# MATHEMATICS

## SECTION - A

**Multiple Choice Questions:** This section contains 20 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

**Choose the correct answer :**

1. $\cot^{-1}\left(\frac{7}{4}\right)+\cot^{-1}\left(\frac{19}{4}\right)+\cot^{-1}\left(\frac{39}{4}\right)+\ldots\infty$

(1) $\cot^{-1}(2)$ (2) $\cot^{-1}\left(\frac{1}{2}\right)$

(3) $\cot^{-1}\left(\frac{1}{3}\right)$ (4) $\cot^{-1}(3)$

**Answer (2)**

**Sol.** $T_r=\cot^{-1}\left(\frac{4r^2+3}{4}\right)$

$$T_r=\tan^{-1}\left(\frac{1}{r^2+\frac{3}{4}}\right)$$

$$T_r=\tan^{-1}\left(\frac{\left(r+\frac{1}{2}\right)-\left(r-\frac{1}{2}\right)}{1+r^2-\frac{1}{4}}\right)$$

$$T_r=\tan^{-1}\left(\frac{\left(r+\frac{1}{2}\right)-\left(r-\frac{1}{2}\right)}{1+\left(r+\frac{1}{2}\right)\left(r-\frac{1}{2}\right)}\right)$$

$$T_r=\tan^{-1}\left(r+\frac{1}{2}\right)-\tan^{-1}\left(r-\frac{1}{2}\right)$$

$$T_1=\tan^{-1}\left(\frac{3}{2}\right)-\tan^{-1}\left(\frac{1}{2}\right)$$

$$T_2=\tan^{-1}\left(\frac{5}{2}\right)-\tan^{-1}\left(\frac{3}{2}\right)$$

$$T_n=\tan^{-1}\left(\frac{2n+1}{2}\right)-\tan^{-1}\left(\frac{1}{2}\right)$$

$$\Sigma T_r=\tan^{-1}\left(\frac{2n+1}{2}\right)-\tan^{-1}\left(\frac{1}{2}\right)$$

$$\Sigma T_r=\frac{\pi}{2}-\tan^{-1}\left(\frac{1}{2}\right)$$

$$\Sigma T_r=\cot^{-1}\left(\frac{1}{2}\right)$$

2. $\int\frac{\left(\sqrt{1+x^2}+x\right)^{19}}{\sqrt{1+x^2}-x}dx$ is equal to

(1) $\frac{1}{21}\left(\sqrt{1+x^2}+x\right)^{20}+\frac{1}{19}\left(\sqrt{1+x^2}+x\right)^{19}+c$

(2) $\frac{1}{36}\left(\sqrt{1+x^2}+x\right)^{18}+\frac{1}{38}\left(\sqrt{1+x^2}+x\right)^{19}+c$

(3) $\frac{1}{42}\left(\sqrt{1+x^2}+x\right)^{21}+\frac{1}{38}\left(\sqrt{1+x^2}+x\right)^{19}+c$

(4) $\frac{1}{21}\left(\sqrt{1+x^2}+x\right)^{21}+\frac{1}{19}\left(\sqrt{1+x^2}+x\right)^{20}+c$

**Answer (3)**

**Sol.** $I=\int\left(\sqrt{1+x^2}+x\right)^{20}dx$

Let $x = \tan\theta$

$\therefore \quad dx = \sec^2\theta d\theta$

$$I=\int(\sec+\tan\theta)^{20}\cdot\sec^2\theta d\theta$$

$$=\int\sec\theta(\sec\theta+\tan\theta)^{20}\cdot\frac{(\sec\theta+\tan\theta)+(\sec\theta-\tan\theta)}{2}d\theta$$

$$=\frac{1}{2}\int\sec\theta(\sec\theta+\tan\theta)(\sec\theta+\tan)^{20}d\theta$$

$$+\frac{1}{2}\int\sec\theta(\sec+\tan\theta)^{20}(\sec\theta-\tan\theta)d\theta$$

$$=\frac{1}{2}\int\sec\theta(\sec\theta+\tan\theta)(\sec\theta+\tan\theta)^{20}d\theta$$

$$+\frac{1}{2}\int \sec\theta\cdot(\sec\theta+\tan\theta)\cdot(\sec\theta+\tan\theta)^{18}d\theta$$

Let $\sec\theta + \tan\theta = u$

$\Rightarrow \sec\theta(\sec\theta + \tan\theta) = \frac{du}{d\theta}$

$$=\frac{1}{2}\int u^{20}du+\frac{1}{2}\int u^{18}d\theta$$

$$=\frac{u^2}{42}+\frac{u^{19}}{38}+c$$

$$=\frac{1}{42}(\sec\theta+\tan\theta)^{21}+\frac{1}{38}(\sec\theta+\tan\theta)^{19}+c$$

$$=\frac{1}{42}\left(\sqrt{1+x^2}+x\right)^{21}+\frac{1}{38}\left(\sqrt{1+x^2}+x\right)^{19}+c$$

3. Let $L_1:\frac{x-1}{3}=\frac{y}{4}=\frac{z}{5}$ and $L_2:\frac{x-p}{2}=\frac{y}{3}=\frac{z}{4}$. If the shortest distance between $L_1$ and $L_2$ is $\frac{1}{\sqrt{6}}$. Then possible value of $p$ is

(1) 3

(2) 2

(3) 5

(4) 7

**Answer (2)**

**Sol.** S.D. between two given lines $L_1$ and $L_2$

$$=\frac{\begin{vmatrix} p-1 & 0 & 0 \\ 2 & 3 & 4 \\ 3 & 4 & 5 \end{vmatrix}}{|(2\hat{i}+3\hat{j}+4\hat{k})\times(3\hat{i}+4\hat{j}+5\hat{k})|}$$

$$=\left|\frac{(p-1)(-1)}{\sqrt{6}}\right|$$

$$\because \left|\frac{p-1}{\sqrt{6}}\right|=\frac{1}{\sqrt{6}}$$

$\therefore$ $P - 1 = \pm 1$

$\therefore$ $P = 0$ or $2$

4. Let $f(x)$ and $g(x)$ satisfies the functional equation $2g(x)+3g\left(\frac{1}{x}\right)=x$ and $2f(x)+3f\left(\frac{1}{x}\right)=x^2+5$.

If $\alpha=\int_1^2 f(x)dx$ and $\beta=\int_1^2 g(x)dx$ then $(9\alpha + \beta)$ is equal to

(1) $\frac{27+6\ln_2}{10}$

(2) $\frac{27-6\ln_2}{10}$

(3) $\frac{3}{5}\ln_2$

(4) $\frac{3}{5}\ln_2+\frac{7}{30}$

**Answer (1)**

**Sol.** $2g(x)+3g\left(\frac{1}{x}\right)=x \quad \Rightarrow 6g(x)+9g\left(\frac{1}{x}\right)=3x$

$2g\left(\frac{1}{x}\right)+3g(x)=\frac{1}{x} \quad \Rightarrow 6g(x)+4g\left(\frac{1}{x}\right)=\frac{2}{x}$

$\Rightarrow 5g\left(\frac{1}{x}\right)=3x-\frac{2}{x}$

$\Rightarrow g(x)=\frac{1}{5}\left(\frac{3}{x}-2x\right)$

Similarly,

$2f(x)+3f\left(\frac{1}{x}\right)=x^2+5 \Rightarrow 4f(x)+6f\left(\frac{1}{x}\right)=2x^2+10$

$3f(x)+2f\left(\frac{1}{x}\right)=5+\frac{1}{x^2} \quad 9f(x)+6f\left(\frac{1}{x}\right)=\frac{15+3}{x^2}$

$$\Rightarrow 5f(x)=\frac{15+3}{x^2}-2x^2-10$$

$$\Rightarrow f(x)=\frac{1}{5}\left[\frac{5+3}{x^2}-2x^2\right]$$

$$\alpha=\int_1^2 f(x)dx=\frac{11}{30^2} \text{ and } \beta=\int_1^2 g(x)dx=\frac{3}{5}\ln x-\frac{x^2}{5}\Big|_1^2$$

$$=\left(\frac{3}{5}\ln_2-\frac{4}{5}\right)-\left(\frac{-1}{5}\right)=\frac{3}{5}(\ln_2-1)$$

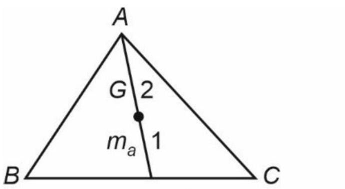
5. In $\Delta ABC$ if $A$ is (2, −3, 1), $B$ is (3, −1, −5) and $C$ is (1, −4, −4). If $G$ is the centroid of $\Delta ABC$, then $6((AG)^2 + (BG)^2 + (CG)^2)$ is equal to

(1) 164 (2) 265

(3) 625 (4) 628

**Answer (1)**

**Sol.**




$$m_a = \frac{1}{2}\sqrt{2b^2 + 2c^2 - a^2}$$

$$AB = \sqrt{1^2 + 2^2 + 6^2} = \sqrt{41}$$

$$BC = \sqrt{2^2 + 3^2 + 1^2} = \sqrt{14}$$

$$AC = \sqrt{1^2 + 1^2 + 5^2} = \sqrt{27}$$

$$AG^2 + BG^2 + CG^2 = \frac{1}{3}\left(AB^2 + BC^2 + AC^2\right)$$

$$= \frac{1}{3}(41 + 14 + 27)$$

$$6\left(AG^2 + BG^2 + CG^2\right) = 2(82)$$

$$= 164$$

6. If $m$ and $n$ are two digits numbers such that $m > n$ and $gcd\ (m, n) = 6$. Find the number of such pairs.

(1) 60 (2) 65

(3) 55 (4) 35

**Answer (2)**

**Sol.** $m, n$ two digit number

$m > n$

$\gcd(m, n) = 6$

$\Rightarrow m = 6a$

$n = 6b$ such that $\gcd(a, b) = 1, a > b$

Now, since $n \geq 10 \Rightarrow b \geq 2$

$m \leq 99 \Rightarrow a \leq 16$

We need to find $a, b$ such that

$\gcd(a, b) = 1, a > b$ and $a, b \in \{2, 3, ....16\}$

Let $b = 2$, $a$ will be all odd numbers

$a \in \{3, 5, 7, 9, 11, 13, 15\} \Rightarrow$ 7 pairs

Let $b = 3, a \in \{4, 5, 7, 8, 10, 11, 13, 14, 16\} \Rightarrow$ 9 pairs

Let $b = 4, a \in \{5, 7, 9, 11, 13, 15\} \Rightarrow$ 6 pairs

Let $b = 5, a \in \{6, 7, 8, 9, 11, 12, 13, 14, 16\} \Rightarrow$ 9 pairs

Let $b = 6, a \in \{7, 11, 13\} \Rightarrow$ 3 pairs

Let $b = 7, a \in \{8, 9, 10, 11, 12, 13, 14, 15, 16\} \Rightarrow$ 9 pairs

Let $b = 8, a \in \{9, 11, 13, 15\} \Rightarrow$ 4 pairs

Let $b = 9, a \in \{10, 11, 13, 14, 16\} \Rightarrow$ 5 pairs

Let $b = 10, a \in \{11, 13\} \Rightarrow$ 2 pairs

Let $b = 11, a \in \{12, 13, 14, 15, 16\} \Rightarrow$ 5 pairs

Let $b = 12, a \in \{13\} \Rightarrow$ 1 pair

Let $b = 13, a \in \{14, 15, 16\} \Rightarrow$ 3 pairs

Let $b = 14, a \in \{15\} \Rightarrow$ 1 pair

Let $b = 15, a \in \{16\} \Rightarrow$ 1 pair

Total $\Rightarrow$ 65 numbers

7. The sum of three terms in A.P. "$A$" is 36 and product is $p$ and for A.P. "$B$" sum is 36 and product is $q$ of three terms and $\frac{p+q}{p-q} = \frac{19}{5}$, given $D = d + 3$. Then the value of $p–q$. (where $d$ and $D$ are common difference of A.P. "$A$" and "$B$", respectively)

(1) 620 (2) 540

(3) 510 (4) 720

**Answer (1)**

**Sol.** Let the terms to $a_1 - d,\ a_1, a_1 - d$, and

$a_2 - D, ,\ a_2, a_2 + D$

$a_1 - d + a_1, a_1 + d = 36 \Rightarrow a_1 - 12$

$a_1 = a_2 = 12$

$(a_1 - d)\ (a_1)\ (a_1 + d) = p$

$\frac{p+q}{p-q} = \frac{19}{5} \Rightarrow 5p + 5q = 19p - 19q$

$\Rightarrow\ 24q = 14p \quad \Rightarrow 12q = 7p$

$12(12 - D)\ (12)\ (12 + D) = 7(12 - d)\ 12\ (12 + d)$

$\Rightarrow\ 12(9 - d)\ (15 + d) = 7(12 - d)\ (12 + d)$

$=\ 12(135 - 6d - d^2) = 7(144 - d^2)$

$= \quad 5d^2 + 72d - 612 = 0 \quad \Rightarrow \quad (5d - 102)(d - 6) = 0$

$\Rightarrow \quad d = 6, D = 9$

$P = (12 - 6)(12)(12 + 6) = 6 \times 12 \times 18$

$q = (12 - 9)(12)(12 + 9) = 3 \times 12 \times 21$

$p - q = 12 \times 9(12 - 7) = 108 \times 5 = 540$

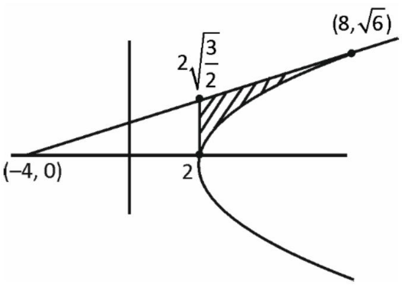
8. The area bounded between the tangent of a parabola $y^2 = x - 2$ which passes through $(-4, 0)$ with positive slope, $x$-axis, and the parabola is (in square units)

(1) $\frac{7\sqrt{6}}{2}$ (2) $\sqrt{6}$

(3) $\frac{3\sqrt{6}}{2}$ (4) $\frac{9}{2}\sqrt{6}$

**Answer (4)**

**Sol.**




$y = (x-2)m + \frac{1}{4m}$

using $y = mx + \frac{a}{m}$ for $y^2 = x - 2$

$\Rightarrow \quad m = \pm\frac{1}{\sqrt{24}}$

$\Rightarrow$ line is $\sqrt{24}y = x + 4$

Area of triangle $= \frac{1}{2} \times 6 \times \sqrt{\frac{3}{2}} = 3\sqrt{\frac{3}{2}} = \sqrt{\frac{27}{2}} = 3\sqrt{\frac{3}{2}}$

$= \frac{3}{2}\sqrt{6}$

Other area $= \int_2^8 \frac{x+4}{\sqrt{24}} - \sqrt{x-2}$

$$\left.\frac{x^2}{\sqrt{24}} + \frac{4x}{\sqrt{24}} - \frac{(x-2)^{3/2}}{\frac{3}{2}}\right|_2^8 = \left(\frac{64+32}{\sqrt{24}} - \frac{6\sqrt{6}}{\frac{3}{2}}\right) - \left(\frac{4+8}{\sqrt{24}} - 0\right)$$

$$= \frac{96 - 4\sqrt{6}}{\sqrt{24}} - \frac{12}{\sqrt{24}} = \frac{84 - 4\sqrt{6}}{2\sqrt{6}}$$

$$= \frac{84 - 48}{2\sqrt{6}} = \frac{36}{2\sqrt{6}} = 3\sqrt{6}$$

9. Let $f(x) = \log_2(\log_3(\log_7)(8 - \log_2(x^2 + 5x + 6))))$ where $(x < -3)$ has domain $(\alpha, \beta)$ and $g(x) = \sin^{-1}\left(\frac{2x^2 + x + 1}{3x + 5}\right)$ has domain $[\gamma, \delta]$. Then the value of $\alpha^2 + \beta^2 + \gamma^2 + \delta^2$ equals to

(1) 20 (2) 19

(3) 18 (4) 22

**Answer (4)**

**Sol.** $\log_2(\log_3(\log_7(8 - \log_2(x^2 + 5x + 6))))$

$\log_3(\log_7(8 - \log_2(x^2 + 5x + 6))) > 0$

$\log_2(8 - \log_2(x^2 + 5x + 6)) > 1$

$8 - \log_2(x^2 + 5x + 6)) > 7$

$-\log_2(x^2 + 5x + 6) > -1$

$\log_2(x^2 + 5x + 6) < 1$

$x^2 + 5x + 6 < 2$

$x^2 + 5x + 4 < 0$

$(x + 4)(x + 1) < 0$ ...(1)

$\text{Log}_7(8 - \log_2(x^2 + 5x + 6)) > 0$

$8 - \log_2(x^2 + 5x + 6) > 1$

$7 > \log_2(x^2 + 5x + 6)$

$2^7 > x^2 + 5x + 6$

$-\log_2(x^2 + 5x + 6) > -1$

$\Rightarrow \quad x^2 + 5x + 6) < 128$

$\Rightarrow \quad x = \frac{-5 \pm \sqrt{25 + 513}}{2}$

$x = \frac{-5 \pm \sqrt{513}}{2}$ ...(2)

$8 - \log_2(x^2 + 5x + 6) > 0$

$\log_2(x^2 + 5x + 6) < 8$

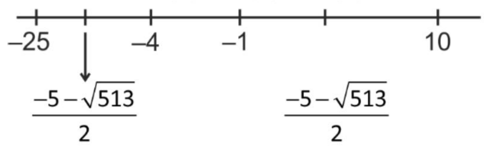
$x^2 + 5x + 6 < 2^8$

$x^2 + 5x + 6 < 256$

$\Rightarrow\ x^2 + 5x - 250 < 0$

$\Rightarrow\ x^2 + 25x - 10x - 250 < 0$ ...(3)

Intersection of (1) and (2) and (3) is




$\frac{-5-\sqrt{5,3}}{2}$

$x \in (-4, 3)$

Also $1 \le \frac{2x^2+x+1}{3x+5} \le 1$

$\Rightarrow\ x \in [-1, 2]$

$\Rightarrow\ \alpha^2 + \beta^2 + \gamma^2 + \delta^2 = 16 + 9 + 1 + 4 \Rightarrow 30$

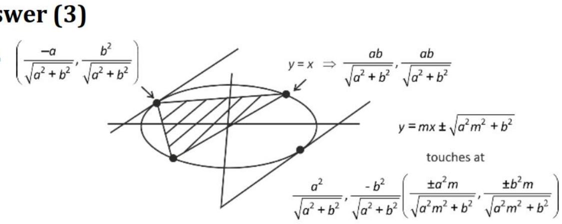
10. Ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ the line $y = x + p$ is a tangent on it and touches at points $P$ and $Q$. Also if the line $y = x$ intersects ellipse at $R$ and $S$. Then area of quadrilateral $PQRS$ is (Where $a = 3$ and $b = 4$)

(1) 12 (2) 10

(3) 24 (4) 20

**Answer (3)**

**Sol.**




$\Rightarrow$ For $m = 1$

$$A_1 = \frac{1}{2}\begin{vmatrix} \frac{ab}{\sqrt{a^2+b^2}} & \frac{ab}{\sqrt{a^2+b^2}} & 1 \\ \frac{-ab}{\sqrt{a^2+b^2}} & \frac{-ab}{\sqrt{a^2+b^2}} & 1 \\ \frac{-a^2}{\sqrt{a^2+b^2}} & \frac{b^2}{\sqrt{a^2+b^2}} & 1 \end{vmatrix}$$

$C_1 \to C_1 + C_2$

$$A_1 = \frac{1}{2}\begin{vmatrix} 0 & 0 & 2 \\ \frac{-ab}{\sqrt{a^2+b^2}} & \frac{-ab}{\sqrt{a^2+b^2}} & 1 \\ \frac{-a^2}{\sqrt{a^2+b^2}} & \frac{b^2}{\sqrt{a^2+b^2}} & 1 \end{vmatrix}$$

$$A_1 = \frac{1}{2}\left(2 \cdot \frac{ab^3 + a^3b}{(a^2+b^2)}\right) = \frac{ab(a^2+b^2)}{(a^2+b^2)} = ab$$

Similarly, $A_2 = ab$

Total area of quadrilateral is $2ab$ for $a = 4$, $b = 3$

Area = 2(4)(3) = 24

11. Given data 2, 3, 3, 4, 7, 5, $a$, $b$ where mean is 4 and S.D is 1.5. Find the mean deviation about mode.

(1) $\frac{19}{8}$ (2) $\frac{9}{8}$

(3) $\frac{11}{8}$ (4) $\frac{5}{8}$

**Answer (2)**

**Sol.** $\frac{2+3+3+4+7+5+9}{8} = 4$

$\Rightarrow\ a + b = 8$

$(1.5)^2 = \frac{2+3+3+4+7+5+9^2+6^2}{8} - (4)^2$

$\Rightarrow\ a^2 + b^2 = 34$

$\therefore\ a = 3, b = 5$

$\therefore$ Mode = 3

Mean deviation about mode = $\frac{1+1+3+2+2}{8}$

$= \frac{9}{8}$

12.

13.

14.

15.

16.

17.

18.

19.

20.

## SECTION - B

**Numerical Value Type Questions:** This section contains 5 Numerical based questions. The answer to each question should be rounded-off to the nearest integer.

21. If $\alpha$ be the non real root of the equation $1 + x + x^2 = 0$.

Find $n$ if $\sum_{k=1}^{n}\left(\alpha^k + \frac{1}{\alpha^k}\right)^2 = 20$.

**Answer (11)**

**Sol.** $\alpha$ is root of equation $1 + x + x^2 = 0$, $\alpha = \omega$ or $\omega^2$

$$\left(\alpha^k + \frac{1}{\alpha^k}\right)^2 = \alpha^{2k} + \frac{1}{\alpha^{2k}} + 2 = \left(\omega^k\right) = \left(\frac{1}{\omega^k}\right) + 2$$

$$\Rightarrow \omega^k + \frac{1}{\omega^k} + 2 = \begin{cases} 4 \text{ , 3 divides k} \\ 1 \text{ , 3 doesn't divide k} \end{cases}$$

$$\Rightarrow \sum_{K=1}^{n}\left(\alpha^k + \frac{1}{\alpha^k}\right)^2 = 20$$

$(1 + 1 + 4) + (1 + 1 + 4) + (1 + 1 + 4) + (1 + 1) = 20$

$\Rightarrow n = 11$

22. Let $A = \{-3, -2, -1, 0, 1, 2, 3\}$ and $xRy \Rightarrow 2x - y \in \{0,1\}$. If $l$ is number of elements in given relation, $m$ and $n$ are minimum number of elements to be added to make it reflexive and symmetric respectively. Then $l + m + n$ equals to

**Answer (17)**

**Sol.** $2x - y = 0$

$\Rightarrow 2x = y$

$\{(-1, -2), (0, 0), (1, 2)\}$

$2x - y = 1$

$\Rightarrow 2x = 1 + y$

$\{(-1, -3), (0, -1), (1, 1), (2, 4)\}$

$\therefore R = \{(-1, -2), (-1, -3), (0, 0), (1, 2), (0, -1), (1, 1), (2, 4)\}$

$\therefore l = 7$

$m = 7 - 2 = 5 \equiv \{(-3, -3), (-2, -2), (-1, -1), (2, 2), (3, 3\}$

$n = 5 \equiv \{(-2, -1), (-3, -1), (2, 1), (-1, 0), (4, 2\}$

$\therefore l + m + n = 17$

23. If $1^2 \cdot {}^{15}C_1 + 2^2 \cdot {}^{15}C_2 + \ldots\ldots + 15^2 \cdot {}^{15}C_{15}$ is equal to $2^n \cdot 3^m \cdot 5^k$, then $m + n + k$ is equal to

**Answer (19)**

**Sol.** $\sum_{r=1}^{15} r^2\,{}^{15}C_r \qquad \left(r\,{}^nC_r = n\,{}^{n-1}C_{r-1}\right)$

$= 15\sum_{r=1}^{15} r.{}^{14}C_{r-1}$

$= 15\sum_{r=1}^{15} (r-1+1)\,{}^{14}C_{r-1}$

$= 15\sum_{r=1}^{15} (r-1)\,{}^{14}C_{r-1} + 15\sum_{r=1}^{15} {}^{14}C_{r-1}$

$15\cdot\sum_{r=0}^{14} r\,{}^{14}C_r + 15\cdot(2^{14})$

$= 15\times 14\sum_{r=0}^{14} {}^{13}C_{r-1} + 15\cdot 2^{14}$

$= 15 \times 14\cdot 2^{13} + 15\cdot 2^{14}$

$= 2^{14}(15 \times 7 + 15)$

$= 2^{14} \times 15(8)$

$= 2^{17}\cdot 3\cdot 5$

$\therefore n + m + k = 19$

24. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ and $A^n = A^{n-1} + A^2 - I \; \forall \; n \geq 3$, then sum of all elements of $A^{50}$ is

**Answer (53.00)**

**Sol.** If $A=\begin{bmatrix}1&0&0\\1&0&1\\0&1&0\end{bmatrix}$

$\Rightarrow$ $A^2=\begin{bmatrix}1&0&0\\1&1&0\\1&0&1\end{bmatrix}, A^3=\begin{bmatrix}1&0&0\\2&0&1\\1&1&0\end{bmatrix}, A^4=\begin{bmatrix}1&0&0\\2&1&0\\2&0&1\end{bmatrix}$

$\Rightarrow$ $A^5=\begin{bmatrix}1&0&0\\3&0&1\\2&1&0\end{bmatrix}, A^6=\begin{bmatrix}1&0&0\\3&1&0\\3&0&1\end{bmatrix}$, similarly

$A^5=\begin{bmatrix}1&0&0\\25&1&0\\25&0&1\end{bmatrix}$

$\Rightarrow$ Sum of elements = 53

25.