**Note:** Please attempt any 10 short questions from Question 2. Also, attempt both parts of Question 3. Cutting and removal of any content is strictly prohibited.

Question.No.01:-Choose the Right option. $(10 \times 1 = 10)$

| | | A. | B. | C. | D. |
|---|---|---|---|---|---|
| i | $e^{x ln2}$ this function is called | Logarithm function | Inverse Function | Exponential Function | Linear Function |
| ii | f($x$) = $\cos x + \sin x$ , is ……… function | Even | Odd | Both even and odd | Neither even and odd |
| iii | The function f(x) = $(x + 2)^2$ is | odd | even | Both even and odd | None of these |
| iv | The polynomial P(x)=2x⁴- 3x³ + 2x - 1 is the degree: | 5 | 6 | 4 | 7 |
| v | The area A of a circle as a function of its Circumference C is | $\frac{1}{2} Cr$ | $Cr$ | $2Cr$ | $\frac{C^2}{4 \pi}$ |
| vi | $\lim_{x \to 2} \sqrt{x^2 - 4} =$ | 2 | -2 | 0 | None |
| vii | $\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^{2n}$ is | $e$ | $\frac{1}{e}$ | $e^2$ | $\frac{1}{-e}$ |
| viii | $\lim_{x \to 0} (1 + 3x)^{\frac{2}{x}}$ is equal | $e^2$ | $e^6$ | $e^{-6}$ | None |
| ix | The function f(x) = $x^{\frac{2}{3}} + 6$ is | odd | even | Both even and odd | None of these |
| x | The polynomial P(x)=2x⁴-3x³+2x-1 is the degree: | 5 | 6 | 4 | 7 |

Question.No.02:-Solve all parts. (03x07=21)

| | |
|---|---|
| i. | Show that the parametric equation $x = a\, Cost$ and $y = a\, Sint$ represents the equation of circle $x^2 + y^2 = a^2$ |
| ii. | Determine whether the given function is even or odd? $f(x) = x\sqrt{x^2 + 5}$ |
| iii. | If $f(x) = \sqrt{x + 1}$ ; $g(x) = \frac{1}{x^2}$ then find $fog \ and \ gog$. |
| iv. | Express the volume V of a cube as a function of the area A of its base. |
| v. | Show that the parametric equation $x = acox\theta , y = bsin\theta$ represent the equation of $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ |
| vi. | Find $\frac{f(a+h)-f(a)}{h}$ and simplify $f(x) = 6x - 9$ vii) Prove that $\sinh 2x = 2\sinh x \ \cosh x$ |
| vii. | Evaluate the following by algebraic form $\lim_{x \to 2} \frac{x^3 - 8}{x^2 - x - 6}$ |
| viii. | Evaluate the following by algebraic form $\lim_{x \to 0} \frac{1 - \cos 2x}{x^2}$ |
| ix. | Express limit in term of e $\lim_{x \to \infty} \left(\frac{x}{1 + x}\right)^x$ |
| x. | Express limit in term of e $\lim_{n \to \infty} \left(1 + \frac{4}{n}\right)^n$ |

Attempt all Questions. (02x05=10)

| | |
|---|---|
| A. | Discuss the continuity of f(x) at x=c $f(x) = \begin{cases} 2x + 5 \ if \ x \leq 2 \\ 4x + 1 \ if \ x > 2 \end{cases}$ |
| B. | For Real Valued Function $(x) = (-x + 9)^3$ , Find $(a) \ f^{-1}(x) \ (b) \ f^{-1}(-1)$ And verify that $f(f^{-1}(x)) = f^{-1}(f(x)) = x$ |

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