Solutions – Easy Test

1. (d) : Let the ages of Akshat, Rishab, Gaurav be X, Y, Z years respectively.
$X = 2Z$ ..... (1)
$X + Z = 2Y$ ..... (2)
$(X + 6 + Y + 6) = 3\ (Z + 6)$ ..... (3)
Solve to get $X = 24$, $Y = 18$, $Z = 12$ years.

2. (b) : Suppose P is midway between Q & R. Now, X hours after 7 a.m. 25
$X - 20\ (X - 1.25) = 220 - 25X - 30\ (X - 3.5)$ etc.
So, 12 o'clock & 125 km from A.

3. (c) : $A + 4 = B + 5 = C + 6 = D + 7 = P + B + C + D + 8$
$A + 4 = B + 5\ \mathrm{A} - 1 = B$
$A + 4 = C + 6\ \mathrm{A} - 2 = C$
$A + 4 = D + 7\ \mathrm{A} - 3 = D$
Now, $A + 4 = A + A - 1 + A - 2 + A - 3 + 8$
$A = \frac{2}{3}$
$B = \frac{-1}{3}, C = \frac{-4}{3}, D = \frac{-7}{3}$
So, $A + B + C + D =$

4. (b) : Let Ab = X km and speed of bus be Y km/hr and time be T hrs original equation becomes
$\frac{X}{Y} = T$ ..... (1)

By increasing speed by 7 km/hr equation becomes
$\frac{X}{y+7} = T - 1$ ..... (2)

By decreasing speed by 5 km/hr equation becomes
$\frac{X}{y-5} = T + 2$ ..... (3)
On solving equation 1, 2 & 3 we get the value of y as and
$\frac{35}{3}\,\mathrm{km/h}$ and $T = \frac{8}{3}$ hrs
$\therefore\ \mathrm{AB} = X = \frac{280}{9}\,\mathrm{km} = 31.11\ \mathrm{km}$

≈ 31 km

5. (b) : For every day's work, P1 can afford to miss 3 days.
Hence, to break even it has to be 7 days' work in 28 days.

6. (b) : Put $a = 2$, $b = 12$ in $\sqrt{a^b} = 5b + a^2$

\ $\sqrt{2^{12}} = 5$ ´ $12 + 4 = 64$

$\Rightarrow\ 2^6 = 64$, which is true.

7. (c) : Let h = height of the container,
Given, $h = 2r$
$\therefore$ Volume $v = \pi r^2 h = \pi r^2 (2r) = 2\pi r^3$
$\therefore$ Absolute error = $(1.02)^3 \times 2\pi r^3 - 2\pi r^3 \times 1^3$
$= 2\pi r^3 [(1.02)^2 - 1] = 2\pi r^3 [1.0612 - 1]$
$= 0.0612 \times 2\pi r^3$

$\therefore$ % error = $\dfrac{0.0612 \times 2\pi r^3}{2\pi r^3} \times 100\% = 6.12\%$

8. (b) : Final ratio of wages = $5 \times 4 : 7 \times 3 : 9 \times 2 = 20 : 21 : 18$
Total wages received by P = $\dfrac{20}{59} \times 5900 = 2000$
Daily wage of P = $\dfrac{2000}{5} = 400$

9. (a) : We know that,
$a^2 + a^2 = \left(4\sqrt{2}\right)^2,\ a^2 = 16,\ a = 4$
Now, 2 (area of square) = (square of diagonal)
So, for new area 32 (16×2)
$2 \times 32 = d^2$
$8 = d$

10. (c) : Since $x > 0$ then at $x = 1$, we get $y = 2$ and for the rest values we get $y > 2$
Also for $0 < x < 1$; $x + \dfrac{1}{x} > 2$
and for $x > 1$; $x + \dfrac{1}{x} > 2$
Hence , $y \geq 2$

11. (c) : Option (b) and (c) both satisfies the given condition, but 997918 is the larger of the two.

12. (d) : $\dfrac{\log_y 8x}{\log_y x} = \dfrac{4}{3}$
$\text{Log}_x\, 8x = \dfrac{4}{3}$
$\text{Log}_x\, 8 + \log_x x = \dfrac{4}{3}$
$\text{Log}_x\, 8 = \dfrac{1}{3}$
$x = 8^3$
$x = 512$

13. (c) : Consider the vowels A, A, E as one unit. Besides this, we have $2R$, $1N$, $1G$ that is a total of 5 things out of which the 2 R are identical.
Required number of ways $= \dfrac{5!}{2!}$

Now A, A and E can be arranged within themselves in ways. $\frac{3!}{2!}$

Required answer = $\frac{5! \times 3!}{2! \times 2!}$

14. (b) : (15, 3)! = Product of 3 consecutive natural numbers starting from 15, which is at least divisible by 3!.
Hence, $H = 3!$.

15. (b) : Coefficient of x^{49} = − Sum of the roots of $f(x)$
= − (1 + 3 + 7 +9+ ...... + 99)
$-(50)^2 = -2500$

16. (b) : The sum of three numbers is given; the product will be maximum if the numbers are equal.
So, if $a + b + c$ is defined, abc will be maximum when all three terms are equal. In this instance, however, with a, b, c being distinct integers, they cannot all be equal. So, we need to look at a, b, c to be as close to each other as possible.
$a = 10$, $b = 10$. $c = 11$ is one possibility, but a, b, c have to be distinct. So, this can be ruled out.
The close options are,
a, b, c = 9, 10, 12; product = 1080
a, b, c = 8, 11, 12; product = 1056
Maximum product = 1080

17. (a) : Let y gold coins were given to 1st son.

Number of gold coins given to 2nd son = $\frac{5}{7}y$

Number of gold coins given to 3rd son = $\frac{3}{7}y$

So, $y - \frac{3}{7}y = 60 \Rightarrow \frac{4y}{7} = 60$

$\Rightarrow \quad y = \frac{60 \times 7}{4} = 15 \times 7 = 105$

Hence, the required number of gold coins:

$= 105 + \frac{5}{7} \times 105 + \frac{3}{7} \times 105$
= 105 + 75 + 45 = 225

18. (c) : Q can be 0 or 5, but 65 is not divisible by 4.
So, Q must be 0.
Now, sum of the digit should be divisible by 9.
So, P is 8.

19. (a) : $(6x^2 + 43x - 49) - (5x^2 + 2x - 7) = 0$
$x^2 + 41x - 42 = 0$
$x^2 + 42x - x - 42 = 0$
$x(x + 42) - 1(x + 42) = 0$
$(x - 1)(x + 42) = 0$

$x = 1$ satisfy both the equations. So, there is only one common root.

20. (c) : The solid sphere is melted and recast into cones. The volume of material is the same before and after casting.

Volume of the sphere = $\left(\frac{4}{3}\right)\pi r^3$ ..... (1)

Volume of the right circular cone = $\frac{1}{3}\pi R^2 H$ ..... (2)

Diameter of the base of the cone

= $\sqrt{2}$ slant height

= $\sqrt{2}\, S$(say) ..... (3)

$4R = 2S = 2(H^2 + R^2)$

$2R^2 = 2H$

$R = H$ ..... (4)

Volume of the cone = $\frac{1}{3}\pi R^2 H$

$= \frac{1}{3}\pi r^2.(r)$ (since, $R = r$)

$= \frac{1}{3}\pi r^3$

From equations (1) and (4), it can be seen that the melted material creates exactly 4 cones of the specified dimensions. No material is left over.