Guess Paper – 2014

Class – XII

Subject – Mathematics

Que- [01] Find $\int_{-\pi}^{\pi} \left(\sin^{-93} x + x^{295}\right) dx$.

Que- [02] Let A = {-1, 0, 1, 2}, B = {-4, -2, 0, 2} and $f, g : A \to B$ be functions defined by $f(x) = x^2 - x$, $x \in$ A and $g(x) = 2\left|x - \frac{1}{2}\right| - 1$, $x \in$ A are f and g equal. Justify your answer.

Que- [03] Prove that the curves $y^2 = 4ax$ and $xy = c^2$ cut at right angles if $c^4 = 32\,a^4$.

Que- [04] Find the equation of tangent to the curve $y = \sqrt{3x-2}$ which is parallel to the line $4x - 2y + 5 = 0$.

Que- [05] Evaluate : $\int_0^{\pi/2} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x} dx$.

Que- [06] Show that the function $f(x) = \begin{cases} \frac{e^{\frac{1}{x}} - 1}{e^{\frac{1}{x}} + 1} & if \quad x \neq 0 \\ 0 & if \quad x = 0 \end{cases}$ is discontinuous at x = 0 .

Que- [07] $Prove\ that \begin{vmatrix} a & b-c & c+b \\ a+c & b & c-a \\ a-b & b+a & c \end{vmatrix} = (a+b+c)(a^2+b^2+c^2)$.

Que- [08] Prove that: $4\tan^{-1}\frac{1}{5} - \tan^{-1}\frac{1}{70} + \tan^{-1}\frac{1}{99} = \frac{\pi}{4}$.

Que- [09] $Solve\ \sin^{-1} x + \sin^{-1}(1-x) = \cos^{-1} x$.

Que- [10] If $y = \log\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$, prove that $\frac{dy}{dx} = \frac{x-1}{2x(x+1)}$.

Que- [11] Evaluate: $\int \sqrt{\left(\frac{1-\sqrt{x}}{1+\sqrt{x}}\right)}\, dx$.

Que- [12] Evaluate: $\int \frac{dx}{(\sin x - 1)(\sin x + 4)}$.

P.T.O.

Que- [13] Using integration, find the area of the region $\{(x, y): |x-1| \le y \le \sqrt{5-x^2}\}$.

Que- [14] A cylinder of greatest volume is inscribed in a cone, show that (i) $R = \frac{2}{3} h \tan\alpha$ (ii) $H = \frac{1}{3} h$ (iii) Volume of the cylinder = $\frac{4}{27}\pi h^3 \tan^2\alpha$. (iv) r : R = 3 : 2. Where r, h, α are the radius, height and semi – vertical angle of the cone and R, H are the radius and height of the inscribed cylinder.

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