CDS 1 2025

LIVE

MATHS

MENSURATION 3D

MCQS

NAVJYOTI SIR

Crack
EXAMS

12 Feb 2025 Live Classes Schedule

9:00AM	12 FEBRUARY 2025 DAILY DEFENCE UPDATES	DIVYANSHU SIR
10:00AM	12 FEBRUARY 2025 DAILY CURRENT AFFAIRS	RUBY MA'AM

SSB INTERVIEW LIVE CLASSES

9:30AM	PIQ FORM & PERSONAL INTERVIEW	ANURADHA MA'AM

AFCAT 1 2025 LIVE CLASSES

3:00PM	STATIC GK - HISTORY	DIVYANSHU SIR
4:30PM	ENGLISH - CLOZE TEST - CLASS 2	ANURADHA MA'AM

NDA 1 2025 LIVE CLASSES

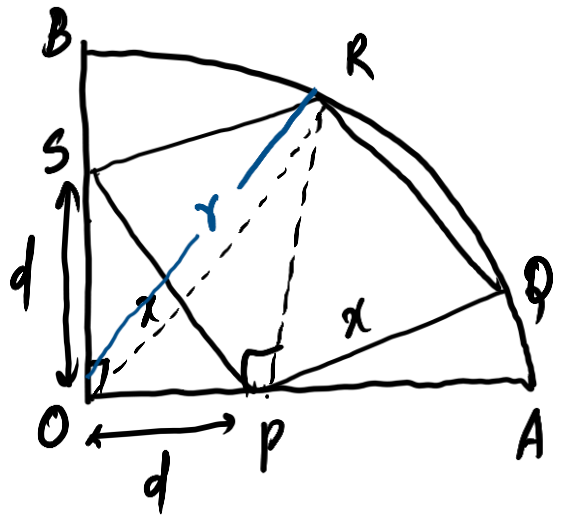
10:00AM	MATHS - LIMITS	NAVJYOTI SIR
11:30AM	POLITY - CLASS 5	RUBY MA'AM
1:00PM	BIOLOGY - CLASS 3	SHIVANGI MA'AM
4:30PM	ENGLISH - CLOZE TEST - CLASS 2	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM	POLITY - CLASS 5	RUBY MA'AM
1:00PM	BIOLOGY - CLASS 3	SHIVANGI MA'AM
4:30PM	ENGLISH - CLOZE TEST - CLASS 2	ANURADHA MA'AM
5:30PM	MATHS - MENSURATION 3D	NAVJYOTI SIR

Q) A square is inscribed in a quarter–circle in such a manner that two of its adjacent vertices lie on the two radii at an equal distance from the centre, while the other two vertices lie on the circular arc. If the square has sides of length x, then the radius of the circle is

(a) $\frac{16x}{\pi+4}$ (b) $\frac{2x}{\sqrt{\pi}}$ (c) $\frac{\sqrt{5}x}{\sqrt{2}}$ (d) $\sqrt{2}x$



$d^2 + d^2 = x^2$

$x^2 = 2d^2$

$\left(d = \frac{x}{\sqrt{2}}\right)$

$PR^2 = 2x^2$

$PR = \sqrt{2}\,x$

$\triangle OPR,$

$OR^2 = PR^2 + OP^2$

$OR^2 = 2x^2 + d^2$

$r^2 = 2x^2 + \frac{x^2}{2}$

$r^2 = \frac{5x^2}{2}$

$\left(r^2 = \frac{\sqrt{5}}{\sqrt{2}}x\right)$

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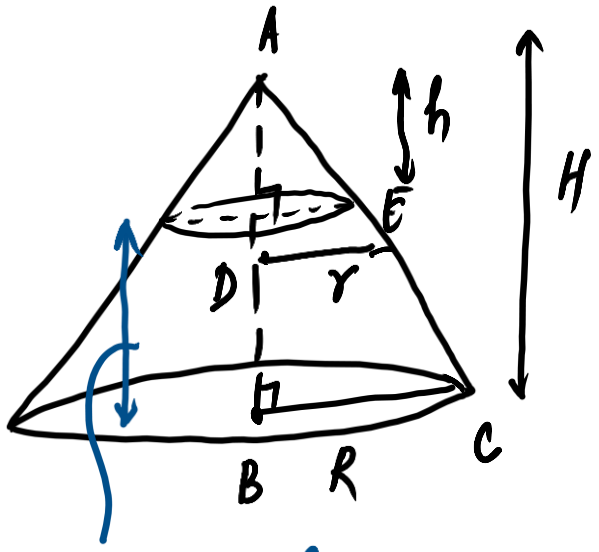
(a) $\frac{16x}{\pi+4}$ (b) $\frac{2x}{\sqrt{\pi}}$ (c) $\frac{\sqrt{5}x}{\sqrt{2}}$ (d) $\sqrt{2}x$

Ans: (c)

Q) The height of a cone is 60 cm. A small cone is cut off at the top by a plane parallel to the base and its volume is $\frac{1}{64}$ the volume of original cone. What is the height from the base at which the section is made ?

(a) 15 cm (b) 20 cm
(c) 30 cm (d) 45 cm



$\triangle ABC \sim \triangle ADE$,

$$\frac{r}{R} = \frac{h}{H} \quad \text{— (1)}$$

$$\frac{\pi r^2 h}{\pi R^2 H} = \frac{1}{64}$$

$$\frac{r^2 h}{R^2 H} = \frac{1}{64}$$

$$\left(\frac{h}{H}\right)^3 = \frac{1}{64} \Rightarrow h = \frac{1}{4}(H)$$

$$h = \frac{1}{4}(60)$$

$$= 15 \text{ cm}$$

$$H - h = 60 - 15$$

$$= 45 \text{ cm}$$

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(a) 15 cm
(b) 20 cm
(c) 30 cm
(d) 45 cm

Ans: (d)

Q) Rain water from a roof 22m × 20m drains into a cylindrical vessel having diameter of base 2 m and height 3.5 m. If the vessel is just full, what is the rainfall?

(a) 3.5 cm (b) 3 cm

(c) 2.5 cm (d) 2 cm

$l \times b \times h$ = Volume of cylinder

(rainfall)

$22 \times 20 \times h = \frac{11}{\cancel{22}} \times (1)^2 \times \frac{\cancel{7}}{\cancel{2}}$

$h = \frac{11 \times 1}{\cancel{22} \times 20} = \frac{1}{40}$ m

$h = \frac{1}{\cancel{40}} \times \cancel{100}^{5}$ cm = 2.5 cm

Q) Rain water from a roof 22m × 20m drains into a cylindrical vessel having diameter of base 2 m and height 3.5 m. If the vessel is just full, what is the rainfall?

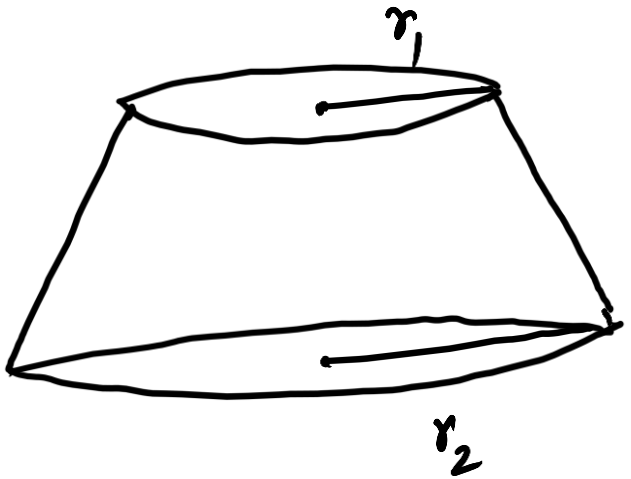
(a) 3.5 cm
(b) 3 cm
(c) 2.5 cm
(d) 2 cm

Ans: (c)

Q) A drinking glass of height 24 cm is in the shape of frustum of a cone and ' diameters of its bottom and top circular ends are 4 cm and 18 cm respectively. If we take capacity of the glass as πx cm^3, then what is the value of x ?

(a) 824 (b) 1236

(c) 1628 (d) 2472



Volume of frustum $= \frac{\pi h}{3}\left(r_1^2 + r_2^2 + r_1 r_2\right)$

$\pi x = \frac{\pi(24)}{3}\left(2^2 + 9^2 + 2 \times 9\right)$

$x = 8\left(4 + 81 + 18\right)$

$x = 8(103)$

$x = 824$

Q) A drinking glass of height 24 cm is in the shape of frustum of a cone and ' diameters of its bottom and top circular ends are 4 cm and 18 cm respectively. If we take capacity of the glass as πx cm^3, then what is the value of x ?

(a) 824 (b) 1236

(c) 1628 (d) 2472

Ans: (a)

Q) The cost of painting a spherical vessel of diameter 14 cm is ₹8008. What is the cost of painting per square centimetre ?

(a) ₹8
(b) ₹9
(c) ₹13
(d) ₹14

$$\text{Cost / cm}^2 = \frac{\text{Total cost}}{\text{Area painted}} = \frac{8008}{4\pi(r)^2}$$

$$= \frac{8008}{4 \times \frac{22}{7} \times 7 \times 7} = \frac{104}{4 \times 2} = \frac{104}{8} = ₹13$$

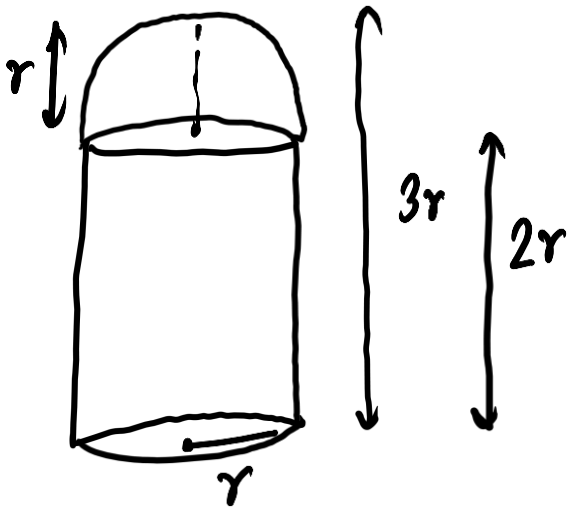
Q) The cost of painting a spherical vessel of diameter 14 cm is ₹8008. What is the cost of painting per square centimetre ?

(a) ₹8
(b) ₹9
(c) ₹13
(d) ₹14

Ans: (c)

Q) A building is in the form of a cylinder surmounted by a hemispherical dome on the diameter of the cylinder. The height of the building is three times the radius of the base of the cylinder. The building contains $67\frac{1}{21}\text{m}^3$ of air. What is the height of the building ?

(a) 6m (b) 4m
(c) 3m (d) 2m



Vol. of building = Vol. of cylinder + Vol. of hemisphere

$$67\frac{1}{21} = \pi r^2(2r) + \frac{2}{3}\pi(r)^3$$

$$\frac{1408}{21} = \pi r^3\left(2+\frac{2}{3}\right)$$

67 × 21 = 1407

$$\frac{1408}{21} = \pi r^3 \left(2 + \frac{2}{3}\right)$$

$$\frac{\cancel{1408}^{176}}{\cancel{21}} \times \frac{\cancel{8}}{\cancel{8}} \times \frac{\cancel{7}}{22} = r^3$$

$$r^3 = \frac{\cancel{176}^{8}}{\cancel{22}}$$

$$r^3 = 8$$

$$\boxed{r = 2}$$

$$3r = 3 \times 2 = \boxed{6\ m}$$

Q) A building is in the form of a cylinder surmounted by a hemispherical dome on the diameter of the cylinder. The height of the building is three times the radius of the base of the cylinder. The building contains $67\frac{1}{21}\text{m}^3$ of air. What is the height of the building ?

(a) 6m (b) 4m
(c) 3m (d) 2m

Ans: (a)

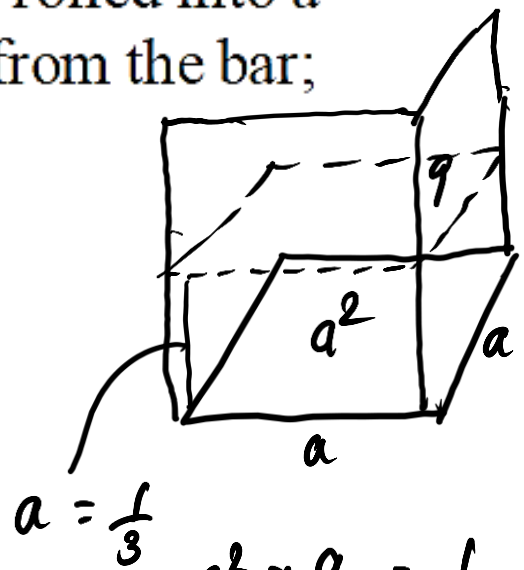
Q) A cubic metre of copper weighing 9000 kg is rolled into a square bar 9 m long. An exact cube is cut off from the bar; How much does the cube weigh ?

(a) 1000 kg

(b) $\frac{1000}{3}$ kg

(c) 300 kg

(d) $\frac{500}{3}$ kg



$a = \frac{1}{3}$

$a^2 \times 9 = 1$

$a^2 = \frac{1}{9} \Rightarrow a = \frac{1}{3}$

$1\ m^3 \longrightarrow 9000\ kg$

vol. of copper

vol. of cube $= \left(\frac{1}{3}\right)^3 = \frac{1}{27}\ m^3$

$1\ m^3 \longrightarrow 9000\ kg$

$\frac{1}{27}\ m^3 \longrightarrow \frac{1}{\cancel{27}_{3}} \times \overset{1000}{\cancel{9000}}\ kg = \frac{1000}{3}\ kg$

Q) A cubic metre of copper weighing 9000 kg is rolled into a square bar 9 m long. An exact cube is cut off from the bar; How much does the cube weigh ?

(a) 1000 kg

(b) $\frac{1000}{3}$ kg

(c) 300 kg

(d) $\frac{500}{3}$ kg

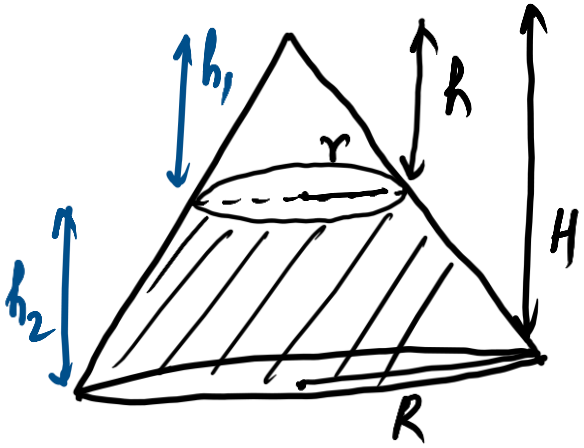
Ans: (b)

Q) A plane divides a right circular cone into two parts of equal volume. If the plane is parallel to the base, then the ratio, in which the height of the cone is divided, is

(a) $1 : \sqrt[3]{2}$ (b) $1 : \sqrt{2}$

(c) $1 : \sqrt[3]{2} - 1$ (d) $1 : \sqrt[3]{2} + 1$

$\frac{h}{H-h}$



$\frac{h_1}{h_2} = \frac{h}{H-h} = ?$

$\frac{1}{3}\pi R^2 H - \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi r^2 h$

$\frac{1}{3}\pi R^2 H = \frac{2}{3}\pi r^2 h$

$R^2 H = 2r^2 h$

$\frac{R^2 H}{r^2 h} = 2$

$\frac{r}{R} = \frac{h}{H} \Rightarrow \frac{H^3}{h^3} = 2$

$\left(\frac{H}{h}\right) = \frac{\sqrt[3]{2}}{1}$

$$\left(\frac{H}{h}\right) = \frac{\sqrt[3]{2}}{1}$$

$$\frac{h}{H} = \frac{1}{\sqrt[3]{2}} \Rightarrow H = \sqrt[3]{2}\,h$$

$$\frac{h}{H-h} = \frac{h}{\sqrt[3]{2}h - h} = \frac{1}{\sqrt[3]{2}-1} \Rightarrow 1 : \sqrt[3]{2} - 1$$

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(a) $1:\sqrt[3]{2}$

(b) $1:\sqrt{2}$

(c) $1:\sqrt[3]{2}-1$

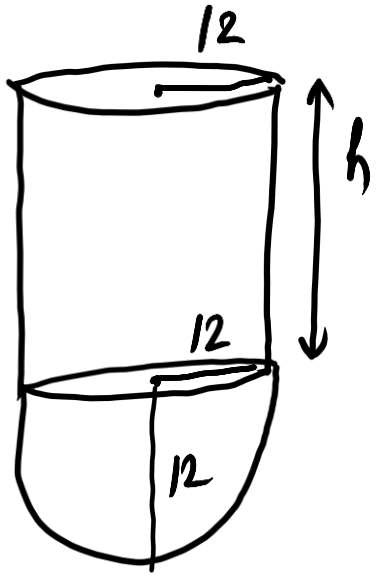
(d) $1:\sqrt[3]{2}+1$

Ans: (c)

Q) A water tank, open at the top, is hemispherical at the bottom and cylindrical above it. The radius is 12m and the capacity is $3312\pi\ m^3$. The ratio of the surface areas of the spherical and cylindrical portions is

(a) 3 : 5 (b) 4 : 5

(c) 1 : 1 (d) 6 : 5



$$3312\pi = \pi(12)^2 h + \frac{2}{3}\pi(12)^3$$

$$3312\pi = (12^2)\pi\left(h + \frac{2}{3}\times 12\right)$$

$$\frac{3312}{144} = h + 8$$

$$h = 23 - 8 = 15$$

$$\frac{2\pi r^2}{2\pi r h} = \frac{r}{h} = \frac{12}{15}$$

$$= 4:5$$

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(a) 3 : 5 (b) 4 : 5

(c) 1 : 1 (d) 6 : 5

Ans: (b)

Q) The areas of three mutually perpendicular faces of a cuboid are x, y, z. If V is the volume, then xyz is equal to

(a) V (b) V^2

(c) $2V$ (d) $2V^2$

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(a) V (b) V^2

(c) $2V$ (d) $2V^2$

Ans: (b)

Q) If a hemisphere is melted and four spheres of equal volume are made, the radius of each sphere will be equal to

(a) radius of the hemisphere

(b) $\frac{1}{6}$ th of the radius of the hemisphere

(c) $\frac{1}{2}$ of the radius of the hemisphere

(d) $\frac{1}{4}$ th of the radius of the hemisphere

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(d) $\frac{1}{4}$ th of the radius of the hemisphere

Ans: (c)

Q) A large water tank has the shape of a cube. If 128 m^3 of water is pumped out, the water level goes down by 2 m. Then the maximum capacity of the tank is

(a) 512 m^3 (b) 480 m^3

(c) 324 m^3 (d) 256 m^3

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(a) 512 m^3 (b) 480 m^3

(c) 324 m^3 (d) 256 m^3

Ans: (a)

Q) In a swimming pool measuring 90 m by 40 m, 150 men take a dip. If the average displacement of water by a man is 8 cubic metres, what will be the rise in water level?

(a) 33.33 cm
(b) 30 cm
(c) 20 cm
(d) 25 cm

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(a) 33.33 cm
(b) 30 cm
(c) 20 cm
(d) 25 cm

Ans: (a)

Q) A rectangular piece of paper of dimensions 22 cm by 12 cm is rolled along its length to form a cylinder. The volume (in cm^3) of the cylinder so formed is $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 562
(b) 412
(c) 462
(d) 362

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(a) 562
(b) 412
(c) 462
(d) 362

Ans: (c)

CDS 1 2025

LIVE

MATHS

TRIGONOMETRY - 1

MCQS

NAVJYOTI SIR

Crack
EXAMS