Code No. 2299 / N

FACULTY OF ENGINEERING

B.E. 2/4 (ECE/M/P/AE/CSE) II – Semester (New) (Suppl.) Examination, December 2012

Subject : Mathematics – IV

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. Every differentiable function is continuous. (True/False) (2)
2. The analytic function whose real part $4 = 3xy^2 + x^3$ is (3)
3. State Taylor's theorem. (2)
4. Expand $\frac{1}{z^2+3z+2}$ in the region $1 < |z| < 2$. (3)
5. Define discrete random variable continuous random variable. (2)
6. If X is a random variable with probability function. (3)

x	0	1	2	3	4	5	6
P(x)	.15	.1	0.05	0.3	0.2	0.1	0.1

Find E(X), E(2X+1).

7. Find the MGF of Chi-square variate. (2)
8. Obtain the mean of Gamma variate. (3)
9. Define correlation, negative correlation between two variables. (2)
10. Write the normal equations parabolic curve $y = ax^2 + bx + c$ to fit. (3)

PART – B (50 Marks)

11.a) If f(z) is an analytic function of z, prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f'(z)|^2$. (5)

b) State and prove Cauchy's integral formula. (5)

12.a) Evaluate $\int_0^{2\pi}\frac{d\theta}{2+\cos\theta}$. (5)

b) Find the b.ℓ.t. which maps the points z = 0, 1, 8 onto w = -5 -1, 3 respectively. (5)

13.a) Show that the function $u = 2x + y^3 - 3x^2y$ is harmonic. (5)

b) Evaluate $\int_{-\infty}^{\infty}\frac{dx}{\left(x^2+1\right)^2}$. (5)

14.a) State and prove Baye's theorem. (5)

b) A coin is tossed until a head appears. What is the expectation of the number of tosses required. (5)

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15.i) Find the mean of Poisson distribution. (3)

ii) Find the variance of Gamma distribution. (3)

iii) A random sample of 10 boys had the IQ's 70, 120, 110, 101, 88, 83, 95, 98, 107 and 100. Do these data support the assumption of a population mean IQ of 160. (4)

16.a) Fit a straight line to the following data. (5)

x	4	6	8	10	12	14
y	14	24	30	31	42	60

b) Find the correlation coefficient and the equation of regression of X on Y for the following data. (5)

X	1	2	3	4	5
Y	2	5	3	8	7

17.i) In a normal distribution exactly 7% of the items are under 38 and 90% are above 65. Find the mean and standard deviation of the distribution. (5)

ii) Find the means of X and Y when the lines of regression are $8x - 10y + 66 = 0$, $40x - 18y = 214$. (5)

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