Reg. No. ☐☐☐☐☐☐☐☐   **A**

B.Tech. Degree III Semester Examination in Marine Engineering December 2019

MRE 1301 ENGINEERING MATHEMATICS III
(2013 Scheme)

Time: 3 Hours   Maximum Marks: 100

$(5 \times 20 = 100)$

I.   (a)   Derive the sampling distribution of a mean of samples taken from a normal   (10)
          population.

     (b)   Define the following $(5 \times 2 = 10)$
               (i)   population
               (ii) sample
               (iii) parameter
               (iv) statistic
               (v)   sampling distribution

OR

II. (a)   If F is the force required to lift a load W by means of a pulley, fit a linear   (10)
          expression F=a+bW against the following data

F	:	50	70	100	120
W	:	12	15	21	25

     (b)   Calculate the correlation coefficient from the following data   (10)

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

III. (a)   Define absolute error, relative error and percentage error.   (6)

     (b)   What do you mean by a parity check code? Explain.   (4)

     (c)   Find a root of the equation $x^3-4x-9=0$ correct to 3 decimal places using   (10)
          bisection method.

OR

IV. (a)   Find a root of the equation $x^2+3x-5=0$ by Newton Raphson method.   (10)

     (b)   Obtain a disjunctive normal form of $z.(x'+y)+y'$.   (10)

V.   (a)   Prove that   (12)
               (i) $E = 1+\Delta$
               (ii) $\delta = E^{1/2}-E^{-1/2}$
               (iii) $E = e^{hD}$

               (iv) $\Delta = \dfrac{\delta^2}{2}+\delta\sqrt{1+\dfrac{\delta^2}{4}}$

     (b)   Form the difference equation for the sequence 0,1,1,2,3,5,8,13,21 …… and   (8)
          solve completely.

OR

VI. Solve the following difference equations
               (i) $Y_{n+2}-4Y_{n+1}+3Y_n = 2^n+3^n$ (6)
               (ii) $Y_{n+2}-2\cos\alpha\, Y_{n+1}+Y_n = \cos\alpha\, n$ (8)
               (iii) $Y_{n+2}-3Y_{n+1}+4Y_n = n^2$ (6)

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

X	0	1	2	5
F(X)	2	3	12	147

(b) Evaluate $\int_0^6 \frac{1}{1+x^2}$ by trapezoidal rule and Simpsons rule. (10)

OR

VIII. (a) The following table gives the census of a population of a state for the years 1961 to 2001. (10)

Year	1961	1971	1981	1991	2001
Population (in million)	19.96	36.65	58.81	77.21	94.61

Find the rate of growth of the population in 2001.

(b) Apply Stirling's formula to evaluate Y_{35} from the following data. (10)

X	20	30	40	50	60
Y	215	238	315	432	510

IX. (a) Give an algorithm to generate Fibonacci sequence. (10)

(b) Give an algorithm to find e^x correct to 5 decimal places. (10)

OR

X. (a) What do you mean by Linear search problem? Evaluate its computational complexity. (10)

(b) Explain the Bubble sort algorithm and find its computational complexity. (10)

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