

Physics Paper I /MCQ

College Name- Hutatma Rajguru Mahavidyalaya, Rajgurunagar

Class- S. Y. B. Sc.

Semester- First: Mathematical Methods in Physics (Paper II)

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Syllabus pattern- 2019 Pattern (CBCS)

Topic- MCQ for practice

1. When imaginary part of a complex number is zero then it reduces to,
 - a) Real number
 - b) Imaginary number
 - c) Its complex conjugate
 - d) Argument of z

Ans= a

2. Two complex numbers are equal when,
 - a) Real parts are equal
 - b) Imaginary parts are equal
 - c) Real parts are equal to imaginary parts
 - d) Real parts are equal and imaginary parts are equal

Ans= d

3. The complex conjugate of a complex conjugate number is,
 - a) z
 - b) $|z|$
 - c) $\sqrt{z}$
 - d) $-z$

Ans= a

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4. If $\bar{z}$ is complex conjugate of z then real part of $z + \bar{z}$ will be,
- a) x
 - b) $1/2x$
 - c) $1/2y$
 - d) $2x$

Ans= d

5. If $z = \sqrt{1+i}$ then the product $z \bar{z}$ will be,
- a) 1
 - b) 2
 - c) $\sqrt{2}$
 - d) $1-i$

Ans= c

6. The modulus of complex number is,
- a) Real number
 - b) Imaginary number
 - c) Again a complex number
 - d) None

Ans= a

7. The argument of the quotient of two complex number is,
- a) $z_1 + z_2$
 - b) $z_1 * z_2$
 - c) $z_1 = z_2$
 - d) $\arg z_1 - \arg z_2$

Ans= d

8. The absolute value of complex number $z = 3 - 4i$ is,
- a) 3
 - b) 5
 - c) 7

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d) 9

Ans= b

9. $(\sin\theta + i\cos\theta)^n$ is equal to,

a) $e^{i\theta}$

b) $n e^{i\theta}$

c) $n(\cos\theta + i\sin\theta)$

d) $e^{ni\theta}$

Ans= d

10. If $\sinh(i\theta) = \frac{e^{i\theta} - e^{-i\theta}}{2}$

a) $\sin\theta$

b) $\cos\theta$

c) $i\sin\theta$

d) $i\cos\theta$

Ans= c

11. The radial part of complex velocity of a particle is.....

a) $e^{i\theta}$

b) $re^{i\theta}$

c) $\dot{r}e^{i\theta}$

d) $\dot{\theta} e^{i\theta}$

Ans= c

12. The transverse component of acceleration a_t is.....

a) $2\dot{r}\ddot{\theta}$

b) $2r\ddot{\theta}$

c) $r\ddot{\theta}$

d) $2\dot{r}\ddot{\theta} + r\ddot{\theta}$

Ans= d

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13. If $z = \sqrt{1 + \sqrt{3}i}$ then $|z|$ will be

- a) 1
- b) 2
- c) 3
- d) $\sqrt{2}$

Ans = d

14. $z = \sqrt[3]{3} + 3i$ then argument of complex number will be

- a) 30°
- b) 40°
- c) 50°
- d) 60°

Ans= a

15. If complex number $z = r \cdot e^{i\pi/2}$ is rotated through $\pi/3$ in the clockwise direction then $\arg(z)$ will be.....

- a) π
- b) $\pi/3$
- c) $\pi/6$
- d) $\pi/4$

Ans= c

16. If $\arg(z_1) = \pi/2$ and $\arg(z_2) = \pi/4$ then $\arg(z_1/z_2)$ will be

- a) $\pi/3$

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b) $\pi/4$

c) $\pi/6$

d) $\pi/5$

Ans= b

17. If $\overline{z}$ is the complex conjugate of the complex number z then $\text{Re}(z)$ will be

a) $z + \overline{z}$

b) $z - \overline{z}$

c) $(z + \overline{z})/2$

d) $(z - \overline{z})/2$

Ans= c

18. If $x^2 - 4x + 11 = 0$ then the roots of equation will be.....

a) $2 \pm \sqrt{3} i$

b) $2 \pm \sqrt{5} i$

c) $2 \pm \sqrt{7} i$

d) $-2 \pm \sqrt{3} i$

Ans = c

19. If $|z+2| = 3|z-2|$ represents a circle having radius,

a) $1/2$

b) $3/2$

c) $5/2$

d) $7/2$

Ans= b

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20. The real part of the function $\omega = \sin z$ is,

- a) $\sin x \cos x$
- b) $\sin y \cos y$
- c) $\sin x \cosh y$
- d) $\sinh y \cos x$

Ans= c

21. $z = i + i^2$, the value of x is

- a) 1
- b) 0
- c) -1
- d) None of these

Ans= c

22. $z = i + i^2$, the value of y is

- a) 0
- b) 1
- c) 3
- d) None of these

Ans= b

23. The root of the equation $x^2 - 4x + 13$ is..

- a) $2 \pm \sqrt{3} i$
- b) $2 \pm \sqrt{5} i$

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c) $2 \pm \sqrt{7} i$

d) $-2 \pm \sqrt{3} i$

Ans= a

24. The sum of $(3+2i)$ and $(2-5i)$ is...

a) $5+7i$

b) $5+3i$

c) $5-3i$

d) None of these

Ans= c

25. The product of $(3+2i)$ and $(2-5i)$ is...

a) $5+7i$

b) $5+3i$

c) $5-3i$

d) $16-11i$

Ans= d

26. The quadratic equation in z , if roots are $(3 \pm 4i)$

a) $z^2-5z+52=0$

b) $z^2-6z+52=0$

c) $z^2-6z+25=0$

d) $z^2-5z+25=0$

Ans= c

27. The value of $(1=i)^8$ is...

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a) 10

b) 12

c) 16

d) 8

Ans= c

28. The principal value of -1 is...

a) i

b) $i\pi$

c) 0

d) $-i$

Ans= b

29. The value of $e^{\pi i}$ is...

a) 1

b) -1

c) 0

d) 3

Ans= b

30. The value of $e^{\pi/2}$ is...

a) 1

b) -1

c) i

d) $-i$

Ans= c

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31. The value of $\ln(-5)$ is...

- a) 1.6
- b) $1.6094 + i\pi$
- c) Zero
- d) 1

Ans = b

32. The value of $i + i^2 + i^3 + i^4$ is

- a) zero
- b) 1
- c) -1
- d) 2

Ans= a

33. If $z = 3 - 2i$, then $|z| = ?$

- a) $\sqrt{11}$
- b) $\sqrt{12}$
- c) $\sqrt{13}$
- d) $\sqrt{14}$

Ans= c

34. Euler's formula is...

- a) $\cos\theta + i\sin\theta = e^{i\theta}$
- b) $\cos\theta - i\sin\theta = e^{i\theta}$
- c) $\cos\theta * i\sin\theta = e^{i\theta}$

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d) $\cos\theta \div i\sin\theta = e^{i\theta}$

Ans= a

35. Exponential form of complex number is..

a) $\cos\theta + i\sin\theta = e^{i\theta}$

b) $r(\cos\theta + i\sin\theta) = r e^{i\theta}$

c) $\cos\theta - i\sin\theta = e^{i\theta}$

d) $r(\cos\theta - i\sin\theta) = r e^{i\theta}$

Ans= b

36. The polar form of complex number is..

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

b) $z = r(\cos\theta - i\sin\theta)$

c) $z = r(\cos\theta * i\sin\theta)$

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

Ans= d

37. In the polar form, the complex conjugate of z is...

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

b) $z = r(\cos\theta - i\sin\theta)$

c) $z = r(\cos\theta * i\sin\theta)$

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

Ans= b

38. Argand diagram means...

a) Graphical representation of the complex number on a complex plane

b) Graphical representation of the complex number on a plane

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- c) Graphical representation of the complex number
- d) All of these

Ans= a

39. Equation of De-Moivre's theorem is...

- a) $(\cos\theta + i \sin \theta) = \cos\theta + i \sin\theta$
- b) $(\cos\theta + i \sin\theta) = \cos n \theta + i \sin\theta$
- c) $(\cos\theta + i \sin \theta) = \cos(n\theta) + i \sin(n\theta)$
- d) $(\cos\theta + i \sin \theta) = \cos i\theta + i \sin\theta$

Ans= c

40. The value of $(1+i)^8 + (1-i)^8$...

- a) 16
- b) 8
- c) 4
- d) 32

Ans= d

State True or False

1. All the rules of algebra of real numbers are not obeyed by the complex numbers.
 - a) True
 - b) False

Ans= b

2. The product $z \bar{z}$ is always real and positive.

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a) True

b) False

Ans= a

3. In the polar form of complex number, the angle θ is called amplitude of z and written as $\text{amp}(z)$.

a) False

b) True

Ans= b

4. In the product of two complex numbers, $\arg(z_1 z_2) = \arg(z_1) - \arg(z_2)$.

a) True

b) False

Ans= b

5. The roots of unity $z = (1)^{1/n}$ are symmetrically spaced around a unit circle.

a) True

b) False

Ans= a

6. For any real y , $|e^{iy}|$ is equal to zero.

a) False

b) True

Ans= a

7. In case of exponential function of complex variable $e^{z+2n\pi} = e^z$, therefore e^z is not periodic function.

a) True

b) False

Ans= b

8. The hyperbolic sine function is related to trigonometric sine function by $\sinh iz = \sin z$.

a) True

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b) False

Ans= b

9. The imaginary part of z is given by $\text{Im}(z) = \frac{z - \bar{z}}{2i}$.

a) True

b) False

Ans= b

10. If $G = \tan z$ then real part of G is $\text{Re}(G) = \frac{\sin 2x}{\cos^2 x + \cosh^2 y}$

a) True

b) False

Ans= a