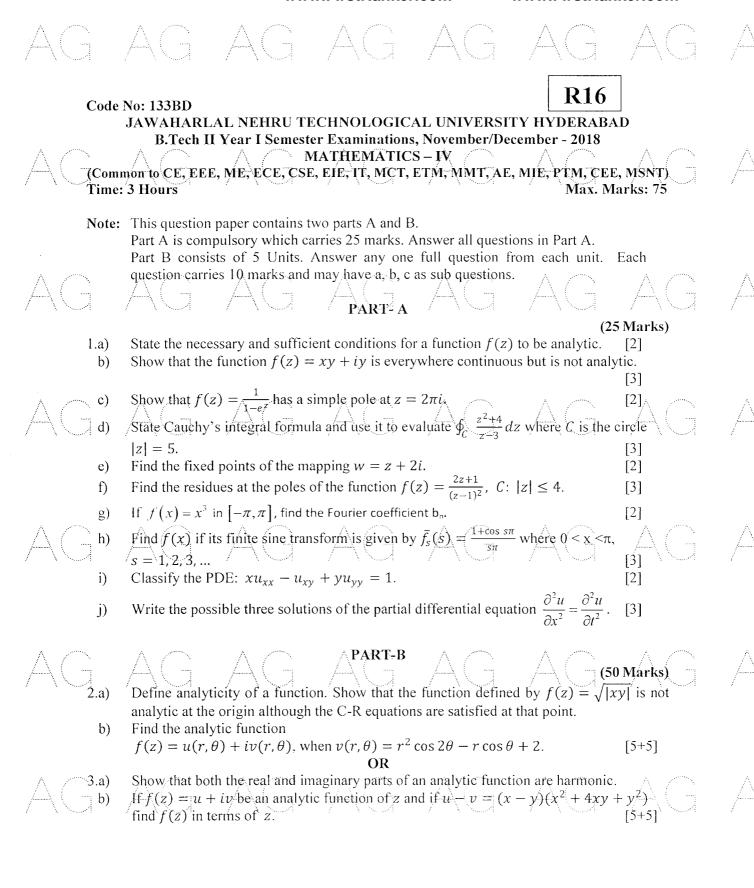


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State Cauchy integral theorem and use it to evaluate the integral $\int_C \frac{e^{2z}}{(z-1)^2(z-3)} dz$ where C is the circle |z| = 4.



If $\Phi(a) = \int_{c} \frac{3z^2 + 7z + 1}{z \neq a} dz$, where C is the circle $x^2 + y^2 = 4$, find $\Phi(3)$, $\Phi'(1-i)$ and (5+5)



Expand $f(z) = \frac{1}{z^2 - 4z + 3}$ in the region 1 < |z| < 3. Also name the series so obtained. 5.a)

Find the nature and location of the singularities of the function $f(z) = \frac{e^{2z}}{(z-z)^4}$ by finding b) its Laurent's series expansion.



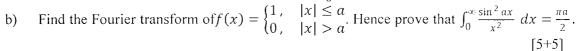
State Residues theorem. Evaluate the integral by contour integration: $\int_0^{\pi} \frac{d\theta}{13+5\cos\theta}$. [10]

Find the residue of $f(z) = \frac{z^3}{z^2 - 1}$ at $z = \infty$. 7.a)

Define bilinear transformation. Find the bilinear transformation which maps the points b) z = 1, $i_r = 1$ onto the points w = i, 0, -i and hence find the image of |z| < 1.



Find the Fourier series for the function $f(x) = \frac{\pi x}{2} \text{ in } 0 \le x \le 2$.





Develop $f(x) = \begin{cases} 2, & -2 < x < 0, \\ 0 < x < 2 \end{cases}$ in a series of sines and cosines and deduce the series

Find the Fourier cosine transform of $f(x) = e^{-x}$, x > 0

[5+5]

The ends A and B of a rod 20 cm long have the temperature at 30°C and 80°C until 10. steady state conditions prevail. The temperature at the ends are suddenly changed to 40° C and 60° C respectively. Find the temperature distribution in the rod at time t. [10]



Write down one dimensional wave equation. A string is stretched and fastened to two points l cm apart. Motion is started by displacing the string in a sinusoidal arch of height y_0 and then released from rest at time t=0. Find the displacement at point x and at any time t.









