ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

FOR GOD AND COUNTRY

WORKSHEET-9

SUBJECT – MATHEMATICS

1st - Term

Chapter: ALGEBRA **Class: XI**

Topic: Complex numbers **Date: 18.07.2020**

Choose the correct option (1 x 15=15)

1 If $(x+iy)^{1/3} = a+ib$, then $\frac{x}{a}+\frac{y}{b} =$

(a) 0 (b) 1 (c) -1 (d) none of these

2 $(\sqrt{-2})(\sqrt{-3})$ is equal to

(a) $\sqrt{6}$ (b) $-\sqrt{6}$ (c) $i\sqrt{6}$ (d) none of these

3 The value of $(1+i)^4 + (1-i)^4$ is

(a) 8 (b) 4 (c) -8 (d) -4

4. If $\sqrt{a+ib} = x+iy$, then possible value of $\sqrt{a-ib}$ is

(a) x^2+y^2 (b) $\sqrt{x^2+y^2}$ (c) $x+iy$ (d) $x-iy$

5. If $z = \cos\frac{\pi}{4} + i\sin\frac{\pi}{6}$, then

(a) $|z| = 1$, $\arg(z) = \frac{\pi}{4}$ (b) $|z| = 1$, $\arg(z) = \frac{\pi}{6}$

(c) $|z| = \frac{\sqrt{3}}{2}$, $\arg(z) = \frac{5\pi}{24}$ (d) $|z| = \frac{\sqrt{3}}{2}$, $\arg(z) = \tan^{-1}\frac{1}{\sqrt{2}}$

6. The polar form of $(i^{25})^3$ is

(a) $\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}$ (b) $\cos\pi + i\sin\pi$ (c) $\cos\pi - i\sin\pi$ (d) $\cos\frac{\pi}{2} - i\sin\frac{\pi}{2}$

7. If $i^2 = -1$, then the sum $i + i^2 + i^3 + \ldots$ upto 1000 terms is equal to

(a) 1 (b) -1 (c) i (d) 0

8. If $z = \frac{-2}{1+i\sqrt{3}}$, then the value of arg(z) is

(a) π (b) $\frac{\pi}{3}$ (c) $\frac{2\pi}{3}$ (d) $\frac{\pi}{4}$

9. If $a = \cos\theta + i\sin\theta$, then $\frac{1+a}{1-a} =$

(a) $\cot\frac{\theta}{2}$ (b) $\cot\theta$ (c) $i\cot\frac{\theta}{2}$ (d) $i\tan\frac{\theta}{2}$

10. If $(1+i)(1+2i)(1+3i)\ldots\ldots(1+ni) = a+ib$, then $2.5.10.17\ldots\ldots(1+n^2) =$

(a) $a-ib$ (b) a^2-b^2 (c) a^2+b^2 (d) none of these

11. If $\frac{(a^2+1)^2}{2a-i} = x+iy$, then x^2+y^2 is equal to

(a) $\frac{(a^2+1)^4}{4a^2+1}$ (b) $\frac{(a+1)^2}{4a^2+1}$ (c) $\frac{(a^2-1)^2}{(4a^2-1)^2}$ (d) none of these

12. The principal value of the amplitude of $(1+i)$ is

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{12}$ (c) $\frac{3\pi}{4}$ (d) π

13. The least positive integer n such that $\left(\frac{2i}{1+i}\right)^n$ is a positive integer, is

(a) 16 (b) 8 (c) 4 (d) 2

14. If z is a non-zero complex number, then $\left|\frac{|\bar{z}|^2}{z\bar{z}}\right|$ is equal to

(a) $\left|\frac{\bar{z}}{z}\right|$ (b) $|z|$ (c) $|\bar{z}|$ (d) none of these

15. If $a = 1+i$, then a^2 equals

(a) $1-i$ (b) $2i$ (c) $(1+i)(1-i)$ (d) $i-1$

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