JEE Main Online Exam 2020

Question with Solutions

3rd September 2020 | Shift-I

MATHEMATICS

Q.1 The proposition $p \to \sim(p \wedge \sim q)$ is equivalent to

(1) $(\sim p) \vee q$ (2) $(\sim p) \vee (\sim q)$ (3) q (4) $(\sim p) \wedge q$

Ans. [1]

Sol. $p \to \sim(p \wedge \sim q)$

$= \sim p \vee \sim(p \wedge \sim q)$

$= \sim p \vee \sim p \vee q$

$= \sim(p \wedge q) \vee q$

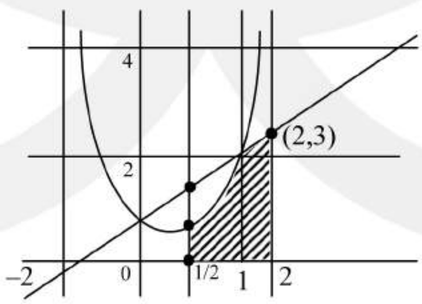
$= \sim p \vee q$

Q.2 The area (in sq. units) of the region $\{(x, y) : 0 \le y \le x^2 + 1, 0 \le y \le x + 1, \frac{1}{2} \le x \le 2\}$ is

(1) $\frac{23}{6}$ (2) $\frac{79}{24}$ (3) $\frac{79}{16}$ (4) $\frac{23}{16}$

Ans. [2]

Sol. $0 \le y \le x^2 + 1, 0 \le y \le x + 1, \frac{1}{2} \le x \le 2$



Required area $= \int_{1/2}^{1}(x^2+1)dx + \frac{1}{2}(2+3)\times 1$

$= \frac{19}{24} + \frac{5}{2} = \frac{79}{24}$

Q.3 If the number of integral terms in the expansion of $(3^{1/2} + 5^{1/8})^n$ is exactly 33, then the least value of n is-

(1) 128 (2) 264 (3) 256 (4) 248

Ans. [3]

Sol. $T_{r+1} = {}^nC_r (3)^{\frac{n-r}{2}} (5)^{\frac{r}{8}}$ $(n \geq r)$

Clearly r should be a multiple of 8.

$\therefore$ there are exactly 33 integral terms

possible values of r can be

0, 8, 16, ..., 32×8

$\therefore$ least value of n = 256.

Q.4 $2\pi - \left(\sin^{-1}\frac{4}{5} + \sin^{-1}\frac{5}{13} + \sin^{-1}\frac{16}{65}\right)$ is equal to-

(1) $\frac{3\pi}{2}$ (2) $\frac{7\pi}{4}$ (3) $\frac{\pi}{2}$ (4) $\frac{5\pi}{4}$

Ans. [1]

Sol. $2\pi - \left(\sin^{-1}\left(\frac{4}{5}\right) + \sin^{-1}\left(\frac{5}{13}\right) + \sin^{-1}\left(\frac{16}{65}\right)\right)$

$= 2\pi - \left(\tan^{-1}\left(\frac{4}{3}\right) + \tan^{-1}\left(\frac{5}{12}\right) + \tan^{-1}\left(\frac{16}{63}\right)\right)$

$= 2\pi - \left(\tan^{-1}\left(\frac{63}{16}\right) + \tan^{-1}\left(\frac{16}{63}\right)\right)$

$= 2\pi - \frac{\pi}{2} = \frac{3\pi}{2}$

Q.5 The lines

$\vec{r} = (\hat{i} - \hat{j}) + l(2\hat{i} + \hat{k})$ and

$\vec{r} = (2\hat{i} - \hat{j}) + m(\hat{i} + \hat{j} - \hat{k})$

(1) intersect for all values of l and m

(2) do not intersect for any values of l and m

(3) intersect when $l = 2$ and $m = \frac{1}{2}$

(4) intersect when $l = 1$ and m = 2

Ans. [2]

Sol. $\vec{r} = \hat{i}(1 + 2\ell) + \hat{j}(-1) + \hat{k}(\ell)$

$\vec{r} = \hat{i}(2 + m) + \hat{j}(m - 1) + \hat{k}(-m)$

For intersection

$1 + 2\ell = 2 + m$ ....(i)

$-1 = m - 1$ ....(ii)

$\ell = -m$ ....(iii)

from (ii) m = 0

from (iii) $\ell = 0$

These values of m and ℓ do not satisfy equation (1).

Hence the two lines do not intersect for any values of ℓ and m

Q.6 $\int_{-\pi}^{\pi} |\pi - |x|| \, dx$ is equal to-

(1) π^2 (2) $\frac{\pi^2}{2}$ (3) $2\pi^2$ (4) $\sqrt{2}\pi^2$

Ans. [1]

Sol. $\int_{-\pi}^{\pi} |\pi - |x|| \, dx = 2\int_{0}^{\pi} |\pi - x| \, dx$

$= 2\int_{0}^{\pi} (\pi - x) dx$

$= 2\left[\pi x - \frac{x^2}{2}\right]_0^{\pi} = \pi^2$

Q.7 Consider the two sets :

A = {m ∈ R : both the roots of $x^2 - (m+1)x + m + 4 = 0$ are real} and B = {–3, 5}.

Which of the following is not true ?

(1) $A \cap B = \{-3\}$ (2) $A \cup B = R$

(3) $A - B = (-\infty, -3) \cup (5, \infty)$ (4) $B - A = (-3, 5)$

Ans. [3]

Sol. $A : B \geq 0$

$\Rightarrow (m + 1)^2 - 4(m + 4) \geq 0$

$\Rightarrow m^2 + 2m + 1 - 4m - 16 \geq 0$

$\Rightarrow m^2 - 2m - 15 \geq 0$

$\Rightarrow (m - 5)(m + 3) \geq 0$

$\Rightarrow m \in (-\infty, -3] \cup [5, \infty)$

$\therefore A = (-\infty, -3] \cup [5, \infty)$

$B = [-3, 5]$

$A - B = (-\infty, -3) \cup [5, \infty)$

$A \cap B = \{-3\}$

$B - A = (-3, 5)$

$A \cup B = R$

Q.8 If α and β are the roots of the equation $x^2 + px + 2 = 0$ and $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ are the roots of the equation $2x^2 + 2qx + 1 = 0$, then $\left(\alpha - \frac{1}{\alpha}\right)\left(\beta - \frac{1}{\beta}\right)\left(\alpha + \frac{1}{\beta}\right)\left(\beta + \frac{1}{\alpha}\right)$ is equal to-

(1) $\frac{9}{4}(9 - q^2)$ (2) $\frac{9}{4}(9 + q^2)$ (3) $\frac{9}{4}(9 - p^2)$ (4) $\frac{9}{4}(9 + p^2)$

Ans. [3]

Sol. α, β are roots of $x^2 + px + 2 = 0$

$\Rightarrow \alpha^2 + p\alpha + 2 = 0$ & $\beta^2 + p\beta + 2 = 0$

$\Rightarrow \frac{1}{\alpha}, \frac{1}{\beta}$ are roots of $2x^2 + px + 1 = 0$

But $\frac{1}{\alpha}, \frac{1}{\beta}$ are roots of $2x^2 + 2qx + 1 = 0$

$\Rightarrow p = 2q$

Also $\alpha + \beta = -p$ $\alpha\beta = 2$

$$\left(\alpha - \frac{1}{\alpha}\right)\left(\beta - \frac{1}{\beta}\right)\left(\alpha + \frac{1}{\beta}\right)\left(\beta + \frac{1}{\alpha}\right)$$

$$= \left(\frac{\alpha^2 - 1}{\alpha}\right)\left(\frac{\beta^2 - 1}{\beta}\right)\left(\frac{\alpha\beta + 1}{\beta}\right)\left(\frac{\alpha\beta + 1}{\alpha}\right)$$

$$= \frac{(-p\alpha - 3)(-p\beta - 3)(\alpha\beta + 1)^2}{(\alpha\beta)^2}$$

$$= \frac{9}{4}(p\alpha\beta + 3p(\alpha + \beta) + 9)$$

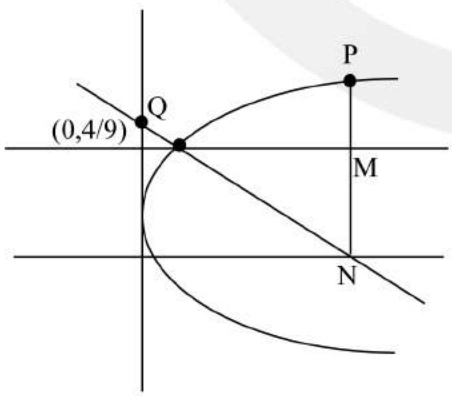
$$= \frac{9}{4}(9 - p^2) = \frac{9}{4}(9 - 4q^2)$$

Q.9 Let P be a point on the parabola, $y^2 = 12x$ and N be the foot of the perpendicular drawn from P on the axis of the parabola A line is now drawn through the mid-point M of PN, parallel to its axis which meets the parabola at Q. If the y-intercept of the line NQ is $\frac{4}{3}$, then-

(1) PN = 4 (2) MQ = $\frac{1}{4}$ (3) PN = 3 (4) MQ = $\frac{1}{3}$

Ans. [2]

Sol.



Let $P = (3t^2, 6t)$; $N = (3t^2, 0)$
$M = (3t^2, 3t)$
Equation of MQ : $y = 3t$
$\therefore Q = \left(\frac{3}{4}t^2, 3t\right)$
Equation of NQ
$$y = \frac{3t}{\left(\frac{3}{4}t^2 - 3t^2\right)}(x - 3t^2)$$
y-intercept of NQ $= 4t = \frac{4}{3} \Rightarrow t = \frac{1}{3}$

$\therefore MQ = \frac{9}{4}t^2 = \frac{1}{4}$

$PN = 6t = 2$

Q.10 If $\Delta = \begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ 2x-3 & 3x-4 & 4x-5 \\ 3x-5 & 5x-8 & 10x-17 \end{vmatrix} = Ax^3 + Bx^2 + Cx + D$, then B + C is equal to-

(1) –3 (2) 9 (3) –1 (4) 1

Ans. [1]

Sol. $\Delta = \begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ 2x-3 & 3x-4 & 4x-5 \\ 3x-5 & 5x-8 & 10x-17 \end{vmatrix}$

$= Ax^3 + Bx^2 + Cx + D$

$R_2 \to R_2 - R_1$ $R_3 \to R_3 - R_2$

$\Delta = \begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ x-1 & x-1 & x-1 \\ x-2 & 2(x-2) & 6(x-2) \end{vmatrix}$

$= (x-1)(x-2) \begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ 1 & 1 & 1 \\ 1 & 2 & 6 \end{vmatrix}$

$= -3(x-1)^2(x-2) = -3x^3 + 12x^2 - 15x + 6$

$\therefore B + C = 12 - 15 = -3$

Q.11 If the first term of an A.P. is 3 and the sum of its first 25 terms is equal to the sum of its next 15 terms, then the common difference of this A.P. is-

(1) $\frac{1}{7}$ (2) $\frac{1}{4}$ (3) $\frac{1}{5}$ (4) $\frac{1}{6}$

Ans. [4]

Sol. Sum of 1^{st} 25 terms = sum of its next 15 terms

$\Rightarrow (T_1 + ... + T_{25}) = (T_{26} + ... + T_{40})$

$\Rightarrow (T_1 + ... + T_{40}) = 2(T_1 + ... + T_{25})$

$\Rightarrow \frac{40}{2}$ [2 × 3 + (39 d)] = 2 × $\frac{25}{2}$ [2 × 2 + 24 d]

$\Rightarrow$ d = $\frac{1}{6}$

Q.12 A dice is thrown two times and the sum of the scores appearing on the dice is observed to be a multiple of 4. Then the conditional probability that the score 4 has appeared atleast once is-

(1) $\frac{1}{8}$ (2) $\frac{1}{9}$ (3) $\frac{1}{3}$ (4) $\frac{1}{4}$

Ans. [2]

Sol. A : Sum obtained is a multiple of 4.

A = {(1, 3), (2, 2), (3, 1), (2, 6), (3, 5), (4, 4), (5, 3), (6, 2), (6, 6)}

B : Score of 4 has appeared at least once.

B = {(1, 4), (2, 4), (3, 4), (4, 4), (5, 4), (6, 4), (4, 1), (4, 2), (4, 3), (4, 5), (4, 6)}

Required probability = $P\left(\frac{B}{A}\right) = \frac{P(B \cap A)}{P(A)}$

$= \frac{1/36}{9/36} = \frac{1}{9}$

Q.13 The value of $(2 \,.\, {}^1P_0 - 3 \,.\, {}^2P_1 + 4 \,.\, {}^3P_2 - \ldots$ up to 51^{th} term) + (1! – 2! + 3! – .... up to 51^{th} term) is equal to-

(1) 1 + (52) ! (2) 1 – 51(51) ! (3) 1 (4) 1 + (51) !

Ans. [1]

Sol. $S = (2.{}^1p_0 - 3.\,{}^2P_1 + 4.\,{}^3p_2$ .... upto 51 terms)

+ (1! + 2! + 3! .... upto 51 terms)

$[\because {}^np_{n-1} = n!]$

$\therefore$ S = (2 × 1! – 3 × 2! + 4 × 3! .... 52.51!)

+ (1! – 2! + 3! ....(51) !)

= (2! – 3! + 4! .... + 52!)

+ (1 ! – 2! + 3! – 4! + ... + (51) !)

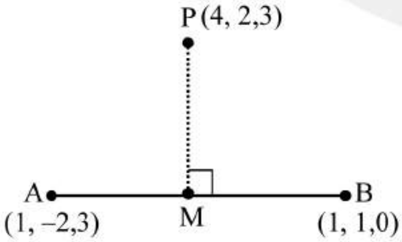
= 1 ! + 52 !.

Q.14 The foot of the perpendicular drawn from the point (4, 2, 3) to the line joining the points (1, –2, 3) and (1, 1, 0) lies on the plane.

(1) x + 2y – z = 1 (2) x – y – 2z = 1 (3) x – 2y + z = 1 (4) 2x + y – z = 1

Ans. [4]

Sol.



Equation of AB = $\vec{r} = (\hat{i} + \hat{j}) + \lambda(3\hat{j} - 3\hat{k})$

Let coordinates of M = (1, (1 + 3λ), – 3λ),

$\overrightarrow{PM} = -3\hat{i} + (3\lambda - 1)\hat{j} - 3(\lambda + 1)\hat{k}$

$\overrightarrow{AB} = 3\hat{j} - 3\hat{k}$

$\therefore \overrightarrow{PM} \perp \overrightarrow{AB} \Rightarrow \overrightarrow{PM} \cdot \overrightarrow{AB} = 0$

$\Rightarrow 3(3\lambda - 1) + 9(\lambda + 1) = 0$

$\Rightarrow \lambda = -\frac{1}{3}$

$\therefore M = (1, 0, 1)$

Clearly M lies on $2x + y - z = 1$.

Q.15 Let [t] denote the greatest integer ≤ t. If for some $\lambda \in R - \{0, 1\}$, $\lim_{x\to 0}\left|\frac{1 - x + |x|}{\lambda - x + [x]}\right| = L$, then L is equal to-

(1) $\frac{1}{2}$ (2) 0 (3) 2 (4) 1

Ans. [3]

Sol. LHL : $\lim_{x\to 0^-}\left|\frac{1 - x - x}{\lambda - x - 1}\right| = \left|\frac{1}{\lambda - 1}\right|$

RHL : $\lim_{x\to 0^+}\left|\frac{1 - x + x}{\lambda - x + 1}\right| = \left|\frac{1}{\lambda}\right|$

For existence of limit

LHL = RHL

$\Rightarrow \frac{1}{|\lambda - 1|} = \frac{1}{|\lambda|} \Rightarrow \lambda = \frac{1}{2}$

$\therefore L = \frac{1}{|\lambda|} = 2$

Q.16 The function, $f(x) = (3x - 7)x^{2/3}$, $x \in R$, is increasing for all x lying in

(1) $(-\infty, 0) \cup \left(\frac{3}{7}, \infty\right)$ (2) $(-\infty, 0) \cup \left(\frac{14}{15}, \infty\right)$

(3) $\left(-\infty, \frac{14}{15}\right)$ (4) $\left(-\infty, \frac{14}{15}\right) \cup (0, \infty)$

Ans. [2]

Sol. $f(x) = (3x - 7)\,x^{2/3}$

$\Rightarrow f(x) = 3x^{5/3} - 7x^{2/3}$

$\Rightarrow f(x) = 5x^{2/3} - \frac{14}{3x^{1/3}}$

$= \frac{15x - 14}{3x^{1/3}} > 0$

+ | – | +

0 14/15

$\therefore f'(x) > 0 \;\forall\; x \in (-\infty, 0) \cup \left(\frac{14}{15}, \infty\right)$

Q.17 The solution curve of differential equation, $(1 + e^{-x})(1 + y^2)\frac{dy}{dx} = y^2$, which passes through the point (0, 1) is-

(1) $y^2 + 1 = y\left(\log_e\left(\frac{1+e^x}{2}\right)+2\right)$

(2) $y^2 = 1 + y\log_e\left(\frac{1+e^x}{2}\right)$

(3) $y^2 = 1 + y\log_e\left(\frac{1+e^{-x}}{2}\right)$

(4) $y^2 + 1 = y\left(\log_e\left(\frac{1+e^{-x}}{2}\right)+2\right)$

Ans. [2]

Sol. $(1 + e^{-x})(1 + y^2)\frac{dy}{dx} = y^2$

$\Rightarrow (1 + y^{-2})\, dy = \left(\frac{e^x}{1+e^x}\right) dx$

$\Rightarrow \left(y - \frac{1}{y}\right) = \ell n\,(1 + e^x) + c$

$\therefore$ It passes through (0, 1) $\Rightarrow c = -\,\ell n2$

$\Rightarrow y^2 = 1 + y\,\ell n\left(\frac{1+e^x}{2}\right)$

Q.18 A hyperbola having the transverse axis of length $\sqrt{2}$ has the same foci as that of the ellipse $3x^2 + 4y^2 = 12$, then this hyperbola does not pass through which of the following points ?

(1) $\left(\frac{\sqrt{3}}{2}, \frac{1}{\sqrt{2}}\right)$ (2) $\left(-\sqrt{\frac{3}{2}}, 1\right)$ (3) $\left(\frac{1}{\sqrt{2}}, 0\right)$ (4) $\left(1, -\frac{1}{\sqrt{2}}\right)$

Ans. [1]

Sol. Ellipse : $\frac{x^2}{4} + \frac{y^2}{3} = 1$

eccentricity $= \sqrt{1-\frac{3}{4}} = \frac{1}{2}$

$\therefore$ foci = $(\pm 1, 0)$

for hyperbola, given $2a = \sqrt{2} \Rightarrow a = \frac{1}{\sqrt{2}}$

$\therefore$ hyperbola will be

$$\frac{x^2}{1/2} - \frac{y^2}{b^2} = 1$$

eccentricity $= \sqrt{1+2b^2}$

$\therefore$ foci $= \left(\pm\sqrt{\frac{1+2b^2}{2}}, 0\right)$

$\because$ Ellipse and hyperbola have same foci

$\Rightarrow \sqrt{\frac{1+2b^2}{2}} = 1$

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

$\therefore$ Equation of hyperbola : $\frac{x^2}{1/2} - \frac{y^2}{1/2} = 1$

$\Rightarrow x^2 - y^2 = \frac{1}{2}$

Clearly $\left(\sqrt{\frac{3}{2}}, \frac{1}{\sqrt{2}}\right)$ does not lie on it.

Q.19 If $y^2 + \log_e(\cos^2 x) = y$, $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$, then-

(1) $|y''(0)| = 2$
(2) $|y'(0)| + |y''(0)| = 3$
(3) $|y'(0)| + |y''(0)| = 1$
(4) $y''(0) = 0$

Ans. **[1]**

Sol. $y^2 + \ln(\cos^2 x) = y$ $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

for $x = 0$ $y = 0$ or 1

Differentiating wrt x

$\Rightarrow 2yy' - 2\tan x = y'$

At $(0, 0)$ $y' = 0$

At $(0, 1)$ $y' = 0$

Differentiating wrt x

$2yy'' + 2(y')^2 - 2\sec^2 x = y''$

At $(0, 0)$ $y'' = -2$

At $(0, 1)$ $y'' = 2$

$\therefore |y''(0)| = 2$

Q.20 For the frequency distribution :

Variate (x) :	x_1	x_2	x_3 .... x_{15}
Frequency (f) :	f_1	f_2	f_3 .... f_{15}

where $0 < x_1 < x_2 < x_3 < .... < x_{15} = 10$ and $\sum_{t=1}^{15} f_t > 0$, the standard deviation cannot be

(1) 1
(2) 4
(3) 2
(4) 6

Ans. **[4]**

Sol. $\because \sigma^2 \le \frac{1}{4}(M - m)^2$

Where M and m are upper and lower bounds of values of any random variable.

$\because \sigma^2 \le \frac{1}{4}(10-0)^2$

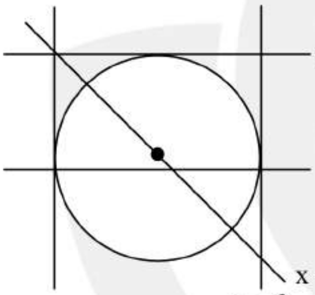
$\Rightarrow 0 < \sigma < 5$

$\therefore \sigma \ne 6.$

Q.21 The diameter of the circle, whose centre lies on the line x + y = 2 in the first quadrant and which touches both the lines x = 3 and y = 2, is __________ .

Ans. **[3]**

Sol.



$\because$ center lies on x + y = 2 and in 1st quadrant

center = $(\alpha, 2-\alpha)$

where $\alpha > 0$ and $2-\alpha > 0 \Rightarrow 0 < \alpha < 2$

$\because$ circle touches x = 3 and y = 2

$\Rightarrow |3-\alpha| = |2-(2-\alpha)| = \text{radius}$

$\Rightarrow |3-\alpha| = |\alpha| \Rightarrow \alpha = \frac{3}{2}$

$\therefore$ radius = α

$\Rightarrow$ Diameter = $2\alpha = 3$

Q.22 If $\lim_{x\to 0}\left\{\frac{1}{x^8}\left(1-\cos\frac{x^2}{2}-\cos\frac{x^2}{4}+\cos\frac{x^2}{2}\cos\frac{x^2}{4}\right)\right\} = 2^{-k}$, then the value of k is __________ .

Ans. **[8]**

Sol. $\lim_{x\to 0}\left\{\frac{1}{x^8}\left(1-\cos\frac{x^2}{2}-\cos\frac{x^2}{4}+\cos\frac{x^2}{2}\cos\frac{x^2}{4}\right)\right\} = 2^{-k}$

$$\Rightarrow \lim_{x\to 0}\frac{\left(1-\cos\frac{x^2}{2}\right)}{4\left(\frac{x^2}{2}\right)^2}\frac{\left(1-\cos\frac{x^2}{4}\right)}{16\left(\frac{x^2}{4}\right)^2} = \frac{1}{8}\times\frac{1}{32} = 2^{-k}$$

$\Rightarrow 2^{-8} = 2^{-k} \Rightarrow k = 8.$

Q.23 Let $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$, $x \in R$ and $A^4 = [a_{ij}]$. If $a_{11} = 109$, then a_{22} is equal to ________ .

Ans. [10]

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

$A^2 = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}\begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix} = \begin{bmatrix} x^2+1 & x \\ x & 1 \end{bmatrix}$

$A^4 = \begin{bmatrix} x^2+1 & x \\ x & 1 \end{bmatrix}\begin{bmatrix} x^2+1 & x \\ x & 1 \end{bmatrix}$

$= \begin{bmatrix} (x^2+1)^2 + x^2 & x(x^2+1)+x \\ x(x^2+1)+x & x^2+1 \end{bmatrix}$

$a_{11} = (x^2+1)^2 + x^2 = 109$

$\Rightarrow x = \pm 3$

$a_{22} = x^2 + 1 = 10$

Q.24 The value of $(0.16)^{\log_{2.5}\left(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+.....\text{to } \infty\right)}$ is equal to __________.

(1) (2) (3) (4)

Ans. [4]

Sol. $(0.16)^{\log_{2.5}\left(\frac{1}{3}+\frac{1}{3^2}+.............\text{ to } \infty\right)}$

$= \left(\frac{4}{25}\right)^{\log_{\left(\frac{5}{2}\right)}\left(\frac{1}{2}\right)}$

$= \left(\frac{1}{2}\right)^{\log_{\left(\frac{5}{2}\right)}\left(\frac{4}{25}\right)} = \left(\frac{1}{2}\right)^{-2} = 4$

Q.25 If $\left(\frac{1+i}{1-i}\right)^{m/2} = \left(\frac{1+i}{1-i}\right)^{n/3} = 1$, $(m, n \in N)$, then the greatest common divisor of the least values of m and n is

_________.

(1) (2) (3) (4)

Ans. [4]

Sol. $\left(\frac{1+i}{1-i}\right)^{m/2} = \left(\frac{1+i}{i-1}\right)^{n/3} = 1$

$\Rightarrow \left(\frac{(1+i)^2}{2}\right)^{m/2} = \left(\frac{(1+i)^2}{-2}\right)^{n/3} = 1$

$\Rightarrow (i)^{m/2} = (-i)^{n/3} = 1$

$\Rightarrow \frac{m}{2} = 4k_1$ and $\frac{n}{3} = 4k_2$

$\Rightarrow m = 8k_1$ and $n = 12\,k_2$

Least value of m = 8 and n = 12.

$\therefore$ GCD = 4