[A] ANSWERS :- 1

1. (d) $\frac{1}{1+a+b^{-1}} + \frac{1}{1+b+c^{-1}} + \frac{1}{1+c+a^{-1}}$

$abc = 1$; putting $a=1$; $b=1$; $c=1$; We get →

$= \left(\frac{1}{3} + \frac{1}{3} + \frac{1}{3}\right) \Rightarrow \boxed{1}$

2. (c) $a+b+c = 2s$

$\Rightarrow c = (s-a) + (s-b)$

Now; $(s-a)^3 + (s-b)^3 + 3(s-a)(s-b)c$

$= (s-a)^3 + (s-b)^3 + 3(s-a)(s-b)\left[(s-a)+(s-b)\right]$

$= \left[(s-a) + (s-b)\right]^3 \Rightarrow \boxed{c^3}$

3. (d) $(x+y) - \frac{1}{x^2+y^2+xy}$

$= (x+y) - \frac{(x-y)}{(x-y)(x^2+y^2+xy)}$

$= (x+y) - \frac{(x-y)}{(x^3-y^3)}$

$= (x+y) - \frac{(x-y)}{(28-27)}$

$= x+y-x+y$

$= 2y$

$= (2 \times \sqrt[3]{27})$

$= (2 \times 3) \Rightarrow \boxed{6}$

4. (b) $\frac{2}{2\alpha} = \frac{3}{\alpha+\beta} = \frac{7}{28} \Rightarrow \frac{1}{\alpha} = \frac{1}{4} \Rightarrow \alpha = 4$

Now $\frac{3}{\alpha+\beta} = \frac{1}{4} \Rightarrow \frac{3}{4+\beta} = \frac{1}{4} \Rightarrow 4+\beta = 12$

$\therefore \beta = 8$

$\boxed{\alpha = 4 \; ; \; \beta = 8}$

[A] ANSWERS :-

5. (c) I-Case: $Z_1 = -20 - 20 + \frac{20 \times 20}{100} = -36\%$.

II Case: $Z_2 = -36 - 20 + \frac{36 \times 20}{100} = -48.8\%$.

$\therefore$ Required answer is $\boxed{48.8\%}$.

6. (c) Let the capacity be x gallons.

$\therefore \frac{x}{20} + \frac{x}{24} - \frac{x}{15} = 3$

$\Rightarrow \frac{6x + 5x - 8x}{120} = 3$

$\frac{3x}{120} = 3$

$\Rightarrow \boxed{x = 120}$

7. (a) Let the CP of each watch be ₹ x.

$\therefore$ SP = (CP + P)

$\Rightarrow$ SP of 14 watches = CP of (14+4) watches

$\Rightarrow$ CP of 18 Watches = (14×450)

$\Rightarrow$ CP of 1 Watch = $\left(\frac{14 \times 450}{18}\right) = \boxed{₹ 350}$

8. (b) $Z = x - y - \frac{xy}{100}$

Here; Z = profit ; x = MRP above CP (%) ;

y = Discount (%).

$\therefore \Rightarrow 8 = x - 10 - \frac{10x}{100}$

$\Rightarrow 18 = \frac{9x}{10}$

$\Rightarrow x = \boxed{20\%}$

1. (b) Let the no of term be n.

$\therefore t_n = a + (n-1)d$

$\Rightarrow 198 = 102 + 3(n-1)$

$\Rightarrow n = 33$

$S_n = \frac{n}{2}(a+l)$

$= \frac{33}{2}(102+198)$

$= \left(\frac{33}{2} \times \overset{150}{300}\right) = \boxed{4950}$

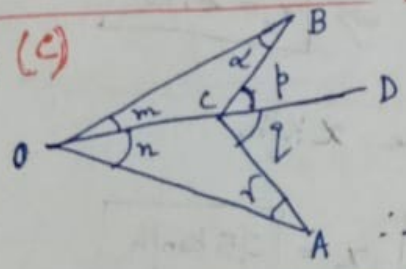
10. (b) $150 \times 8 = 90 \times 40 \times h \Rightarrow h = \frac{1}{3}m = \frac{100}{3}cm$

$\therefore h = \boxed{33.33cm}$

11. (d) Volume of tetrahedron :→ $\frac{\sqrt{2}}{12} \times (\text{side})^3 = \frac{\sqrt{2}}{12} \times (6)^3$

$= \boxed{18\sqrt{2}\ cc}$

12. (c)



$\triangle BOC$; $\beta = (\alpha + m) \longrightarrow (i)$

$\triangle AOC$; $\gamma = (n + r) \longrightarrow (ii)$

$\therefore \beta + \gamma = m + n + \alpha + r$

$\Rightarrow x = \boxed{(\alpha + \beta + \gamma)}$ [$\because \beta = (m+n)$ and $x = (\beta + \gamma)$]

13. (a) Let $\theta = 45$; putting the value of θ in both of the given equations; We get →

$\therefore a = \left(\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}\right) = \sqrt{2}$

$b = (\sqrt{2} + \sqrt{2}) = 2\sqrt{2}$

Now; $b(a-1)$

$= 2\sqrt{2}$

According to the given option;

$2a = 2\sqrt{2}$

then, the required answer is (a).

[A] ANSWERS :-

14. (a) $\cos^2 5^\circ + \cos^2 10^\circ + \cos^2 15^\circ + \dots + \cos^2 90^\circ$

$= (\cos^2 5^\circ + \cos^2 85^\circ) + (\cos^2 10^\circ + \cos^2 80^\circ) + \dots + \cos^2 45^\circ + \cos^2 90^\circ$

$= (\sin^2 5^\circ + \cos^2 5^\circ) + (\sin^2 10^\circ + \cos^2 10^\circ) + \dots + \frac{1}{2} + 0$

$\left[\because \sin(90^\circ - \theta) = \cos\theta \text{ and } \cos 45^\circ = \frac{1}{\sqrt{2}}\right]$

$\left[\because \sin^2\theta + \cos^2\theta = 1\right]$

$= (1 + 1 + 1 + \dots + 8 \text{ times}) + \frac{1}{2} + 0 \Rightarrow \boxed{8\frac{1}{2}}$

15. (b) Let the Original deposit be ₹ x.

$\therefore \frac{4 \times x}{100} - \frac{(x - 500) \times 3}{100} = 32.50$

$\Rightarrow 4x - 3x = (3250 - 1500) \Rightarrow \boxed{x = ₹1750}$

16. (a) Let the speed of goods train be x km/h.

$\therefore D = VT$

$\Rightarrow \frac{187.5}{10} = (50 + x) \times \frac{5}{18} \times \frac{9}{x}$

$\Rightarrow 50 + x = \frac{1875}{25} = 75$

$\boxed{x = 25 \text{ km/h}}$

17. (a) LCM of 9, 12 is 36.

$\therefore$ A in 1 day $\rightarrow \left(\frac{36}{9}\right) = 4$ units of job

B in 1 day $\rightarrow \left(\frac{36}{12}\right) = 3$ units of job.

(A+B) $\rightarrow$ in 2 days $\longrightarrow$ 7 units of job.

$\therefore$ In 10 days $\longrightarrow$ 35 " " "

Remaining $= (36 - 35) = 1$ unit of job done by A in $\frac{1}{4}$ days.

$\therefore$ Required number of days $= \boxed{10\frac{1}{4} \text{ days}}$

18. (b) Let monthly salary = ₹100

Savings = ₹20 ; Expenses = ₹80

Now; Present Expenses: $\left(\frac{80 \times 120}{100}\right)$ = ₹96

Savings = (100 − 96) = ₹4

∴ When Savings is ₹4 ⟶ Salary ₹100

×250 (1000) ×250 → 25,000

19. (b) LCM of 8, 12 and 16 is 48.

Number (N) = 48K + 3

Now; $\frac{48K+3}{7}$ ⟶ for K = 3

N = {(48 × 3) + 3} = 147

20. (b) They will meet at their starting point = LCM of $\left(\frac{150}{10} \text{ and } \frac{150}{15}\right)$ ⇒ 30 sec.

21. (b) B covers 15 mt in 5 sec.

n : n (300 : n) ×20 (100 sec)

∴ A's time over the course = (100 − 5) = 95 sec

22. (b) 9, 15, 27, 51, 99, 195

×2−3, ×2−3, ×2−3, ×2−3, ×2−3

[A]. ANSWERS

23. (d) $\tan 57^\circ = \dfrac{\sin\theta + \cos\theta}{\cos\theta - \sin\theta}$

$\Rightarrow \tan 57^\circ = \dfrac{\tan\theta + 1}{1 - \tan\theta}$ [$\because$ divided by $\cos\theta$]

$\Rightarrow \tan 57^\circ = \dfrac{\tan 45^\circ + \tan\theta}{1 - \tan 45^\circ \cdot \tan\theta}$ [$\because \tan 45^\circ = 1$]

$\Rightarrow \tan 57^\circ = \tan(\theta + 45^\circ)$ [$\tan(A+B) = \dfrac{\tan A + \tan B}{1 - \tan A \cdot \tan B}$]

$\Rightarrow \theta + 45^\circ = 57^\circ$

$\Rightarrow \theta = 12^\circ$

$\Rightarrow 5\theta = 60^\circ$

$\therefore \operatorname{Cosec} 5\theta = \operatorname{Cosec} 60^\circ = \boxed{\frac{2}{\sqrt{3}}}$

24. (b) $\sin^2 60^\circ + \cos^2(3x - 9) = 1$

$\Rightarrow \cos^2(3x-9) = 1 - \sin^2 60^\circ$

$\Rightarrow \cos^2(3x-9) = \cos^2 60^\circ$

$\therefore 3x - 9 = 60^\circ$

$x = \boxed{23^\circ}$

25. (d) Total Weights increased $= \left(10 \times 1\frac{1}{2}\right)$

$= 15\text{kg}$

$\therefore$ Weight of new man $= (68 + 15) = \boxed{83\text{kg}}$

X