B. Tech Degree III Semester Examination in Marine Engineering, November 2009

MRE 301 ENGINEERING MATHEMATICS III

Time: 3 Hours   Maximum Marks: 100

(All questions carry _EQUAL_ marks)

I. (a) Derive the sampling distribution of mean of sample taken from a normal population.
    (b) Distinguish between parameter and statistics.
    (c) A normal population has a mean 0.1 and S.D. 2.1. Find the probability that the mean of the sample 900 members will be negative.

OR

II. (a) Fit a straight line $y = a + bx$ to the following data by the method of least squares.

x :	0	1	3	6	8
y :	1	3	2	5	4

   (b) Find the correlation coefficient between x and y for the given value. Find also two regression lines.

x :	1	2	3	4	5	6	7	8	9	10
y :	10	12	16	28	25	36	41	49	40	50

III. (a) Give an example of a set of error detecting code, which is capable of detecting at most 2 errors.
    (b) Explain the use of De Morgan's theorem.

OR

IV. (a) Explain how can you build Exclusive OR Gate by using universal Gates.
    (b) Express the following Boolean expression in product of sum $X = ABC + \bar{A}BC + A\bar{B}\bar{C}$

V. With usual notation prove that

   (a) $1 + \mu^2\delta^2 = (1 + \frac{1}{2}\delta^2)^2$

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

   (c) $E = e^{hD}$

OR

VI. Solve the difference equation

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

   (b) $y_{n+2} + y_n = \sin\frac{n}{2}$

   (c) $(\Delta^2 - 3\Delta + 2)y_n = 0$

VII. (a) Find the value of y at x = 21 and x = 28 from the following data.

x :	20	23	26	29
y :	0.3420	0.3907	0.4384	0.4848

   (b) Evaluate $\int_4^{5.2} \log_e x$ using Trapezoidal, Simpson's rule.

OR

VIII. (a) Using Lagrange's interpolation formula, find y (10) from the following table.

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

   (b) Evaluate y^1 and y^{11} at x = 2 given

x :	0	1	3	6
y :	18	10	-18	40

IX. (a) Write an algorithm to generate the even Fibanocci sequence less than 100.
    (b) Explain the algorithm for linear search with using a suitable example.

OR

X. (a) Write the algorithm to Bubble sort. What is its computational complexity?
    (b) Explain Merge sort by using an example.

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