University Examinations of Semester VI for batch of 2019-20 TYBSc-paper I Complex Analysis Sample Questions				
1.	The singular point of $f(z)=\frac{5z+3}{z(z^2-1)}$ are			
	(a)	only at 0	(b)	Only at $0,\pm 1$
	(c)	only at ± 1	(d)	only 1
2.	The trigonometric function isin(z)=			
	(a)	$\frac{e^{iz}-e^{-iz}}{2}$	(b)	$\frac{e^{z}-e^{-z}}{2}$
	(c)	$\frac{e^{z}-e^{-zi}}{2i}$	(d)	$\frac{e^{zi}-e^{-zi}}{2i}$
3.	$f(z)=\begin{cases}\frac{z^2+9}{z+3i} & if\ z\neq 3i\\ 0 & if\ z=3i\end{cases}$ Then			
	(a)	f is continuous at 3i	(b)	f is continuous everywhere
	(c)	f is not continuous anywhere	(d)	f is differentiable at z=3i
4.	$u(x,y)=x^2+y^2, v=2xy$			
	(a)	u & v are harmonic conjugates of each other	(b)	u is harmonic conjugate of v but v is not harmonic conjugate of u
	(c)	v is harmonic conjugate of u but u is not harmonic conjugate of v	(d)	u and v are not harmonic conjugates of each other
5.	$f(z)=e^{x}e^{iy}$ then			
	(a)	$f'(z)$ exist nowhere on $\mathbb{C}$	(b)	$f'(z)$ exist only at i
	(c)	$f'(z)$ everywhere on $\mathbb{C}$	(d)	$f'(z)$ exist only at 0

6.	The singular point of $f(z) = \frac{z^2+20}{(z-2)(z^2+2z+2)}$ are			
	(a)	$1 \pm i$	(b)	$2, -1 \pm i$
	(c)	0	(d)	$0, \pm 1$
7.	$\overline{\exp(\iota z)} = \exp(i\bar{z})$ for			
	(a)	$z = n\pi i, n \in N$	(b)	$\forall z \in \mathbb{C}$
	(c)	$z = 0$ only	(d)	z=i only
8.	The value of integral $\int_C \frac{dz}{z^3(z+4)}$, where C is the circle $\|z+8\| = 3$, taken in counterclockwise direction equals ______________			
	(a)	$2\pi i$	(b)	0
	(c)	πi	(d)	1
9.	$\exp(5 \pm 3\pi i) =$			
	(a)	e^{-5}	(b)	$-e^5$
	(c)	e^5	(d)	e^3
	Correct answer	(b)		
10.	If $f(z)$is analytic at a then following is the Taylor series of f at z_0. ($f^{(k)}$ represents k^{th} $derivatives\ of\ f$).			
	(a)	$\sum_{k=0}^{\infty} \frac{f^{(k)}(a)}{k!} a^k$	(b)	$\sum_{k=0}^{\infty} \frac{f^{(k)}(a)}{k!} (z-a)^k$
	(c)	$\sum_{k=0}^{\infty} \frac{f^{(k)}(a)}{k!} (z+a)^k$	(d)	$-\sum_{k=0}^{\infty} \frac{f^{(k)}(a)}{k!} a^k$
11.	$\int_C \frac{dz}{z^2+20} dz \quad C: \|z\| = 5$			
	(a)	$\frac{\pi i}{2}$	(b)	0
	(c)	πi	(d)	$2\pi i$
12.	An analytic function with constant modulus is ….			

	(a)	constant	(b)	linear
	(c)	quadratic	(d)	Not constant
13.	The radius of convergence of the power series $\sum_{n=0}^{\infty}(n+2)^2(z-i)^{2n}$ is _______________			
	(a)	1	(b)	∞
	(c)	-1	(d)	0
14.	$f(z)=\frac{e^z}{z}$ Then			
	(a)	$'0'$ is an essential singularity of f	(b)	$'0'$ is a pole of f
	(c)	$'0'$ is a removable singularity of f	(d)	$'$-1' is a pole of f
15.	The residue at $z=i$ of $f(z)=\frac{1}{(z^2+1)^2}$ is____________			
	(a)	4	(b)	$\frac{i}{4}$
	(c)	$\frac{-i}{4}$	(d)	0
16.	Let $f(z)=\frac{z-1}{(z-4)^3(z+3)^6}$, then $z=4$ and $z=-3$ are the poles of the order _________			
	(a)	6 and 4	(b)	3 and 4
	(c)	3 and 6	(d)	5 and 7
17.	The residue at $z=0$ of $f(z)=z^2\sin\left(\frac{1}{z}\right)$ is __________			
	(a)	$\frac{-1}{6}$	(b)	$\frac{1}{6}$
	(c)	0	(d)	-1
18.	$f(z)=\frac{z+3}{\sin 2z}$. f has a pole of ___________			
	(a)	Order 1 at $n\pi, n\in\mathbb{Z}$	(b)	order 2 at $n\pi, n\in\mathbb{Z}$
	(c)	order 1 at $n\,\pi/2, n\in\mathbb{Z}$	(d)	order n at $n\pi, n\in\mathbb{Z}$

19.	$$f(z) = \left(\frac{z+1}{z-1}\right)^3 \cdot \underset{z=1}{Res} f(z) =$$			
	(a)	1	(b)	0
	(c)	6	(d)	-6
20	(a)	Does not exist	(b)	0
	(c)	1	(d)	$^1/_2$