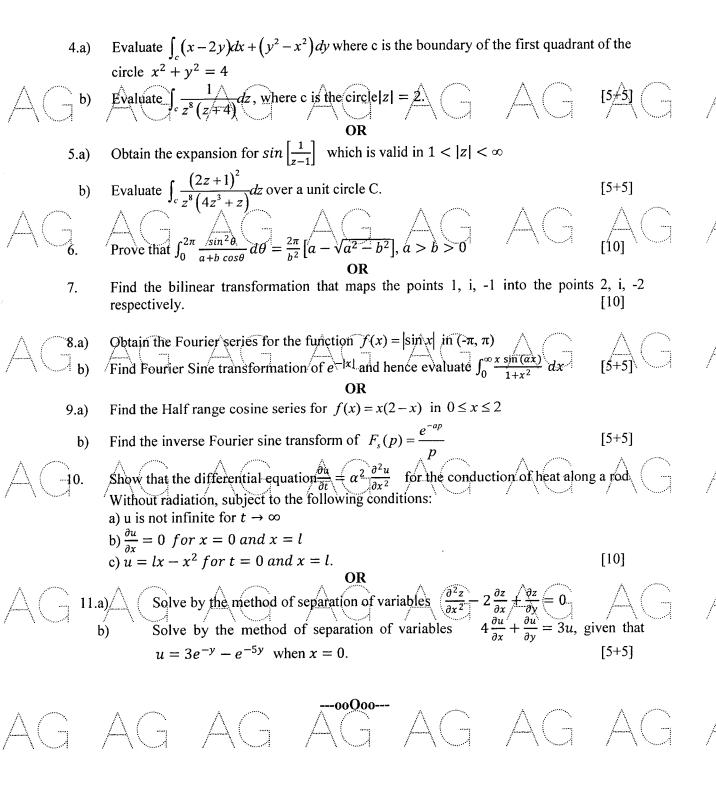


Codo	No: 133BD R16	
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD		
B.Tech II Year I Semester Examinations, April/May - 2018 MATHEMATICS - JV MATHEMATICS - JV		
(Common to GE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, AE, MIE, PTM, CEE, MSNT)		
Time: 3 Hours Max. Marks: 75		
Note:	This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A.	
	Part B consists of 5 Units. Answer any one full question from e	ach unit.
AG	Each question carries 10 marks and may have a, b, c as sub questions. PART A	AG
, ,	(2	5 Marks)
1.a)	Show that $u = \frac{x}{x^2 + y^2}$ is harmonic	[2]
b)	Write Cauchy-Riemann equations in polar form.	[3]
c)	Expand $f(z) = \sin z$ in Taylor's series about $z = \frac{\pi}{4}$	[2]
\triangle (\supseteq d)	Find residue of $f(z) \neq \frac{z}{z^2+1}$ at its poles	[3]
/ \ e)	Find residue of $f(z) \neq \frac{z}{z^2+1}$ at its poles Find image of the circle $ z = 2$ under the transformation $w = z + 3 + 2t$	[2] \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
f)	Determine the region of w-plane into which the region is mapped transformation $w = z^2 z-1 = 2$.	by the [3]
g)	Find the value b_n of the Fourier series of the function $f(x) = x^2 - 2$, when -2	
		[2]
∧	Find the Fourier sine transformation of $2e^{-5x} + 5e^{-2x}$ Classify the equation $3\frac{\partial^2 u}{\partial x^2} + 6\frac{\partial^2 u}{\partial y^2} + 4\frac{\partial^2 u}{\partial x \partial y} - 2\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} - 4 = 0$ Write the one dimensional Heat equation in steady state.	
/-\\	Classify the equation $3\frac{\partial}{\partial x^2} + 6\frac{\partial}{\partial x^2} + 4\frac{\partial}{\partial x\partial y} - 2\frac{\partial}{\partial x} + \frac{\partial}{\partial y} - 4 = 0$	/ ² /\\
j)	Write the one dimensional Heat equation in steady state.	[3]
PART-B		
	`	0 Marks)
	Discuss the continuity of $f(x,y) \neq \begin{cases} \frac{2xy(x+y)}{x^2+y^2}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$	AG
b)	Construct the analytic function $f(z)$, whose real part is $e^x \cos y$.	[5+5]
2	OR	ind f(a) in
3.a)	If $f(z) = u + iv$ is an analytic function of z and if $u - v = e^x(cosy - siny)$ find $f(z)$ in terms of z	
$\triangle \bigcirc^{\mathbf{b}}$	if $u(x, y)$ and $v(x, y)$ are harmonic functions in a region R, Prove that the $\left(\frac{\partial u}{\partial y} - \frac{\partial v}{\partial x}\right) + i\left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}\right)$ is an analytic function.	function [5+5]



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