

[A]

ANSWERS

<6>

1. (b) Let the number (N) = $\frac{6Q+3}{3}$ → Rem is $\boxed{3}$

2. (b) Let the third number be 100.

∴ First number = 20

Second " = 50

Hence, the ratio between → 1st : 2nd = $20:50 = \boxed{2:5}$

3. (b) Let the no. be x.

$$\therefore \frac{3}{4}x - \frac{3}{14}x = 150$$

$$\Rightarrow 21x - 6x = (150 \times 28)$$

$$\Rightarrow x = \frac{28 \times 150}{15}$$

$$x = \boxed{280}$$

4. (b) Volume of rectangular block = $(18 \times 15 \times 12) \text{ cm}^3$

Now; HCF of 18, 15 and 12 is 3.

So, the volume of cube = $3^3 = 27 \text{ cm}^3$

$$\text{Hence, the no of cube} = \left(\frac{18 \times 15 \times 12}{27} \right) = \boxed{120}$$

5. (b) The LCM of 6 and 4 is 24.

Let the number of pencils are 24.

Pencils	CP (₹)	Pencils
6	4	4
4×6	4×4	4×6
24	16	24

SP (₹)	Profit (%)
6	
6×6	
36	
	$\frac{36 - 16}{16} \times 100$
	$= \boxed{125\%}$

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6 (b) Let 1st distance in x hrs and 2nd part be in y hrs.

∴ By the Condition:

$$4x + 5y = 35 \rightarrow (i)$$

$$5x + 4y = 37 \rightarrow (ii)$$

By solving eqⁿ(i) & eqⁿ(ii); We get $\rightarrow x = 5$ and $y = 3$

∴ Total time taken $\rightarrow (5+3) = \boxed{8 \text{ hrs}}$

7 (b) Let the total investment be ₹ x .

According to the question:

$$\frac{x}{3} = \frac{x}{5} + 15000$$

$$\Rightarrow \frac{x}{3} - \frac{x}{5} = 15000 \Rightarrow$$

$$x = \boxed{\text{₹} 125000}$$

8 (b) Let the sum lent out at 12.5% be x .

∴ Sum lent at 10% be = ₹ $(1500 - x)$

$$\text{Now, } (1500 - x) \times 10 \times 5 = x \times 12.5 \times 4$$

$$\Rightarrow 50(1500 - x) = 50x$$

$$\Rightarrow x = \boxed{750}$$

$$9 (c) \frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy}$$

$$= \frac{x^3 + y^3 + z^3}{xyz} \left[\begin{array}{l} \text{Since, } x + y + z = 0; \\ \text{then } x^3 + y^3 + z^3 = 3xyz \end{array} \right]$$

$$= \frac{3xyz}{xyz}$$

$$= \boxed{3}$$

[A] ANSWERS:- (8)

10. (b) Let the sides of the cuboid are x , $2x$ and $4x$,

$\therefore$ Volume of the cuboid is $8x^3$

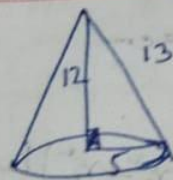
Let the side of the cube be y .

$$\therefore y^3 = 8x^3 \Rightarrow y = 2x$$

$$\text{Now, } \frac{\text{Diagonal of the cuboid}}{\text{Diagonal of the cube}} = \frac{\sqrt{(x)^2 + (2x)^2 + (4x)^2}}{\sqrt{3} \cdot 2x}$$

$$= \frac{\sqrt{21} x}{2\sqrt{3} x} = \boxed{\sqrt{7} : 2}$$

11. (c)

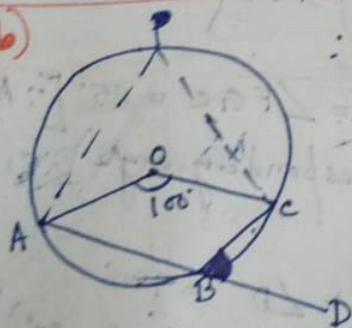


Volume of the Cone: $\frac{1}{3} \pi r^2 h$

Here, $r = 5$; $h = 12$ and $l = 13$

$$V = \left(\frac{1}{3} \pi \times 25 \times 12 \right) \text{ cm}^3 = \boxed{100\pi \text{ cm}^3}$$

12. (b)



$$\therefore \angle AOC = 2\angle APC$$

$$\Rightarrow \angle APC = \frac{\angle AOC}{2} = \left(\frac{100}{2} \right)^\circ = 50^\circ$$

For, cyclic quadrilateral; APCB

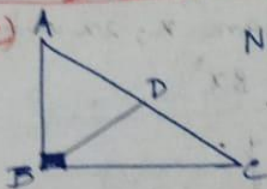
$$\angle APC + \angle ABC = 180^\circ$$

$$\Rightarrow \angle ABC = (180^\circ - 50^\circ) = 130^\circ$$

$$\text{Now, } \angle CBD = (180^\circ - 130^\circ) = \boxed{50^\circ}$$

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13. (c)



Now, $BD = DA = DC$

$$\therefore BD = \frac{AC}{2} = \boxed{3 \text{ cm}}$$

14. (a)

$$Z = x - y - \frac{xy}{100}$$

Here, $Z = \text{profit}(\%)$; $x = \text{MP above CP}(\%)$ and $y = \text{Discount}(\%)$

$$\therefore Z = 30 - 10 - \frac{30 \times 10}{100} \Rightarrow Z = 17\%$$

$$\therefore \boxed{17\% \text{ profit}}$$

15. (b) External radius (r_1) = $\frac{8}{2} = 4 \text{ cm}$

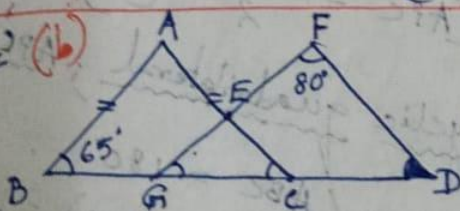
Internal radius (r_2) = $\frac{6}{2} = 3 \text{ cm}$

Height (h) = 20 cm

So, the Volume of Iron = $\pi (r_1^2 - r_2^2) h$

$$= \left\{ \frac{22}{7} (4^2 - 3^2) \times 20 \right\} = \boxed{440 \text{ cm}^3}$$

16. (b)



$\angle ABC = \angle FGC = 65^\circ$ [$\because AB \parallel FE$
(Corresponding angle)]

Now, In $\triangle FGD$: $\angle G + \angle F + \angle D = 180^\circ$

$$\Rightarrow \angle D = \{180^\circ - (65^\circ + 80^\circ)\}$$

$$\angle FDC = \boxed{35^\circ}$$

17. (b) $\sin(15^\circ + A) = \sin(15^\circ - A)$
 Let $A = 15^\circ$; putting the value of 'A' in the given condition; We get the solution.

$$(\sin 30^\circ - \sin 0^\circ) \Rightarrow \left(\frac{1}{2}\right) - 0 \Rightarrow \frac{1}{2}$$

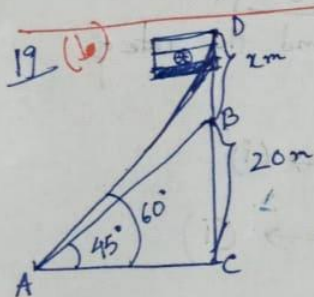
Now, put $A = 15^\circ$ in option (b); We get $\rightarrow \frac{1}{2} \sin 30^\circ = \frac{1}{4}$
 question satisfied the given option (b).

$\therefore$ Required answer is $\boxed{\frac{1}{2} \sin 2A}$

18. (a) Let $\frac{4}{3}\pi r_1^3$ be the volume of small drops and $\frac{4}{3}\pi r_2^3$ be the volume of big drop.

$$\text{So, } 27 \times \frac{4}{3}\pi \times (0.2)^3 = \frac{4}{3}\pi r_2^3 \quad [\because r_1 = 0.2 \text{ cm}]$$

$$\Rightarrow V_2^3 = \frac{27 \times 8}{1000} \Rightarrow r = \frac{6}{10} = \boxed{0.6 \text{ cm}}$$



Now in $\triangle DAC$;

$$DB = x \text{ m}$$

$$DC = (x + 20) \text{ m}$$

$$\therefore \tan 60^\circ = \frac{x + 20}{AC} \quad \text{--- (i)}$$

$$\triangle ABC; \tan 45^\circ = \frac{20}{AC}$$

$$\Rightarrow AC = 20 \quad [\because \tan 45^\circ = 1]$$

$$\therefore \text{from eqn (i)} \rightarrow \frac{x + 20}{20} = \sqrt{3} \quad [\because \sqrt{3} = 1.732]$$

$$\Rightarrow x + 20 = 20\sqrt{3}$$

$$\Rightarrow x = (20\sqrt{3} - 20)$$

$$= 20(\sqrt{3} - 1)$$

$$\text{Length of the flag staff} = \boxed{14.64 \text{ m}}$$

$$\text{Distance of the building from point A is } \boxed{20 \text{ m}}$$

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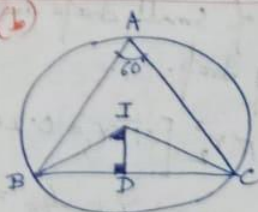
$$\begin{aligned} 20. (A) & \sin^6 x + 3 \sin^4 x + 3 \sin^2 x + \sin^0 x - 1 \\ &= (\sin^2 x)^3 + 3 (\sin^2 x)^2 \sin^2 x + 3 \sin^2 x (\sin^2 x) + (\sin^2 x)^0 - 1 \\ &= (\sin^2 x + \sin^2 x)^3 - 1 \end{aligned}$$

$$\text{Here } \cos x + \cos x = 1 \Rightarrow \cos x = \sin x$$

$$\therefore \sin x = \cos x$$

$$\therefore (\sin x + \cos x)^3 - 1 = (1)^3 - 1 = \boxed{0}$$

21. (b)



$$IB = IC;$$

$$\therefore \text{In } \triangle BIC;$$

$$\angle IBD = \angle ICD = \frac{180^\circ - 120^\circ}{2}$$

$$= 30^\circ$$

$$\therefore \text{In } \triangle BID : \angle BID = (180^\circ - (90^\circ + 30^\circ))$$

$$= \boxed{60^\circ}$$

22. (b) Let the investment be ₹x and the rate of interest be r%.

$$\therefore x \left(1 + \frac{r}{100}\right) = 1200 \rightarrow (i)$$

$$x \left(1 + \frac{r}{100}\right)^3 = 1587 \rightarrow (ii)$$

Now, eq (ii) $\div$ eq (i); We get $\rightarrow$

$$\left(1 + \frac{r}{100}\right)^2 = \frac{1587}{1200} = \frac{529}{400}$$

$$\Rightarrow 1 + \frac{r}{100} = \frac{23}{20}$$

$$\Rightarrow \frac{r}{100} = \frac{3}{20}$$

$$\Rightarrow r = \boxed{15\%}$$

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23. (b) Let the CP be ₹ 100x

Now SP = 115x

After that CP becomes to 105x and the SP becomes to (115x + 6).

$$\therefore SP - CP = \text{Profit}$$

$$(115x + 6) - 105x = (105x \times \frac{10}{100})$$

$$\Rightarrow 115x - 105x - 10.5x = -6$$

$$0.5x = 6$$

$\Rightarrow$

$$x = 12$$

$$\therefore CP = \boxed{1200}$$

24. (b) $3.245 \times 10^K = 0.0003245$

$$\Rightarrow 10^K = \frac{3245}{10^7} \div \frac{3245}{10^3}$$

$$\Rightarrow 10^K = 10^{-4} \Rightarrow \boxed{K = -4}$$

25. (a) $D = VT$ $\left[\because V = \frac{D}{T} \right]$

Relative speed = $(32 + 40) \text{ km/hr} = 72 \text{ km/hr}$

$$\therefore 72 \text{ km/hr} = \left(\frac{72 \times 5}{18} \right) \text{ m/s} = 20 \text{ m/s}$$

$$D = (130 + 110) \text{ m} = 240 \text{ m}$$

$$\therefore 240 = 20 \times T \Rightarrow T = \boxed{12 \text{ sec}}$$

X