Code No.: 3277

FACULTY OF ENGINEERING

B.E. II/IV Year (ECE/Mech./Prod./CSE/Auto Mobile Engg.) II Semester (Main) Examination, May/June, 2011

MATHEMATICS – IV

Time : 3 *Hours*] [*Max. Marks* : 75

Answer **all** *questions of Part A.*

Answer **five** *questions from Part B.*

Part A – (Marks : 25)

1. For the function $f(Z) = Z$ the following is true.
   (a) $f(z)$ is not continuous at $Z = 0$
   (b) $f(z)$ is differentiable at every point.
   (c) $f(z)$ is not differentiable at every point.
   (d) None of above.

2. Find $\xi c \dfrac{2z3 + 4z}{Z - 2i}\ d_2$ where C is the circle $|2| = 4$.

3. Expand the function $f(z) = e^z$ in Taylor's series about $z = 1$.

4. Residue of $f(z) = \cot z$ at singular points (a) 1 (b) 0 (c) $\pi/2$ (d) $\pi/2$

5. A random variable X has the following probability distribution

x	0	1	2	3	4
p (x)	k	k	2k	k^2	$3k^2$

   find $P(x \angle 3)$

6. If $f(x)$ is density function of continuous random variable X, then the moment generating function of X about x=a is ———.

7. X is a normal variate with mean 30 and standard deviation 5. Find the probabilty that $26 \le x \le 40$.

8. Write the equations of line of regression of x on y and y on x.

9. Find the student's – t for the following variable in a sample of eight –4, –2, –2, 0, 2, 2, 3, 3 taking the mean of the universe to be zero.

10. State the following true or false.
    (a) The variable of poission distribution with parameter $\lambda = 2$ then variance of poisson distribution is 4.
    (b) Standard normal variable parameters are 0 and 1.

(50 marks)

11. (a) State and prove Cauchy's integral theorem.

(b) Prove that the function f(z) defined by :

$$f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^3 + y^2} \qquad O, \text{ if } z = 0$$

satisfies C–R equations but $f'(0)$ does not exist.

12. (a) State and prove residue theorem.

(b) Evaluate $\int_o^d \frac{\cos ax}{x^2+1} dx$

13. (a) Define expectation of Random variable. The probability density function of a random variable is given by

$$f(x) = \begin{cases} \frac{1}{2}(x+1), & -1 \leq x \leq 1 \\ 0, & \text{elsewhere} \end{cases}$$

then fin E (x) and variance of X.

(b) The joint probability density function of continous random variable (X, Y) is given $f(x, y) = ke^{-(x+y)}$ $x > 0, y > 0$.

Find the value of k.

14. (a) Fit a Poission distribution to the set of observations:

x:	0	1	2	3 4
f:	122	60	15	2 1

(b) Find mean and variance of normal distribution.

15. Find coorrelation co-efficient between x and y for the given values. Find the two regression lines also.

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

16. (a) If f(z) is analytic function with constant modules, show that f(z) is constant.

(b) State and prove Baye's theorem.

17. (a) Expand $f(z) = \frac{1}{(z-1)(z-2)}$ in the region $|\angle|z|\angle 2$.

(b) The values in two random samples are given below :

Sample 1 : 15 25 16 20 22 24 21 17 19 23

Sample 2 : 35 31 25 38 26 29 32 34 33 27 29 31

Can we conclude that the two samples are drawn from the same population. Test at 5% level of significance.