

SEM	SET	PAPER CODE	TITLE OF THE PAPER
II	2014	14PMA2108	COMPLEX ANALYSIS

**SECTION - A****Answer all the questions:** **$30 \times 1 = 30$** **Choose the correct answer:**

- The complex line integral is
  - of path dependent
  - independent of paths
  - independent of end points
  - none of the above
- If  $f(z)$  is analytic in a simple connected domain  $D$ , then
  - Indefinite integral exist
  - Indefinite integral does not exist
  - Integral of  $f(z)$  is dependent of path in  $D$
  - None of the above
- The integral of  $\int_{|z|=1} \frac{e^z}{z} dz$  is equal to
  - $6\pi i$
  - $2\pi i$
  - $\pi i$
  - $-2\pi i$
- The value of  $\int_{|z|=2} \frac{dz}{z^2 + 1}$  is
  - 2
  - $-i$
  - 1
  - 0

5. The integral of  $\oint_c (z - z_0)^m dz$  is equal to
- a) 0 for  $m = -1$                       b)  $2\pi i$  for  $m = -1$   
c) 2 for  $m = -1$                       d)  $\pi$  for  $m = -1$
6. The value of the integral  $\int_{|z|=3} \frac{e^z}{z-2} dz$  is
- a)  $2\pi i e^2$                       b)  $2\pi i$   
c)  $e^2$                       d)  $2\pi i e^3$
7. The poles of the functions  $f(z) = \frac{\sin z}{\cos z}$  are at
- a)  $(2n+1)\pi/2$ ,  $n$  is any integer      b)  $2n\pi/3$ ,  $n$  is any integer  
c)  $n\pi$                       d) none of these
8. The singularity of the functions  $\frac{z - \sin z}{z^2}$  is
- a)  $z = 0$                       b)  $z = 2$   
c)  $z = -2$                       d)  $z = 4$
9. A function which has poles as its only singularities in the finite part of the plane is said to be
- a) an analytic function              b) an entire function  
c) a meromorphic function      d) none of these
10. For the function  $f(z) = e^z$ ,  $z = \infty$  is
- a) isolated essential singularity      b) pole  
c) an ordinary point              d) zeros
11. Number of poles of the function  $f(z) = \tan(1/z)$  is
- a) 2              b) 4              c) infinite              d) finite
12. If a function is analytic at all points of a bounded domain except at finitely many points, then these exceptional points are called
- a) zeros                      b) singularities  
c) poles                      d) simple points

13. The value of  $\int_{|z|=1/2} \frac{3z^2 + 7z + 1}{z + 1} dz$  is
- a)  $2\pi i$       b) 0      c)  $\pi i/2$       d)  $\pi i$
14. The residue of the function can be found, if the pole is an isolated singularity
- a) true      b) false      c) partially false      d) none of these
15.  $\int_C f(z) dz$  is equal to
- a)  $2\pi i f(a)$       b)  $2\pi i \operatorname{Im} f(a)$   
c)  $2\pi i \operatorname{Res} f(a)$       d)  $-2\pi i \operatorname{Res} f(a)$
16. The residue of  $f(z) = \pi \operatorname{cosec} \pi z$  at  $z = n$  is
- a)  $(-1)^n n$       b)  $-1$       c) 1      d)  $(-1)^n$
17. Polynomial  $f(z)$  of degree  $n$  has a pole of order  $n$  at
- a) 0      b) infinity      c)  $|z|=1$       d) nowhere
18. If  $f(z)$  is analytic and has a pole at  $z=a$ , then  $\lim_{z \rightarrow a} f(z)$  is
- a) 0      b) 1      c)  $\infty$       d) any constant
19. If the principle of the Laurent's series is zero, then the Laurent's series reduces to
- a) Maclaurin's series      b) Cauchy's series  
c) Taylor series      d) none of these
20. A bounded entire function is constant. This statement is
- a) Cauchy's theorem      b) Liouville's theorem  
c) Morera's theorem      d) Schwarz lemma
21. The third term in the expansion of  $\tan z$  with the help of Maclaurin's series is
- a)  $1/5 z^5$       b)  $1/5! z^5$       c)  $2/15 z^5$       d)  $2/3 z^5$
22. If  $f(z)$  is analytic in  $|z| \leq 1$  and satisfies  $|f| = 1$  on  $|z| = 1$ , then  $f(z)$  is
- a) irrational      b) rational  
c) integer      d) constant

