B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
III Year VI Semester
Core Major - Paper XIV
COMPLEX ANALYSIS

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define Analytic function.
2. Define Harmonic function.
3. Define Jordan curve.
4. State cauchy Goursat theorem.
5. State Liouvillie's theorem.
6. State taylor's series.
7. Define removable singularities.
8. Define zeroes and poles.
9. Define linear fractional transformation.
10. Define velocity potential.
11. Define multiple connected region.
12. Define bilinear transformation.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Derive Cauchy Riemann equation in polar form.
14. Find the value of the integral I = $\int_{\mathbf{C}} \overline{\mathbf{z}}\ \mathbf{d}z$.where C is the right hand half z = $2\mathbf{e}^{\mathbf{i}\theta}$ (-$\frac{\pi}{\mathbf{2}} \leq \theta \leq \frac{\pi}{\mathbf{2}}$) of the circle $|\mathbf{z}| = 2$.
15. State and prove fundamental theorem of algebra.
16. State and prove cauchy residue theorem.
17. Find the linear fractional transformation that maps the points z = 1,0,-1; w = i, ∞, 1.
18. Evaluate $\int_{\mathbf{C}} \frac{\mathbf{z}}{(\mathbf{z+2})\,(\mathbf{z-1})}\mathbf{d}z$, where C is the circle $|\mathbf{z}| = 1.5$
19. Evaluate $\int_{\mathbf{0}}^{\infty} \frac{\mathbf{x^2}}{\mathbf{x^6+1}}\ \mathbf{d}x$.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Derive necessary and sufficient condition for Cauchy Riemann equation.
21. State and prove Cauchy integral formula.
22. State and prove Laurent's series.
23. An isolated singular point $\mathbf{z_0}$ of a function f is a pole of order m if and only if f(z) can be written in the form f (z) $= \frac{\emptyset(\mathbf{z})}{(\mathbf{z}-\mathbf{z_0})^{\mathbf{m}}}$.
24. Derive the transformation w $= \mathbf{z^2}$.

B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
III Year VI Semester
Core Major - Paper XIV
COMPLEX ANALYSIS

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define Analytic function.
2. Define Harmonic function.
3. Define Jordan curve.
4. State Cauchy Goursat theorem.
5. State Liouvillie's theorem.
6. State taylor's series.
7. Define removable singularities.
8. Define zeroes and poles.
9. Define linear fractional transformation.
10. Define velocity potential.
11. Define multiple connected region.
12. Define bilinear transformation.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Derive Cauchy Riemann equation in polar form.
14. Find the value of the integral I = $\int_{\mathbf{C}} \overline{\mathbf{z}}\, \mathbf{d}z$.where C is the right hand half z $= 2\mathbf{e}^{\mathbf{i}\theta}$ (-$\frac{\pi}{\mathbf{2}} \leq \theta \leq \frac{\pi}{\mathbf{2}}$) of the circle $|\mathbf{z}| = 2$.
15. State and prove fundamental theorem of algebra.
16. State and prove cauchy residue theorem.
17. Find the linear fractional transformation that maps the points z = 1,0,-1; w = i, ∞, 1.
18. Evaluate $\int_{\mathbf{C}} \frac{\mathbf{z}}{(\mathbf{z+2})\,(\mathbf{z-1})} \mathbf{d}z$, where C is the circle $|\mathbf{z}| = 1.5$
19. Evaluate $\int_{\mathbf{0}}^{\infty} \frac{\mathbf{x^2}}{\mathbf{x^6+1}}\, \mathbf{d}x$.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Derive necessary and sufficient condition for Cauchy Riemann equation.
21. State and prove Cauchy integral formula.
22. State and prove Laurent's series.
23. An isolated singular point $\mathbf{z_0}$ of a function f is a pole of order m if and only if f(z) can be written in the form f (z) $= \dfrac{\emptyset(\mathbf{z})}{(\mathbf{z}-\mathbf{z_0})^{\mathbf{m}}}$.
24. Derive the transformation w $= \mathbf{z^2}$.