DECEMBER 2022 **U/ID 32518/UCM6C**

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer any TEN questions

1. Fine the polar coordinates of $f(z) = z^2$.

2. Define Harmonic Function.

3. Write down general form of linear transformation

4. Define linear fractional transformation

5. State Cauchy Goursat Theorem

6. Define Contour integral.

7. Define convergence series.

8. Find the order of $(z+i)^3$ when zero is -1.

9. Find the residue of cot z at the simple pole z = 0.

10. State argument principle.

11. Find the Laurent's series of $f(z)=z^2e^{\frac{1}{z}}$ about $z=0$.

12. If $z=e^{i\theta}$ then find the value of $\sin\theta$ interms of z.

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. Prove that a composition of continuous function is continuous.

14. Discuss the transformation $w=\frac{1}{z}$

15. State and prove Liouille's theorem.

16. Expand $f(z)=\frac{z-1}{z+1}$ as a Taylor's series

(a) about the point $z=0$

(b) about the point $z=1$

17. State and prove Rouche's theorem.

18. Determine and classify the singular points $f(x)=\frac{r}{e^r-1}$.

19. Derive Cauchy's integral formula.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

20. Obtain the sufficient condition for differentially.

21. Discuss the transformation $w = \sin z$.

22. State and prove Laurent's theorem.

23. State and prove residue theorem.

24. Evaluate $\int_0^{2\pi} \frac{d\theta}{5 + 4\sin\theta}$

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