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# **ELEMENTARY MATHEMATICS**

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# Marking System in CDS 2 2024 Mathematics Paper

- Total no. of Questions = **100**
- Total no. of Marks = **100 marks**
- 1 Question = **1 marks**
- Negative marking = **0.33 marks for every incorrect answer**

If  $a + b + c = 0$ , find the value of  $\frac{a+b}{c} - \frac{2b}{c+a} + \frac{b+c}{a}$

- (a) 0    (b) 1  
(c)  $-1$     (d) 2

If  $a + b + c = 0$ , find the value of  $\frac{a+b}{c} - \frac{2b}{c+a} + \frac{b+c}{a}$

(a) 0

(b) 1

(c) -1

(d) 2

**Ans : (a)**

---

If  $x = 3^{1/3} - 3^{-1/3}$  then  $3x^3 + 9x$  is equal to

- (a) 5      (b) 6      (c) 7      (d) 8

---

If  $x = 3^{1/3} - 3^{-1/3}$  then  $3x^3 + 9x$  is equal to

- (a) 5      (b) 6      (c) 7      (d) 8

**Ans : (d)**



Which one is one of the factors of

$$x^2 + \frac{1}{x^2} + 8\left(x + \frac{1}{x}\right) + 14?$$

(a)  $x + \frac{1}{x} + 1$

(b)  $x + \frac{1}{x} + 3$

(c)  $x + \frac{1}{x} + 6$

(d)  $x + \frac{1}{x} + 7$

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$$x^2 + \frac{1}{x^2} + 8\left(x + \frac{1}{x}\right) + 14?$$

(a)  $x + \frac{1}{x} + 1$

(b)  $x + \frac{1}{x} + 3$

(c)  $x + \frac{1}{x} + 6$

(d)  $x + \frac{1}{x} + 7$

**Ans : (c)**

If  $p = 999$ , then the value of  $\sqrt[3]{p(p^2 + 3p + 3) + 1}$  is

- (a) 1000      (b) 999      (c) 998      (d) 1002

If  $p = 999$ , then the value of  $\sqrt[3]{p(p^2 + 3p + 3) + 1}$  is

- (a) 1000      (b) 999      (c) 998      (d) 1002

**Ans : (a)**

$$\text{If } \frac{\cos^2 \theta - 3 \cos \theta + 2}{\sin^2 \theta} = 1$$

Where  $0^\circ < \theta < 90^\circ$  then what is  $\sin^2 \theta + \cos \theta$  equal to

- (a)  $\frac{5}{4}$       (b)  $\frac{3}{2}$       (c)  $\frac{7}{4}$       (d) 2

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Where  $0^\circ < \theta < 90^\circ$  then what is  $\sin^2 \theta + \cos \theta$  equal to

- (a)  $\frac{5}{4}$       (b)  $\frac{3}{2}$       (c)  $\frac{7}{4}$       (d) 2

**Ans : (a)**

$ABC$  is a triangle in which  $D$  is the midpoint of  $BC$  and  $E$  is the midpoint of  $AD$ . Which of the following statements is/are correct?

1. The area of triangle  $ABC$  is equal to four times the area of triangle  $BED$ .
2. The area of triangle  $ADC$  is twice the area of triangle  $BED$ .

Select the correct answer using the code given below.

- |                  |                     |
|------------------|---------------------|
| (a) 1 only       | (b) 2 only          |
| (c) Both 1 and 2 | (d) Neither 1 nor 2 |

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Select the correct answer using the code given below.

- (a) 1 only                      (b) 2 only  
(c) Both 1 and 2              (d) Neither 1 nor 2

**Ans : (c)**



Chord CD intersects the diameter AB of a circle at right angle at a point P in the ratio 1 : 2. If diameter of circle is D, then CD is equal to

(a)  $\frac{\sqrt{2}d}{3}$

(b)  $\frac{2d}{3}$

(c)  $\frac{2\sqrt{2}d}{3}$

(d)  $\frac{2\sqrt{3}d}{3}$

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(c)  $\frac{2\sqrt{2}d}{3}$

(d)  $\frac{2\sqrt{3}d}{3}$

**Ans : (c)**

What is area of largest triangle inscribed in a semi circle of radius  $r$  units ?

- (a)  $r^2$  square units
- (b)  $2r^2$  square units
- (c)  $3r^2$  square units
- (d)  $4r^2$  square units

What is area of largest triangle inscribed in a semi circle of radius  $r$  units ?

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**Ans : (a)**

In an equilateral triangle another equilateral triangle is drawn inside joining the mid-points of the sides of given equilateral triangle and the process is continued up to 7 times. What is the ratio of area of fourth triangle to that of seventh triangle ?

- (a) 256:1                      (b) 128:1  
(c) 64:1                        (d) 16:1

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- (a) 256:1                      (b) 128:1  
(c) 64:1                        (d) 16:1

**Ans : (c)**

What is the area between a square of side 10 cm and two inverted semi-circular, cross-sections each of radius 5 cm inscribed in the square?

- (a)  $17.5 \text{ cm}^2$                       (b)  $18.5 \text{ cm}^2$   
(c)  $20.5 \text{ cm}^2$                       (d)  $21.5 \text{ cm}^2$

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- (a)  $17.5 \text{ cm}^2$                       (b)  $18.5 \text{ cm}^2$   
(c)  $20.5 \text{ cm}^2$                       (d)  $21.5 \text{ cm}^2$

**Ans : (d)**



A rectangular paper, when folded into two congruent parts had a perimeter of 34 cm for each part folded along one set of sides and the same is 38 cm when folded along the other set of sides. What is the area of the paper?

- (a)  $140 \text{ cm}^2$                       (b)  $240 \text{ cm}^2$   
(c)  $560 \text{ cm}^2$                       (d) None of these

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- (a)  $140 \text{ cm}^2$                       (b)  $240 \text{ cm}^2$   
(c)  $560 \text{ cm}^2$                       (d) None of these

**Ans : (a)**

A right circular cylinder of maximum volume is cut out from a solid wooden cube. The material left is what percent of the volume (nearest to an integer) of the original cube?

- (a) 19      (b) 28      (c) 23      (d) 21

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- (a) 19      (b) 28      (c) 23      (d) 21

**Ans : (d)**

A conical vessel, whose internal radius is 12 cm and height 50 cm, is full of liquid. The contents are emptied into a cylindrical vessel with internal radius 10 cm. Find the height to which the liquid rises in the cylindrical vessel.

- (a) 18 cm                      (b) 22 cm  
(c) 24 cm                      (d) None of these

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(c) 24 cm                      (d) None of these

**Ans : (c)**

In a hostel the rent per room is increased by 20%. If number of rooms in the hostel is also increased by 20% and the hostel is always full, then what is the percentage change in the total collection at the cash counter?

- (a) 30%      (b) 40%      (c) 44%      (d) 48%

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- (a) 30%      (b) 40%      (c) 44%      (d) 48%

**Ans : (c)**



A number when divided by 5 leaves a remainder 3. What is the remainder when the square of the same number is divided by 5?

- (a) 9                                      (b) 3  
(c) 0                                      (d) 4

A number when divided by 5 leaves a remainder 3. What is the remainder when the square of the same number is divided by 5?

- |       |       |
|-------|-------|
| (a) 9 | (b) 3 |
| (c) 0 | (d) 4 |

**Ans : (d)**

If  $k$  is a positive integer, then every square integer is of the form

- (a) only  $4k$                       (b)  $4k$  or  $4k + 3$   
(c)  $4k + 1$  or  $4k + 3$         (d)  $4k$  or  $4k + 1$

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(c)  $4k + 1$  or  $4k + 3$         (d)  $4k$  or  $4k + 1$

**Ans : (d)**

# PHYSICS



# Marking System in CDS 2 2024 GK - Physics Section

- Total no. of Questions = 9 – 11 / 120
- Total no. of Marks = 10.8 – 13.2 marks
- 1 Question = 1.2 marks
- Negative marking = 0.4 marks for every incorrect answer

**Which of the following is a fundamental force of nature that acts between all particles having mass?**

- A. Gravitational force
- B. Magnetic force
- C. Frictional force
- D. Tension force

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**What is the SI unit of electric current?**

- A. Volt
- B. Ampere
- C. Coulomb
- D. Ohm

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**Which of the following is not a vector quantity?**

- A. Velocity
- B. Acceleration
- C. Temperature
- D. Force

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- D. Force

**When a body is thrown vertically upwards, what is its acceleration at the highest point?**

- A.  $g$  downwards
- B.  $2g$  downwards
- C. Zero
- D.  $g$  upwards

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**Which of the following electromagnetic waves has the highest frequency?**

- A. Radio waves
- B. Microwaves
- C. X-rays
- D. Infrared radiation

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**What is the relationship between the current passing through a conductor and the voltage across it, according to Ohm's law?**

- A. Directly proportional
- B. Inversely proportional
- C. No relationship
- D. Exponential relationship

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**The process by which a liquid changes into a gaseous state at a temperature below its boiling point is called:**

- A. Boiling
- B. Evaporation
- C. Condensation
- D. Sublimation

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**Which of the following statements about sound waves is true?**

- A. Sound waves cannot travel through a vacuum.
- B. Sound waves travel slower in solids than in gases.
- C. Sound waves are transverse waves.
- D. Sound waves have a frequency range below 20 Hz.

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- A. Pascal's law
- B. Archimedes' principle
- C. Boyle's law
- D. Newton's second law

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**Which of the following is true for a concave lens?**

- A. It converges parallel rays of light.
- B. It forms a virtual and erect image.
- C. It has a positive focal length.
- D. It magnifies objects placed in front of it.

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- A. Fusion
- B. Fission
- C. Decay
- D. Transmutation

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**B. Fission**

C. Decay

D. Transmutation

**What is the SI unit of pressure ?**

- A. Pascal
- B. Joule
- C. Newton
- D. Watt

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**A. Pascal**

B. Joule

C. Newton

D. Watt

**Which of the following is a property of a convex mirror?**

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- D. It provides a wider field of view than a plane mirror.

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**Which of the following statements about a simple pendulum is true?**

- A. The period of oscillation depends on the mass of the pendulum bob.
- B. The period of oscillation is independent of the length of the pendulum.
- C. The period of oscillation increases with increasing amplitude.
- D. The period of oscillation is given by  $T = 2\pi\sqrt{l/g}$ , where  $l$  is the length of the pendulum and  $g$  is the acceleration due to gravity.

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**Which of the following statements about electric charge is true?**

- A. Like charges attract, and unlike charges repel.
- B. Protons have a negative charge, and electrons have a positive charge.
- C. Electric charge is a vector quantity.
- D. The SI unit of electric charge is the ampere.

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**A block of mass 5 kg is pushed horizontally with a force of 20 N. If the coefficient of kinetic friction between the block and the surface is 0.3, what is the acceleration of the block?**

- A.  $1 \text{ m/s}^2$
- B.  $3 \text{ m/s}^2$
- C.  $4 \text{ m/s}^2$
- D.  $5 \text{ m/s}^2$

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- C.  $4 \text{ m/s}^2$
- D.  $5 \text{ m/s}$

**A convex lens has a focal length of 15 cm. An object is placed 20 cm away from the lens. What is the nature and position of the image formed?**

- A. Real, inverted, and located 60 cm from the lens
- B. Real, inverted, and located 10 cm from the lens
- C. Virtual, erect, and located 30 cm from the lens
- D. Virtual, erect, and located 10 cm from the lens

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**A body is thrown vertically upwards with an initial velocity of 20 m/s. What is the maximum height reached by the body? (Take  $g = 10 \text{ m/s}^2$ )**

- A. 20 m
- B. 40 m
- C. 10 m
- D. 80 m

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- C. 10 m
- D. 80 m

**Which of the following statements about the conservation of momentum is true?**

- A. Momentum is conserved only in collisions involving elastic bodies.
- B. Momentum is conserved only in collisions involving perfectly inelastic bodies.
- C. Momentum is conserved in all collisions, regardless of whether they are elastic or inelastic.
- D. Momentum is not conserved in any type of collision.

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**Which of the following statements about heat transfer by conduction is true?**

- A. It can only occur in liquids and gases.
- B. It requires the presence of a medium for propagation.
- C. It is faster in gases compared to solids.
- D. It occurs due to the movement of fluid particles.

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**The force experienced by a unit positive charge placed at a point in an electric field is called**

- A. Electric potential
- B. Electric flux
- C. Electric field intensity
- D. Electric resistance

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**A circuit consists of three resistors connected in series. Their resistances are 4 ohms, 6 ohms, and 8 ohms respectively. What is the equivalent resistance of the circuit?**

- A. 18 ohms
- B. 3 ohms
- C. 2 ohms
- D. 14 ohms

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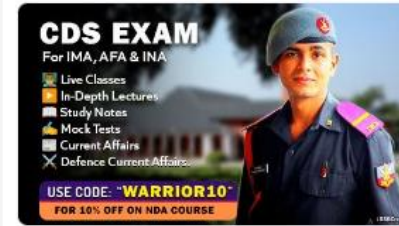
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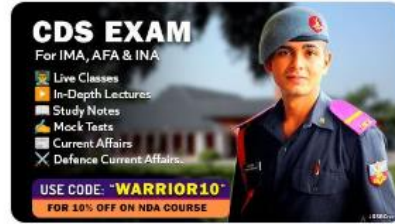
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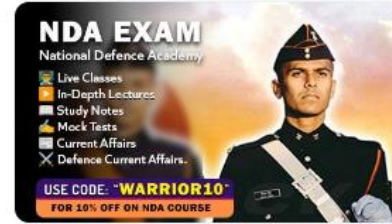
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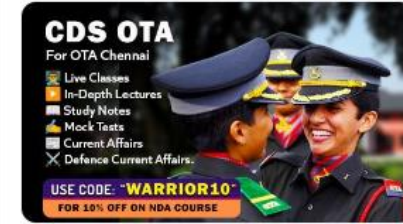
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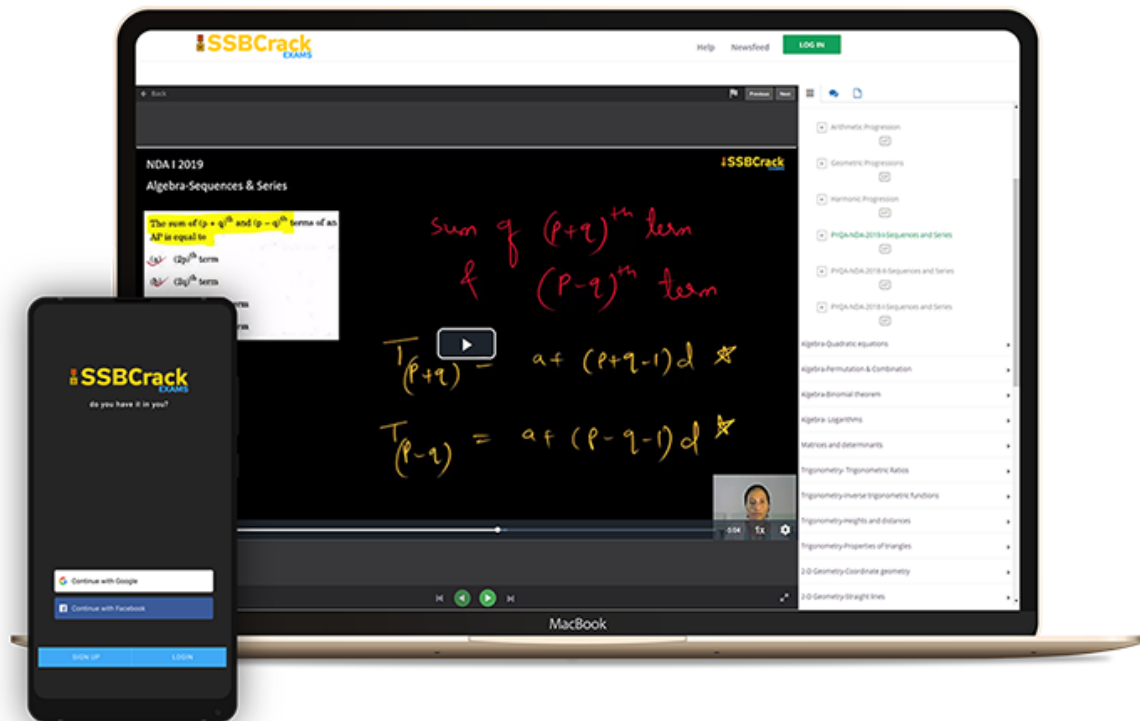


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