Vivekananda College of Engineering & Technology, Puttur [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®]

Affiliated to VTU, Belagavi & Approved by AICTE New Delhi

CRM08

Rev 1.10

<BS>

<11/03/2022>

CONTINUOUS INTERNAL EVALUATION - 2

Smalled wholesal agency and the second	Sem / Div: III/A,B	Sub: ADDITIONAL MATHEMATICS I	S Code: 18MATDIP31
Date: 14/03/202	Time:3:50-5:00 pm	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

	PART A In the Maclaurin's series expansion of tanx $e^{ax+by} f(ax-by)$ prove that $b \frac{\partial u}{\partial x} + a \frac{\partial u}{\partial y} = 2abu$.	8
		8
Carlotte State Control	$e^{-xy}f(ax-by)$ ox by	
If u =	$= \tan^{-1} \left(\frac{x^3 + y^3}{x + y} \right)$, prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$.	9
	OR	
Prove	e that $\sqrt{1+\sin 2x} = 1+x-\frac{x^2}{2}-\frac{x^3}{6}+\frac{x^4}{24}+\cdots$	8
If z =	$= \tan^{-1}\left(\frac{x^2+y^2}{x+y}\right)$, find $\frac{\partial z}{\partial x} & \frac{\partial z}{\partial y}$.	8
c If u =	$= \sin^{-1}\left(\frac{x^2y^2}{x+y}\right), \text{ prove that } x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 3\tan u.$	9
1	a Prove	Prove that $\sqrt{1+\sin 2x} = 1+x-\frac{x^2}{2}-\frac{x^3}{6}+\frac{x^4}{24}+\cdots$

3 a If $x = u(1-v)$, $y = uv$, find $J = \frac{\partial(x, y)}{\partial(u, v)}$	8
b If $z = xy^2 + x^2y$ where $x = at$, $y = 2at$, find $\frac{dz}{dt}$	8
c If $u = f(y - z, z - x, x - y)$ prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$	9
OR	
4 a If $x = r \cos \theta$, $y = r \sin \theta$ find $J = \frac{\partial(x, y)}{\partial(r, \theta)}$	8
b If $u = xy + yz + zx$, where $x = t \cos t$, $y = t \sin t$, $z = t$, find du / dt at $t = \pi / 4$.	8
c If $z = f(x,y)$ where $x = e^u \sin v$, $y = e^u \cos v$ then prove that $\left(\frac{\partial z}{\partial u}\right)^2 + \left(\frac{\partial z}{\partial v}\right)^2 = e^{2u} \left\{ \left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2 \right\}$	9

Prepared by:

Navana P

HOD 14/3