BT-MRE-III(R/S)-12.21-1037 Reg. No. | | | | | | | | |

A

B.Tech. Degree III Semester Regular/Supplementary Examination in Marine Engineering December 2021

19-208-0301 ENGINEERING MATHEMATICS III

(2019 *Scheme*)

Time: 3 Hours Maximum Marks: 60

(5 × 15 = 75)

I. (a) What are the Cauchy Reimann conditions? Verify the same for $f(z)=z^2$. (7)

(b) Show that the function $f(Z)=\sqrt{|xy|}$ is not analytic at the origin, even though it satisfies Cauchy- Reimann equations at that point. (8)

OR

II. (a) Find an analytic function whose imaginary part is $3x^2y-y^3$ and which vanishes at $z=0$. (8)

(b) Evaluate $\int_C z\,dz$ where C is the first quadrant of the unit circle $|z|=1$ from $z=i$ to $z=1$. (7)

III. (a) Define the following terms: (6)

(i) Population
(ii) Sample
(iii) Statistic
(iv) Parameter.

(b) A population follows the normal distribution with mean 2 and variance 9. Find the probability that the mean of a sample of size 16 taken from this population will be greater than 2.5. (9)

OR

IV. (a) Fit a straight line y=ax+b to the following data (6)

x	10	12	14	18	20	22
y	14	19	21	24	27	30

(b) Find the correlation coefficient and regression lines from the following (9)

x	1	3	4	6	8	9	11	14
y	1	2	4	4	5	7	8	9

V. (a) Find a real root of the equation $x-xe^x=0$ correct to four decimal places by bisection method (8)

(b) Use Regula Falsi method to solve $x^3-4x+1=0$ correct to 3 decimal places (7)

OR

VI. (a) Use Taylors method to find y (1.2) correct to 3 decimal places where $\frac{dy}{dx}=x+y$ and $y(1)=2$ by taking $h=0.02$. (7)

(b) Solve $\frac{dy}{dx}=1n(x+y)$, $y(0)=1$ correct to 3 decimal places at $x=0.4$, using Modified Euler's method by taking $h=0.2$. (8)

(P.T.O)

VII. (a) Find the difference equation satisfied by $y = \frac{a}{x} + b$ (8)

(b) Express $2x^2 - 3x + 1$ in factorial notation. (7)

OR

VIII. (a) Solve the difference equation $(\Delta^2 - 3\Delta + 2)y_n = 0$. (5)

(b) Solve the equation $y_{n+4} - 2y_{n+2} + y_n = 5^n$. (5)

(c) Solve $y_{n+2} + y_{n+1} + y_n = n^2$. (5)

IX. (a) From the following data, evaluate $\cos 39^\circ$ and $\cos 41^\circ$ using Gauss interpolation formula (7)

X (in degree)	10	20	30	40	50	60	70
cosx	0.9848	0.9397	0.8660	0.7660	0.6428	0.5000	0.3420

(b) Evaluate f(11) using appropriate interpolation formula from the following (8)

x	0	10	20	30	40
F(x)	7	18	32	48	85

OR

X. (a) Evaluate $\frac{dy}{dx}$ at $x = 1$ from the following (7)

x	0	2	4	6	8
y	4	8	15	7	6

(b) Evaluate $\int_0^2 \frac{1}{1 + \log x} dx$ by (8)

(i) Trapezoidal rule by taking n = 10

(ii) Simpson's rule by taking n = 5.

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