straight line from the following data (10)

X	1	3	5	7	8	10
Y	8	12	15	17	18	20

- III. (a) Find a root of the equation $x^3 - 4x - 9 = 0$ using the bisection method correct to 3 decimal places. (10)
- (b) Distinguish between error detecting and error correcting codes. (10)

OR

- IV. (a) Evaluate $\sqrt{13}$ using Newton's iteration formula correct to 4 decimal placed. (4)
- (b) Show that $(A + \bar{B} + \bar{C})(A + \bar{B} + C) = A + \bar{B}$ (6)
- (c) Simplify $(A + \bar{B} + C)((A + B + C)(\bar{A} + B + C)(\bar{A} + \bar{B} + C)(\bar{A} + \bar{B} + \bar{C})$. (10)

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

x	0	1	2	3	4
f(x)	1	3	9	----	81

- (b) Prove that: (10)
- (i) $E = e^{hD}$
- (ii) $\Delta = E\nabla = \nabla E \delta E^{1/2}$
- (iii) $\mu^2 = 1 + \frac{\delta^2}{4}$

OR

- VI. Solve the difference equations (20)

- (i) $y_{n+3} + 8y_n = (2n+3)2^n$
- (ii) $y_{n+2} - 5y_{n+1} - 6y_n = 4^n, y_0 = 0, y_1 = 1$

(P.T.O.)

- VII. (a) Find the polynomial $f(x)$ by using Lagrange's formula and find $f(3)$ for (10)

x	0	1	2	5
f(x)	2	3	12	147

- (b) Find the number of men getting wage of rupees 10 from the following table: (10)

Wages (in rupees)	5	15	25	35
No. of men	9	30	35	42

OR

- VIII. (a) Find $y'(0)$ and $y''(0)$ from the following data: (10)

x	0	1	2	3	4	5
y	4	8	15	7	6	2

- (b) Evaluate using Simpson's 1/3rd rule $\int_0^6 \frac{e^x}{1+x} dx$ and $\int_0^\pi \sin x dx$ using 11 ordinates. (10)

- IX. (a) Explain bubble sort problem with its computational complexity. (10)
 (b) Design an algorithm for $\sin x$. (10)

OR

- X. (a) Find an algorithm to find the sum of first n natural numbers. (10)
 (b) Give an algorithm for e^x . (10)
