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

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **11MA208/12MA205** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **COMPLEX ANALYSIS, STATISTICS AND Z-TRANSFORMS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Write down the necessary and sufficient condition for f(z) = u+iv to be analytic? | 1 |
| 2. | Define conformal mapping. | 1 |
| 3. | Define Isolated singularity. | 1 |
| 4. | State Cauchy’s Integral formula | 1 |
| 5. | The mean of the poisson distribution is \_\_\_\_\_\_\_\_\_\_. | 1 |
| 6. | What is the regression line of y on x? | 1 |
| 7. | State Null Hypothesis. | 1 |
| 8. | What is meant by Critical Region? | 1 |
| 9. | Evaluate z(1). | 1 |
| 10. | State unit step sequence. | 1 |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | Check whether the function u=xy is harmonic or not? | 3 |
| 12. | Find the Taylor series expansion of f(z)= at z=0. | 3 |
| 13. | Write down the moments  about the mean. | 3 |
| 14. | Write down the formula to test the significance for single proportion for n>30. | 3 |
| 15. | Find . | 3 |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | If f(z) is a regular function of z, then prove that | 10 |
| b. | Find the region in w plane into which the triangular region enclosed by the lines x=0, y=0, x+y=1 is transformed under the mapping w=2z. | 5 |
| (OR) | | | |
| 17. | a. | Find the analytic function f(z) where | 8 |
| b. | Find the image of the circle  under the transformation w = | 7 |
| 18. | a. | Evaluate , where c is the circle using cauchy’s Integral formula. | 5 |
| b. | Evaluate | 10 |
|  | | | |
| 19. | a. | Find the Laurent’s series expansion of f(z)= in the region (i) <1  (ii) 1<  <2 (iii) >2 | 10 |
| b. | Evaluate  where C is the circle  using Cauchy’s Residue Theorem. | 5 |
| 20. | a. | Find the coefficient of correlation between industrial production and export using the following data.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Production(x) | 55 | 56 | 58 | 59 | 60 | 60 | 62 | | Export(y) | 35 | 38 | 37 | 39 | 44 | 43 | 44 | | 10 |
| b. | A machine manufacturing screws is known to produce 5% defective. In a random sample of 15 screws what is the probability that there are (i) exactly three defectives (ii) not more than three defectives. | 5 |
| (or) | | | |
| 21. | a. | A sample of 12 fathers and their eldest sons have the following data about their heights in inches. Calculate the rank correlation coefficient.   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Father(x) | 65 | 63 | 67 | 64 | 68 | 62 | 70 | 66 | 68 | 67 | 69 | 71 | | Son(y) | 68 | 66 | 68 | 65 | 69 | 66 | 68 | 65 | 71 | 67 | 68 | 70 | | 10 |
| b. | Six coins are tossed 6400 times. Using the poisson distribution, what is the approximate probability of getting six heads 10 times? | 5 |
| 22. | a. | The nine items of a sample had the following values 45,47,50,52,48,47,49,53,51. Does the mean of the nine items differ significantly from the assumed population mean 47.5 | 7 |
| b. | The number of automobile accidents per week in a certain community are as follows: 12,8,20,2,14,10,15,6,9,4. Are these frequencies is agreement with the belief that accident conditions were the same during this 10 week period. | 8 |
| (OR) | | | |
| 23. | . | Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Horse A | 28 | 30 | 32 | 33 | 33 | 29 | 34 | | Horse B | 29 | 30 | 30 | 24 | 27 | 29 | --- |   Test whether the two horses have the same running capacity. | 15 |
| 24. | a. | Use partial fraction to evaluate | 8 |
| b. | Find the Z Transform of rnsinnand rncosn. | 7 |
| (OR) | | | |
| 25. | a. | Solve given , | 10 |
| b. | Find Z-1using Residue method. | 5 |