MTH632 MID TERM CURENT PAPERS

(VISIT VURANK FOR MORE)

Q1. Evaluate $\lim_{z \to \infty} \frac{z-1}{z^2+z+1}$

Q2 $\lim_{z \to i} \frac{z-1}{z^2+1}$

Q3 $\lim_{z \to 2+i} 2z^2 + 4 - 3z + 5i$

Q4:- find $f'(y) \Rightarrow f(y) = (y + 6y^2)^3$

Q5:- Find value of $(1 + \sqrt{3}i)^4$

Q6:- Find $(1+\sqrt{3})^{1/3}$ exponential for
was given.

MCQS:- (i) $z - w$ (2) Congugate b/w
(3) reciprocal of i (4) ~~polar form of~~
(#) Almost paper was easy. MCQ
were too much easy.

Δ 2

Subjective MTH632

1. Show that polynomial $P(z) = 1 - z - z^2 + z^3 - z^4 + z^5$ in complex plane is continuos at point $z = \frac{1}{2}$

2. $\lim_{x \to 4} \frac{2 - \sqrt{z}}{4 - z}$

3. $\lim_{z \to 2+i} (z^2 + 4z - 4 + 5i)$

4. $\lim_{z \to 3} (z^2 + 4z + 3)$

5. $f(z) = \frac{(1+z^2)^4}{z^2}$, find deriavitive, $f'(z)$.

6. Evaluate $\lim_{z \to 2i} (3z^2 - 4z + 6 - 6i)$

MTH 632

1. $(\sqrt{2} - i) - i(1 - \sqrt{2}i) = -2i$ Prove it (2 Marks)
2. $(1+z)^2 = 1 + 2z + z^2$ prove it (2 Marks)
3. Check continuity of function at $z = i$ (3 Mark)

   $f(z) = \dfrac{z^3 + 3z + 2}{z^2 + 1}$

4. Evaluate $\lim_{z \to 2+i} \left(z^2 + 2 + 5i - 4z \right)$ (3 Marks)
5. Find $f'(z)$ at $z = i$ (5 Mark)

   $f(z) = \dfrac{z^3}{(z+i)^3}$

6. Evaluate (5 Mark)

   $\dfrac{1+2i}{3-4i} + \dfrac{2-i}{5i}$

MTH632 2019 (Mids)

Q:- $(-\sqrt{3}\,i)^2$ express it as $a+ib$ (2)

Q:- evalute $f(z)=\dfrac{z^2+3z+2}{z^2+1}$ at $z=i$ (2)

Q:- $\lim\limits_{z\to\infty} \dfrac{5z^2+1}{3z^2-z}$ (3)

Q:- $\lim\limits_{z\to 2+i} z^2-4z+2+5i$ (3)

Q:- $f(z) = z^4-9z^2+iz-2$ check continuity at $z=-i$ (5)

Q:- find. $\lim\limits_{n\to\infty} z_n$, $z_n = \dfrac{1}{n}\cos\left(\dfrac{n\pi}{3}\right) + \sin n(\pi/3)\,i$ (5)

$\lim_{z\to 2+i} (z^2-4z+2+5i)$

$\lim_{z\to 4} \frac{2-\sqrt{z}}{4-z}$ (5) (8)

at of $f(z) = \frac{z-1}{z+1}$ at $z=i$

(1) Verify that $(2,-3)(-2,1) = (-1,8)$ (2)

(2) Test continuity of $f(z)$ at $z = i$ for

$$f(z) = \frac{z^2+3z+2}{z^2+1}$$ (2)

(3) Find $f'(z)$ if $f(z) = \frac{z-1}{2z+1}$ (3)

(4) Evaluate $\lim_{z\to 2+i} (z^2-4z+2+5i)$ (3)

(5) Evaluate $\lim_{z\to 4} \frac{2-\sqrt{z}}{4-z}$ (5)

(6) Find derivative of $f(z) = \frac{z-1}{z+1}$ at $z = i$ (5)

VU

Rough Sheet

FALL/SPRING MID/FINAL TERM 2018 (Year)

Campus Code: VBWN01

Date: 23/12/2018

Course Code: MTH 632

Superintendent Signature: ______

Student Signature: ______

Student ID: ______

1) verify $(2,-3)(-2,1)=(-1,8)$

2) $\lim_{z \to i} \frac{z-i}{z^2+1}$

3) $\lim_{z \to 4i} \frac{z^2+16}{z-4i}$

4) Find derivative of $f(z)=(iz^3+3z^2)^3$ at $z=2i$

5) $\lim_{n \to \infty} z_n$ where $z=\frac{1}{n}\left(\cos\left(\frac{n\pi}{3}\right)+\sin\left(\frac{n\pi}{3}\right)i\right)$

6) Cauchy Rieman eqn in Pola form

Show that $f'(z)=\frac{1}{2f(z)}$

Moreover

$f(z)=\sqrt{r}\, e^{i\theta/2}$

Note: Submit this sheet to Superintendent, before leaving the Examination Center.

VU

Rough Sheet

FALL/SPRING MID/FINAL TERM 20_8 (Year) Date: [illegible]

Superintendent Signature: ________

Student Signature: [illegible]

Campus Code: ________

Student ID: [illegible]

Course Code: [illegible]

$2+i \cdot -1-3i$

$Re(1-2i)$

$=1$

$(1+7i)(3+2i)$

$(17, 19)$

$-11, 23i$

$6i - \frac{1}{3}$

$\frac{19i - i}{3}$

$= \frac{17i}{3}$

$\left| e^{(2+3i)} \right|$

(23) $16x^3 + 15x - 30$

$36x^2 + 15$

$= (2, -5)(2, +1)$

$= -4+5, +6+2$

$= -1, 8$

$z_1 - z_2$

$= (5+i) - (-8+3i)$

$= (5+i+8-3i)$

$= 13-2i$

$= 13+2i$

$5i+5-10$

$(1+2i)^2$

$= 1+4i+4i^2$

$= 1-4+4i$

$-3+4i$

$(1+z)^2 = 1+2z+z^2$

$= (1+x+iy)^2$

$= 1+2z+z^2$

(25) $\lim_{z \to 4} \frac{2-\sqrt{z}}{4-z}$

$= \lim_{z \to 4} \frac{2-\sqrt{z}}{(2-\sqrt{z})(2+\sqrt{z})}$

$= \frac{1}{2+\sqrt{z}}$

$= \frac{1}{2+2}$

$= \frac{1}{4}$

(26) $\lim_{z \to 1-i} (z^{-2} + 2)$

$\lim_{z \to (1-i)} \left(\frac{1}{z^2} + 2\right)$

$= \frac{1+2z^2}{z^2}$

$= \frac{1+2(1-i)^2}{(1-i)^2}$

$= \frac{1+2(1+i^2-2i)}{1+i^2-2i}$

$= \frac{1+2-2+4i}{1-1+2i} = 2$

(30) $f(z) = (iz^3 + 3z^2)^3$

$f'(z) = 3\left[iz^3 + 3z^2\right]^2 \frac{d}{dz}(iz^3 + 3z^2)$

$= 3(iz^3 + 3z^2)^2 (3iz^2 + 6z)$

$= 3\left[i(2i)^3 + 3(2i)^2\right]^2 (3i(2i) \ldots$

$= 3\left[8i^4 + 12i^2\right]^2 \ldots$

$= 3(0)$

$= 0$

Note: Submit this sheet to Superintendent, before leaving the Examination Center.

Mth 632

Reduce $\frac{1+2i}{3-4i} + \frac{2-i}{5i}$ (5)

in Real form

Express $-1+i$ in exponential form (3) marks

Express $\sqrt{3}-i$ in exponential form

2 marks

Mcqz

Mcqz are very very easy and mostly were 1-20 module

Cauchy-Raimann rule

$f'(z) = z - \bar{z}$ 5 marks

(21) Solve: $(-3+2i)^2 = (-3+2i)(-3+2i) = -3(-3+2i)+2i(-3+2i)$

$= 9 - 6i - 6i + 4i^2 = 9 - 12i - 4 = 5 - 12i$

(22) Evaluate $\lim_{(x,y)\to(3,4)} x(x+y) - y^2$

(23) $-\sqrt{3} + i$ in exponential form $\frac{1}{1.73} = 0.57$

$r\cos\theta = -\sqrt{3}$, $r\sin\theta = 1$

$\theta = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

(24) $f(z) = (z+4z)^8$ at $z = 3+4i$

$f(z) = (z-4z)^8 \Rightarrow f(3+4i) = (3+4i-4i)^8 = (3)^8$

$f'(z) = 8(z-4i)^{8-1}$

$= 8(3+4i-4i)^7 = 8(3)^7 =$ ______

(25) $(-4 - 4i)^3$ Evaluate

$(a+b)^3 = a^3 + 3ab(a+b)$

$(a+b)^2 = a^2 + b^2 + 2ab = (a+b)$

$z = -\sqrt{3} + i$

$z = re^{i\theta}$

$r = \sqrt{(-\sqrt{3})^2 + 1^2}$

$= \sqrt{3+1} = \sqrt{4}$

$r = 2$

$\tan\theta = \frac{1}{-\sqrt{3}} = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

$\frac{9\pi}{2}$

$z = r(\cos\theta + i\sin\theta)$

Math 632

Q.No 1 Evalute $(-4-4i)^3$

Q.No 2 Expression $\left(\frac{-\sqrt{3}+i}{2}\right)$ in the form $a+ib$

Q.No 3 $z = x+iy$

$$x = \frac{z+\bar{z}}{2} \qquad y = \frac{z-\bar{z}}{2i}$$

Q.No 4 $(1+z)^2 = 1+z^2+2z$ Prove

Course Code: MATH 32 Student ID: [illegible]

(1)
$$\begin{array}{r} 3+i \\ -1+2i \\ \hline 2+3i \end{array}$$

(2) $\sqrt{3^2+2^2} = \sqrt{9+4} = \sqrt{13}$

(3) $z = r e^{i\theta}$

$\frac{1}{z} = \frac{1}{r e^{-i\theta}}$

(4) $f(z) = \frac{3iz}{5}$

$= \frac{3i \cdot 10^2}{5} = 6i$

(5) $f(z) = \frac{3iz - i}{3}$

$2z + i = 0$

$-i = 2z$

$\frac{-i}{2} = z$

$= \frac{3i \times 2 - i}{3}$

$= \frac{6i - i}{3}$

$= 5i$

(6) $\sqrt{6^2+7^2}$

$= \sqrt{36+49}$

$= \sqrt{85}$

(7) $(4 \cdot i)^2$

$= 16 + i^2 - 2 \cdot 4 \cdot i$

$= 16 - 1 - 8i$

$= 15 - 8i$

(8) $f(z) = z^2 + z + 1$

$= (i-1)^2 + i - 1 + 1$

$= i^2 + 1 - 2i + i - 1 + 1$

$= -2i + 2i = i(-2+1)$

$= -i$

(9) $f(z) = z^2 + 3z - 1$

$= i^2 + 3i - 1$

$= -1 + 3i - 1$

$= -2 + 3i$

(10) $f(z) = 2z^3 + 2z - 7$

$f'(z) = 6z^2 + 2$

(11)

$\frac{1+2i}{3-4i} + \frac{2-i}{5i}$

$= \frac{1+2i}{3-4i} \times \frac{3+4i}{3+4i} + \frac{2-i}{5i} \times \frac{i}{i}$

$= \frac{(1+2i)(3+4i)}{(3-4i)(3+4i)} + \frac{2i - i^2}{5i^2}$

$= \frac{3 + 4i + 6i + 8i^2}{(3)^2 - (4i)^2} + \frac{2i - (-1)}{5(-1)}$

$= \frac{3 + [illegible] + 8(-1)}{[illegible] 16(-1)} + \frac{2i+1}{-5}$

$= \frac{3 + 10i - 8}{9+16} + \frac{2i+1}{-5}$

$= \frac{-5+10i}{25} - \frac{2i+1}{5}$

$= \frac{-5+10i - 5(2i+1)}{25}$

$= \frac{-5+10i-10i-5}{25}$

$= \frac{-10}{25}$

$= -\frac{2}{5}$

(12) $\lim_{(x,y)\to(3,4)} 3xy - y^2$

$3 \cdot 3 \cdot 4 - 4^2$

$= 36 - 16$

$= 20$

(13) $\lim_{z \to 2+i} (z^2 - 4z + 2 + 5i)$

$= (2+i)^2 - 4(2+i) + 2 + 5i$

$= 4 + i^2 + 4i - 8 - 4i + 2 + 5i$

$= 4 - 1 + 4i - 8 - 4i + 2 + 5i$

$= -3 + 5i$

[illegible] to Superintendent, before leaving the Examination Center.

The number $z = x + iy$ can be written in polar form as ANS: $r\cos\theta + ir\sin\theta$

Q3.IF $z = e^{i\theta}$, then $z^n =$ ANS: $e^{in\theta}$

Q4. The absolute value of complex number Z=1-i is $\sqrt{2}$

The absolute value of complex number Z=a+ib is 1) $a^2 + b^2$, 2) a+b, 3) ab, 4) $\sqrt{ab}$

The function f(z)= $\frac{1}{z^2+1}$ is defined everywhere in the finite plane except at the point 1) $z = \pm 1$, 2) $z = \pm 2$, 3) $z = \pm i$,

4) $z = \pm 2i$

let a and b denote complex constants, then $\lim_{z \to z_0}$ az+b= 1)az+b, 2) az_0+b 3) a+b 4) b

. The magnitude of exp(2+3i) is 1) exp(2) 2) exp(3) 3) exp(2*3) 4) exp(2/3)

square of 1+2i is -3+4i

Q10. let f(z)= $\frac{1}{z}$ is discontinuous at z= 1) 0 2) 1 3) -1 4) i

1. let $f(z) = \frac{1}{z^2+1}$ is discontinuous at z = 1) $\pm i$ 2) ± 1 3) ± 2 4) $\pm 2i$

. Let $f(z) = \frac{1}{z-3i}$ is discontinuous at z = 1) 3i 2) -3i 3) i 4) $-i$

The polar Cauchy – Riemann equation on a pair of real – valued function of two real variables u and v are

1) $Ur = V\theta$ and $U\theta = -Vr$ 2) $Ur = V\theta$ and $U\theta = Vr$ 3) $rUr = V\theta$ and $U\theta = -rVr$ 4) $rU\theta = Vr$ and $Ur = -rV\theta$

The limit of f(z)=z²-2z+1 at z=i+1 is 1) 1 2) -1 ,3) i 4) $-i$

Q15. The limit of f(z) = z²+3z-1 at z= i is 1) 3i-2 2) 3i 3) 2i-3

Q16. let f(z)=12z³+15z-30 then f′(z) is 1) z+15 2) 12z²+15 3) 36z²+15 4) 36z²+15

Multiply w=(3+2i) with z =(1+7i) we get z.w= 1) 3+14i 2) -11+23i 3) 21+14i 4) 21+2i

. conjugate of complex numbers z = -3-3i is 1) -3+3i 2) 3+3i 3) -3+6i 4) 3-3i

The sum of two complex numbers z=3+i , w=-1+2i is z+w= 1) 2+3i 2) 3+2i 3) -1+i

....

Q20. Solve $(-3+2i)^2$ (2)

Q21. Compute the exponential form of $\sqrt{3} - i$ (2)

Q22. Verify that ,(3,1)(3,-1)($\frac{1}{5}$,$\frac{1}{10}$)= (2,1) (3)

Q23. By using Cauchy – Riemann equations (in polar form) , find $f'(z)$ of the $f(z) = \frac{1}{z^4} = \frac{1}{r^4}(\cos 4\theta - i\sin 4\theta)$ (3)

Q24.Using the definition $\frac{dw}{dz} = \lim_{\Delta z \to 0} \frac{\Delta w}{\Delta z}$, prove that $\frac{dw}{dz} = -\frac{1}{z^2}$ when w= $\frac{1}{z}(z \neq 0)$. (5)

Evaluate , $\lim_{z \to 1+i} \frac{z^2 + z - 2 + i}{z^2 - 2z + 1}$ (5)

(VISIT VURANK FOR MORE)

(KEEP REMEMBER IN YOUR PRAYERS)