30 IMPORTANT QUESTIONS

1. In a certain town 25% families own a phone and 15% own a car, 65% families own neither a phone nor a car. 2000 families own both a car and a phone. Consider the following statements in this regard

(i) 10% families own both a car and a phone

(ii) 35% families own either a car or a phone

(iii) 40000 families live in the town

Which of the above statements are correct?

(A) (i) and (ii) (B) (i) and (iii)

(C) (ii) and (iii) (D) (i), (ii) and (iii)

Ans. (C)

$n(P) = 25\%, n(C) = 15\%$

$n(P^o \cap C^o) = 65\%, n(P \cap C) = 2000$

Since, $n(P^o \cap C^o) = 65\%$

$\therefore n(P \cup C)^o = 65\%$ and $n(P \cup C) = 35\%$

Now, $n(P \cup C) = n(P) + n(C) - n(P \cap C)$

$35\% = (25 + 15)\% - n(P \cap C)$

$\therefore n(P \cap C) = (40 - 35)\% = 5\%,$

But $n(P \cap C) = 2000$

$\therefore$ Total number of families = $\frac{2000 \times 100}{5} = 40000$

2. If f : R $\rightarrow$ S, defined by f(x) = sinx – $\sqrt{3}$ cosx + 1, is onto, then the interval of S is

(A) [0, 3] (B) [–1, 1]

(C) [0, 1] (D) [–1, 3]

Ans. (D)

As f(x) is onto

$\therefore$ S = Range

minimum value of $f(x) = -\sqrt{1+\left(-\sqrt{3}\right)^2}+1=-1$

and maximum value of $f(x) = +\sqrt{1+\left(-\sqrt{3}\right)^2}+1=3$

$\Rightarrow S = [-1, 3]$

3. The sum of the terms in the n^{th} bracket of the series

(1) + (2 + 3 + 4) + (5 + 6 + 7 + 8 + 9) + ..., is-

(A) $(n-1)^3 + n^3$

(B) $(n+1)^3 + 8n^2$

(C) $\frac{(n+1)(n+2)}{6n}$

(D) $(n+1)^3 + n^3$

Ans . (A)

For n = 1, we have

Sum of the terms in first bracket = 1

And, $(n-1)^3 + n^3 = (1-1)^3 + 1^3 = 1$

For n = 2, we have

Sum of the terms in the second bracket = 2 + 3 + 4 = 9

And, $(n-1)^3 + n^3 = (2-1)^3 + 2^3 = 1 + 8 = 9$

4. $\log_7 \log_7 \sqrt{7(\sqrt{7\sqrt{7}})} =$

(A) $3\log_2 7$ (B) $1-3\log_3 7$

(C) $1-3\log_7 2$ (D) None of these

Ans. (C)

$\log_7 \log_7 \sqrt{7\sqrt{7\sqrt{7}}} = \log_7 \log_7 7^{7/8} = \log_7 (7/8) = \log_7 7 - \log_7 8 = 1 - \log_7 2^3 = 1 - 3\log_7 2$.

5. z_0 is a complex number $\left(\text{Re}(z_0) \neq -\frac{1}{2}\right)$ which satisfying

$|z|^{n-3} z^2 + |z|^{n-3} z - |z|^{n-1} + 1 = 0$, then

(A) $\text{Re}(z_0) = -1, I_m(z_0) = \frac{1}{2}$

(B) $\text{Re}(z_0) = 1, I_m(z_0) = 1$

(C) $\text{Re}(z_0) = -1, I_m(z_0) = 0$

(D) $\text{Re}(z_0) = -2, I_m(z_0) = 0$

Ans. (C)

$|z_0|^{n-3} z_0^2 + |z_0|^{n-3} z_0 - |z_0|^{n-1} + 1 = 0$

$\Rightarrow \; |z_0|^{n-1} = |z_0|^{n-3}\left(z_0^2 + z_0\right) + 1$ (1)

Clearly $z_0^2 + z_0$ is purely real

$\Rightarrow \; z_0^2 + z_0 = \bar{z}_0^2 + \bar{z}_0$

$\Rightarrow \; (z_0 - \bar{z}_0)(z_0 + \bar{z}_0 + 1) = 0$

But $\text{Re}(z_0) \neq -\frac{1}{2}$

$\Rightarrow \; z_0 + \bar{z}_0 + 1 \neq 0$

So $z_0 = \bar{z}_0$

Hence z_0 is purely real

From equation (1)

$|z_0|^{n-3} z_0 + 1 = 0$

$\Rightarrow \; z_0 = -1$ is the only solution

6. If α and β are the real distinct roots of the equation $x^2 + px + q = 0$ ands α^4, β^4 be those of equation $x^2 - rx + s = 0$, $(p, q, r, s \in R)$, then the roots of equation $x^2 - 4qx + 2q^2 - r = 0$ are always

(A) both positive

(B) both negative

(C) one positive and other negative

(D) none of these

Ans. (C)

$\alpha + \beta = -p \quad \alpha\beta = q$

$\alpha^4 + \beta^4 = r \quad \alpha^4\beta^4 = s$

$(\alpha + \beta)^4 = (\alpha^4 + \beta^4) + 4\alpha\beta(\alpha^2 + \beta^2) + 6(\alpha\beta)^2$

or $p^4 = r + 4q\,[p^2 - 2q] + 6q^2$

or $p^4 = r + 4qp^2 - 2q^2$

or $p^4 - 4qp^2 + (2q^2 - r) = 0$

$\Rightarrow$ p^2 is the root of $x^2 - 4qx + (2q^2 - r) = 0$

$\therefore$ one root is positive

More over, product of roots = $2q^2 - r$

$= 2\alpha^2\beta^2 - (\alpha^4 + \beta^4)$

$= -[\alpha^4 + \beta^4 - 2\alpha^2\beta^2]$

$= -(\alpha^2 - \beta^2)^2 < 0$

$\therefore$ one root is positive and other root is negative

7. If 1, a_1, a_2, a_3.... a_{n-1} are nth roots of unity then

$\frac{1}{1-a_1} + \frac{1}{1-a_2} + ... + \frac{1}{1-a_{n-1}}$ equal to

(A) $\frac{n-1}{2}$ (B) $\frac{n}{2}$

(C) $\frac{2^n-1}{n}$ (D) none of these

Ans. (A)

$z^n = 1$ where z = 1, a_1, a_2 ... a_{n-1}

Let $\alpha = \frac{1}{1-z}$ i.e. $z = 1 - \frac{1}{\alpha}$

$\therefore$ (1) becomes

$$\left(1 - \frac{1}{\alpha}\right)^n = 1$$

$\Rightarrow (\alpha - 1)^n - \alpha^n$

$\Rightarrow -n.\alpha^{n-1} + {}^nC_2\alpha^{n-2} .... + (-1)^n = 0$

where $\alpha = \frac{1}{1-a_1}, \frac{1}{1-a_2} .... \frac{1}{1-a_{n-1}}$

$\therefore \frac{1}{1-a_1} + \frac{1}{1-a_2} + ... + \frac{1}{1-a_{n-1}} = \frac{{}^nC_2}{n} = \frac{n-1}{2}$

8. Find the general solution of $\sin\theta > \frac{1}{2}$

(A) $n\pi + \frac{\pi}{6} < \theta < n\pi + \frac{5\pi}{6}$

(B) $n\pi < \theta < n\pi + \frac{3\pi}{2}$

(C) $2n\pi + \frac{\pi}{6} < \theta < 2n\pi + \frac{5\pi}{6}$

(D) none of these

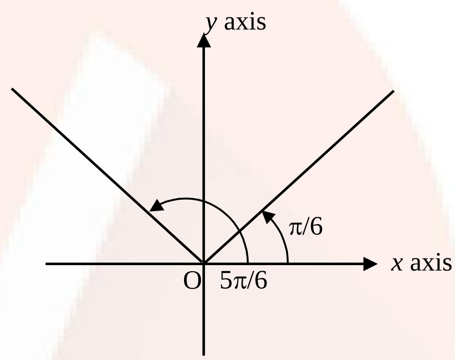
Ans. (C)

We have

$\sin\theta > \frac{1}{2}$

So $\frac{1}{2} < \sin\theta \le 1$

$\sin\theta$ is +ve in Ist and IInd quadrant in Ist quadrant when θ increases $\sin\theta$ increases and in II quadrant θ increases $\sin\theta$ decreases



so when $\frac{\pi}{6} < \theta < \frac{5\pi}{6}$

$\frac{1}{2} < \sin\theta \le 1$

So general solution is

$2n\pi + \frac{\pi}{6} < \theta < 2n\pi + \frac{5\pi}{6}$

9. If in an equilateral triangle, inradius is a rational number then which of the following is not true?

(A) Area is always irrational.

(B) Circumradius is always rational.

(C) Ex–radii are always rational.

(D) Perimeter is always rational.

Ans. (D)

In equilateral Δ, $R = 2r$

$\Rightarrow R \in Q$

$$\Delta = 3 \times \frac{1}{2} R.R \sin\frac{2\pi}{3}$$

$$= \frac{3}{2} R^2 \frac{\sqrt{3}}{2}$$

$\Rightarrow \Delta \notin Q$

$$r_1 = 4R \sin\frac{A}{2}.\cos\frac{B}{2}\cos\frac{C}{2}$$

$$= 4R \times \frac{1}{2} \times \left(\frac{\sqrt{3}}{2}\right)^2$$

$\Rightarrow r_1 \in Q$ (Also $r_2, r_3 \in Q$)

$$S = 3 \times 2\left(R\cos\frac{\pi}{6}\right) = 6R\frac{\sqrt{3}}{2} \quad \Rightarrow S \notin Q.$$

10. If a tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ makes angle α with the x–axis, then the square of the length of the intercept of the tangent cut between the axes is

(A) $a^2 \tan^2 \alpha + b^2 \cot^2 \alpha$

(B) $a^2 \sec^2 \alpha + b^2 \operatorname{cosec}^2 \alpha$

(C) $a^2 \operatorname{cosec}^2 \alpha + b^2 \sec^2 \alpha$

(D) $a^2 \cot^2 \alpha + b^2 \tan^2 \alpha$

Ans. (B)

Let the equation of the tangent be $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$

slope of this tangent = $-\frac{b}{a}\cot\theta$.

As the tangent makes α angle with the x–axis

$\therefore \quad \tan\alpha = -\frac{b}{a}\cot\theta$

Square of intercept cut between the axis

$$= \left(\frac{a}{\cos\theta}\right)^2 + \left(\frac{b}{\sin\theta}\right)^2$$

$$= a^2\left(1+\tan^2\theta\right) + b^2\left(1+\cot^2\theta\right)$$

$$= a^2 + b^2 + a^2\left(\frac{b^2}{a^2}\cot^2\alpha\right) + b^2\left(\frac{a^2}{b^2}\tan^2\alpha\right)$$

$$= a^2 + b^2 + b^2\cot^2\alpha + a^2\tan^2\alpha$$

$$= a^2\sec^2\alpha + b^2\operatorname{cosec}^2\alpha.$$

11. If the acute angle between the two asymptotes of a hyperbola be $\frac{\pi}{3}$, then the eccentricity of the hyperbola is

(A) $\frac{2}{\sqrt{3}}$ (B) 2

(C) 2 or $\frac{2}{\sqrt{3}}$ (D) none of these

Ans. (C)

Angle between the asymptotes = $2\tan^{-1}\frac{b}{a} = \frac{\pi}{3}$

$\Rightarrow \tan^{-1}\frac{b}{a} = \frac{\pi}{6}$

$\Rightarrow \frac{b}{a} = \tan\frac{\pi}{6} = \frac{1}{\sqrt{3}}$

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

Let e be the eccentricity of the hyperbola.

$$e^2 = 1 + \frac{b^2}{a^2} \text{ or } 1 + \frac{a^2}{b^2}$$

$$e^2 = \frac{4}{3} \text{ or } 4$$

$$e = \frac{2}{\sqrt{3}} \text{ or } 2$$

12. Equation of the line passing through (□, □), cutting the parabola $y^2 = 4ax$ at two distinct points A and B such that AB subtends right angle at the origin is

(A) $\beta x + (4a - \alpha)y - 4a\beta = 0$

(B) $2\beta x + (\alpha - 4a)y - 2a\beta = 0$

(C) $\beta x + (\alpha - 4a)y - 2a\beta = 0$

(D) none of these

Ans. (A)

Any line through (α, β)

$y - \beta = m(x - \alpha)$ ..(i)

Solving equation (i) with equation of the parabola.

$\Rightarrow 2at - \beta = m(at^2 - \alpha)$

$\Rightarrow amt^2 - 2at + \beta - m\alpha = 0$

$\Rightarrow t_1 t_2 = \frac{\beta - m\alpha}{am} = -4$

$\Rightarrow m = \left(\frac{\beta}{\alpha - 4a}\right)$

Hence required equation

$y - \beta = \frac{\beta}{\alpha - 4a}(x - \alpha)$

$\Rightarrow y(\alpha - 4a) - \alpha\beta + 4a\beta = \beta x - \alpha\beta$

$\Rightarrow \beta x + (4a - \alpha)y - 4a\beta = 0$

13. If the length of common chord of two circles $x^2 + y^2 + 8x + 1 = 0$ and $x^2 + y^2 + 2\mu y - 1 = 0$ is $2\sqrt{6}$, then the value of μ are

(A) ±2 (B) ±3

(C) ±4 (D) ±8

Ans. (B)

Equation of common chord (radical axis)

$\Rightarrow 8x - 2\mu y + 2 = 0$

$\Rightarrow 4x - \mu y + 1 = 0$

$AC^2 = 15$

$AM = \frac{1}{2}AB = \sqrt{6}$

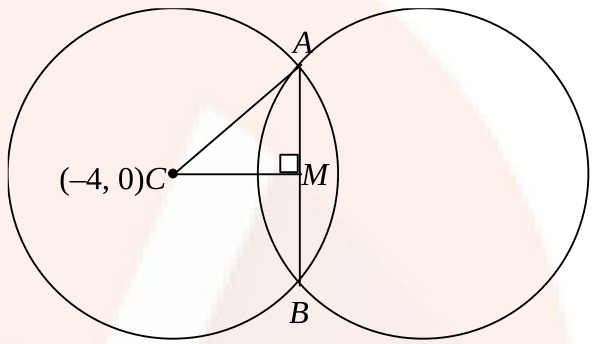
$\Rightarrow CM^2 = AC^2 - AM^2 = 9$

$\left[\frac{4(-4)+1}{\sqrt{16+\mu^2}}\right]^2 = 9$

$16 + \mu^2 = \frac{225}{9} = 25$

$\Rightarrow \mu^2 = 9$

$\Rightarrow \mu = \pm 3.$



14. 20 persons are to be seated around a circular table. Out of these 20, two are brothers. Then number of arrangements in which there will be atleast three persons between the brothers is

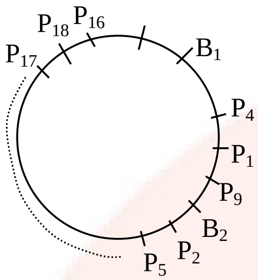
(A) 18 × 20! (B) 36 × 18!

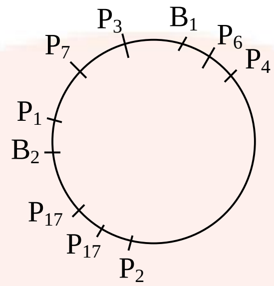
(C) 13 × 18! (D) none of these

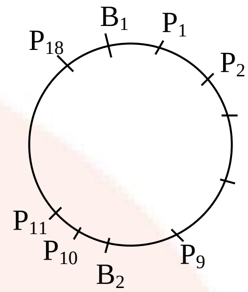
Ans. (C)

Consider exactly three persons between the brothers. Take first brother as reference now second brother can be placed in two ways (left or right), rest 18 in 18! ways.

similarly we have $2 \times 18!$ arrangements for exactly 4 persons or 5 persons or 6 persons or 7 persons or 8 persons in between the brothers. For exactly 9 persons in between them we have only 18! ways







These will also include 10 or 11 or 12 ...... 15 persons in between the brothers.

As we can see figure 1 represents both the cases 3 persons and 15 persons are in between the brothers.

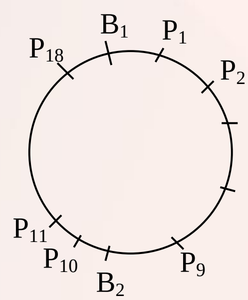
So total no. of arrangements = $6 \times 2 \times 18! + 18! = 13 \times 18!$

Alternative

If one of the brothers is made reference point then remaining 18 persons (excluding the second brother) can be seated in 18! Ways.

For the second brother we have only 19 – 6 = 13 places to sit.

$\Rightarrow$ Total number of ways = $13 \times 18!$



15. The range of the values of the term independent of *x* in the expansion of

$$\left(x.\sin^{-1}\alpha + \frac{\cos^{-1}\alpha}{x}\right)^{10}, \alpha \in [-1, 1] \text{ is}$$

(A) $\left[-\frac{{}^{10}C_5\pi^{10}}{2^5}, \frac{{}^{10}C_5\pi^{10}}{2^{20}}\right]$

(B) $\left[\frac{{}^{10}C_5\pi^2}{2^{20}}, -\frac{{}^{10}C_5\pi^2}{2^5}\right]$

(C) [1, 2]

(D) (1, 2)

Ans. (A)

$T_{r+1} = {}^{10}C_r.(x \sin^{-1}\alpha)^{10-r}.\left(\frac{\cos^{-1}\alpha}{x}\right)^r$, $\Rightarrow 10 - 2r = 0$ $\Rightarrow r = 5$

$T_6 = {}^{10}C_5(\sin^{-1}\alpha)^5.(\cos^{-1}\alpha)^5$

$= {}^{10}C_5.(\sin^{-1}\alpha.\cos^{-1}\alpha)^5$

$f(\alpha) = \sin^{-1}\alpha.\cos^{-1}\alpha$. Put $\sin^{-1}\alpha = t$

$f(t) = t.\left(\frac{\pi}{2} - t\right)$ $-\frac{\pi}{2} \le t \le \frac{\pi}{2}$

$f'(t) = \frac{\pi}{2} - 2t = 0$ $\Rightarrow t = \frac{\pi}{4}$

$f\left(\frac{\pi}{4}\right) = \frac{\pi^2}{16}, f\left(-\frac{\pi}{2}\right) = -\frac{\pi}{2}.\pi = -\frac{\pi^2}{2}, f\left(\frac{\pi}{2}\right) = 0$

$\left(-\frac{\pi^2}{2}, \frac{\pi^2}{16}\right)$

So required range is

$= \left[{}^{10}C_5.\left(-\frac{\pi^2}{2}\right)^5, {}^{10}C_5\left(\frac{\pi^2}{16}\right)^5\right]$ $= \left[-\frac{{}^{10}C_5.\pi^{10}}{2^5}, \frac{{}^{10}C_5.\pi^{10}}{2^{20}}\right]$

16. If the mean of a set of observations $x_1, x_2, \ldots x_n$ is $\bar{x}$, then the mean of the observations $x_i + 2i$, $i = 1, 2, \ldots n$ is

(A) $\bar{x} + 2$ (B) $\bar{x} + 2n$

(C) $\bar{x} + (n+1)$ (D) $\bar{x} + n$

Ans. C)

It is given that $\bar{x} \frac{x_1 + x_2 + \ldots + x_n}{n}$

Therefore $n\bar{x} = x_1 + x_2 + \ldots + x_n$

Let $\bar{y}$ be the mean of observations x_i +2n, i = 1, 2, ….., n

Then $\bar{y} \frac{(x_1 + 2.1) + (x_2 + 2.2) + (x_3 + 2.3) + ... + (x_n + 2.n)}{n}$

$$= \frac{\sum_{i=1}^{n} x_i + 2(1 + 2 + 3 + ... + n)}{n}$$

$$= \frac{1}{n}\sum_{i=1}^{n} x_i + \frac{2(n)(n+1)}{2n} = \bar{x} + (n+1)$$

17. Which of the following is correct for the statements p and q?

(A) p □□q is true when at least one from p and q is true

(B) p □□q is true when p is true and q is false

(C) p$\leftrightarrow$q is true only when both p and q are true

(D) ~ (p □□q) is true only when both p and q are false

Ans. (D)

We know that p $\wedge$ q is true only when both p and q are true so option (A) is not correct

we know that p $\to$ q is false only when p is true and q is false so option (B) is not correct

we know that p $\leftrightarrow$ q is true only when either p and q both are true or both are flase

so option (C) is not correct

we know that ~(p $\vee$ q) is true only when (p $\vee$ q) is false

i.e. p and q both are false

So option (D) is correct

18. The value of

$$\lim_{x\to 0} \frac{\left(1+x^2\right)^{1/x^2} - e + \frac{1}{2}ex^2 - \frac{11}{24}ex^4}{x^2 \tan^2 x \sin^2 x}$$ is

(A) $\frac{7e}{24}$ (B) $\frac{-9e}{16}$

(C) $\frac{7e}{36}$ (D) none of these

Ans. (D)

$$y = \lim_{x\to 0}(1+x^2)^{1/x^2}$$

$$\Rightarrow \ln y = \lim_{x\to 0}\frac{1}{x^2}\ln\left(1+x^2\right)$$

$$\Rightarrow \ln y = \lim_{x\to 0}\frac{1}{x^2}\left(x^2-\frac{x^4}{2}+\frac{x^6}{3}-\frac{x^8}{4}.....\right)$$

$$\Rightarrow y = e^{1-\frac{x^2}{2}+\frac{x^4}{3}-\frac{x^6}{4}+....}$$

$$\Rightarrow y = e.e^{-x^2/2}e^{x^4/3}.e^{-x^6/4}$$

$$= e.\left(1-\frac{x^2}{2}+\frac{x^4}{4.2!}-\frac{x^6}{8.3!}+......\right)\left(1+\frac{x^4}{3}+\frac{x^8}{9.2!}+..........\right)\left(1-\frac{x^6}{4}+...\right)$$

$$= e\left[1-\frac{x^2}{2}+\frac{11x^4}{24}-\frac{x^6}{48}-\frac{x^6}{6}-\frac{x^6}{4}......\right]$$

Putting its value we get

$$\lim_{x\to 0}\frac{\frac{-7}{16}e.x^6}{x^2\tan^2 x\sin^2 x} = -\frac{7}{16}e$$

19. Numbers 1, 2, 3, ... , 100 are written down on each of the cards A, B and C. One number is selected at random from each of the cards. The probability that the numbers so selected can be the measures (in cm) of three sides of right-angled triangles no two of which are similar, is

(A) $4/100^3$ (B) $3/50^3$

(C) $3!/100^3$ (D) none of these

Ans. (D)

$n(S) = 100 \times 100 \times 100$

We know that $(2n + 1)^2 + (2n^2 + 2n^2) = (2n^2 + 2n + 1)^2$ for all $n \in N$.

$\therefore$ for $n = 1, 2, 3, 4, 5, 6$ we get lengths of the three sides of a right-angled triangle whose longest side ≤ 100.

For example, when $n = 1$, sides are 3, 4, 5; when $n = 2$, sides are 5, 12, 13 and so on.

The number of selections of 3, 4, 5 from the three cards by taking one from each is 3!.

$\therefore$ $n(E) = 6(3\,!)$. Hence, $P(E) = \dfrac{6(3!)}{100\times100\times100} = \dfrac{1}{100}\left(\dfrac{3}{50}\right)^2$.

20. The direction ratios of a normal to the plane passing through (1, 0, 0), (0, 1, 0) and making an angle $\frac{\pi}{4}$ with the plane $x + y = 3$ are

(A) $(1, \sqrt{2}, 1)$ (B) $(1, 1, \sqrt{2})$

(C) (1, 1, 2) (D) $(\sqrt{2}, 1, 1)$

Ans. (B)

Let the plane be $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$

$\Rightarrow \frac{1}{a} = 1, \frac{1}{b} = 1 \Rightarrow a = b = 1.$

Also, $\cos\frac{\pi}{4} = \dfrac{\frac{1}{a} + \frac{1}{b}}{\sqrt{\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2}}\sqrt{1+1}} \Rightarrow c = \pm\frac{1}{\sqrt{2}}$

Thus direction ratios are $(1, 1, \sqrt{2})$ or $(1, 1, -\sqrt{2})$.

21. The total price of 4 soaps and 5 brushes is Rs. 123 and total cost of 5 soaps and 4 brushes is Rs. 120. What is the cost of one soap?

(A) Rs. 10 **(B)** Rs. 12 **(C)** Rs. 15

(D) cann't be determined

Ans. (B)

4S + 5B = 123 --(I)
5S + 4B = 120 ----(II)
From eqn. I and II,
S = Rs. 12

22. The average age of 30 students and a class teacher is 20 years. If class teacher's age is excluded, the average age is reduced by 1 year. What is the class teacher's age?

(A) 39 years **(B)** 40 years **(C)** 49 years **(D)** 50 years

Ans. (D)

Age of class teacher = $31 \times 20 - 30 \times 19$
= 620 - 570 = 50 years

23. The area of a circle is equal to a rectangle whose perimeter and breadth are 42 m and 8.5 m respectively. What is the area of the circle?

(A) 106.25 m^2 **(B)** 104.25 m^2 **(C)** 146.25 m^2 **(D)** 128.25 m^2

Ans. (A)

$2(l + b) = 42$
$l + b = 21$
$l + 8.5 = 21$

l = 12.5 m.
Area of rectangle = 106.25 m^2

24. The difference between 64% of a number and 36% of the same number is 22288.What is 62% of that number?
(A) 49352 **(B)** 44452 **(C)** 46452 **(D)** 48952

Ans. (A)

(64% - 36%) = 22288

$$62\% = \frac{22288 \times 62}{28} = 49352$$

25. If an amount of Rs.264096 is distributed equally amongst 36 persons .How much amount would each person get?
(A) 7316 **(B)** 7336 **(C)** 7836 **(D)** 7646
Ans. (B)

Each person get = $\frac{264096}{36}$ =Rs.7336

26. Sanjay decided to denote 5% of his salary, On the day of donation he changed his mind and donated Rs. 487.50 .Which was 75% of what he had decided earlier. How much is Sanjay's monthly salary?
(A) Rs.16000 **(B)** Rs.18000 **(C)** Rs.13000 **(D)** Rs.12000

Ans26. (C)

Sanjay's salary = 487.50 × $\frac{100}{75} X \frac{100}{5}$

= Rs. 13000

27. A's income is 50% more than B, C's income is 2/3 times of A and D's income is 60% more than (C) If income of A, B, C and D is increased by 10% then D's income is what percent of B's income (after the increase)?

(A) 150%
(B) 160%
(C) 175%
(D) 176%

Ans. **(B)**

Let B’s initial income be100
Initial Incomes:
A = 100 * 1.5 = 150
B = 100
C $= \frac{2}{3} * 150 = 100$
D = 100 * 1.6 = 160

Income after increase
A = 150 * 1.1 = 165
B = 100 * 1.1 = 110
C = 100 * 1.1 = 110
D = 160 * 1.1 = 176

Required Percentage $= \frac{176}{110} * 100 = 160\%$

28. The marked price of a mobile is Rs.180. A Person buy it in Rs. 137.7 after two successive discounts in which one is 10%, then find another discount percentage?

a. 12%
b. 12.5%
c. 15%

d. 20%

Ans. **(C)**

Marked price = Rs. 180
After 10% discount = Rs. 162
Additional discount = Rs. 162 – Rs. 137.7 = Rs. 24.3
Required percentage $= \frac{24.3}{162} * 100 = 15\%$

29. The average of Anoop's mark in Philosophy and Hindi is 65. His average of mark in Philosophy and Sanskrit is 75. What is the difference between the marks which he obtained in Hindi and Sanskrit?

(A) 40 (B) 60
(C) 20 (D) Data inadequate

Ans. (C)

P + H = (65 × 2) =130; P + S = (75 × 2) = 150

30 . 4850 students appeared for an exam out of which 28% failed. What is the respective ratio between the number of students who passed to the number of students who failed?

(A) 18 : 7 **(B)** 11 : 18 **(C)** 3 : 1 **(D)** 1 : 3

Ans. (A)

Failed students = $\left(\frac{\mathbf{4850\times28}}{\mathbf{100}}\right)$
= 1358
Passed students = 4850 – 1358
= 3492
Ratio = 3492 : 1358
= 1746 : 679 = 18 : 7