**Reg. No. \_\_\_\_\_\_\_\_**

**Karunya University**

**(Karunya Institute of Technology and Sciences)**

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination - June 2011**

**Subject Title: MATHEMATICS - III Time: 3 hours**

**Subject Code: MA233 Maximum Marks: 100**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. Write down the Cauchy’s Riemann equation in Cartesian form.

2. Mobius Transformation is also called as \_\_\_\_\_\_\_\_\_\_.

3. If f(z) is analytic and f′(z) is continuous at all points on inside a simple closed curve C, then  = \_\_\_\_\_\_\_\_\_\_.

4. Find the zero of f(z) = z cos z.

5. The correlation coefficient lies between\_\_\_\_\_\_\_\_\_\_.

6. The mean and variance of Poisson distribution is \_\_\_\_\_\_\_\_\_\_.

7. If the number of sample size n > 30, then it is called \_\_\_\_\_\_\_\_\_\_ samples.

8. Write down the formula for Ψ2 – goodness of fit.

9. If Z{f(n)} = F(Z), then Z {anf(n)} = \_\_\_\_\_\_\_\_\_\_.

10. What is the value of Z-1?

**PART – B (5 x 3 = 15 MARKS)**

11. Show that the function u =is harmonic.

12. Find the residue at z = 0 of .

13. Find the mean and variance of the distribution whose moment generating function is (0.4et+0.6)2.

14. Write the uses of F test.

15. Find the Z transform of sin (nπ/2.)

**PART – C (5 x 15 = 75 MARKS)**

16. a. Find the analytic function whose real part is ex(x cos y – y sin y). (7)

b. If f(z) is analytic, show that ∇2|f(z)|2 =4 | f′(z)|2. (8)

(OR)

17. a. Find the image of the circle |z-1| = 1 in the complex plane under the mapping w =.(7)

b. Find the bilinear transformation which maps the points 1, i, -1 onto the points 0,1, ∞.(8)

[P.T.O]

18. a. Evaluate where C is |z| = 3 by Cauchy’s integral formula. (7)

b. Expand as a Laurent’s series valid in the regious (i) 1<|z|<2 (ii) |z|>2. (8)

(OR)

19. Evaluate.

20. a. In a correlation analysis the equation of two regression lines are 3x + 12y = 19 and 3y+9x=46. Find (i) the value of the correlation coefficient (ii) Mean value of X and Y (7)

b. Calculate the correlation coefficient from the following data: (8)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X: | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Y: | 15 | 16 | 14 | 13 | 11 | 12 | 10 | 8 | 9 |

(OR)

21. a. Find the m.g.f, mean and variance of Poisson distribution. (7)

b. If X is a normal variate with μ = 30 and σ = 5. Find the probability of (i) X ≥ 45

(ii) | X-30 |≥ 5. (8)

22. a. A simple sample of height of 6400 English men has a mean of 170 cm and a S.D. of 6.4cm, while a simple sample of heights of 1600 Americans has a mean of 172 cm and a S.D of a 6.3 cm. Do the data indicate that Americans are on the average, taller than the Englishmen? (7)

b. A certain injection administered to each of 12 patients resulted in the following increases of blood pressure 5, 2, 8, - 1, 3, 0, 6, -2, 1, 5, 0, 4. Can it be concluded that the injection will be in general accompanied by an increase in B.P? (8)

(OR)

23. a. Ten oil tins are taken at random from an automatic filling machine. The mean weight of the tin is 15.8 kg and standard deviation is 0.5 kg. Does the sample mean differ significantly from the intended weight of 16 kg? (7)

b. Two groups of 100 people each were taken for testing the use of a vaccine, 15% contracted the disease out of inoculated persons in the first group, while 25% contracted the disease in the other group. Test the efficiency of the vaccine using χ2. (8)

24. a. Find the Z transform of . (7)

b. Find the inverse Z-transform of . (8)

(OR)

25. Using Z-transform, Solve the difference equation y(n+2) -3y (n+1) + 2y(n) =2n, given that

y (0) = y (1) = 0.