1. 2.	If the function $f(x) = 2x^2$ (A) $(-\infty, 4)$ (c) $f(x) = x + 1/x, x \neq 0$ is more	B) (4, ∞)	(C) $(-\infty, 8]$	s in the interval (D) $(8, \infty)$
0		B) $ x  > 1$	(C) $ x  < 2$	(D) $ x  > 2$
3.	The function x* decreases	on the interval-		
	(A) (0, e)	(B) (0, 1)	$(C)\left(0,\frac{1}{e}\right)$	(D) None of these
1.	Function $f(x) = x^2(x-2)^2$	is-	tanx is increasing in	
	(A) increasing in (0, 1)	(2, ∞)	(B) decreasing in (0, 1	$)\cup(2,\infty)$
	(C) decreasing function		(D) increasing function	Historian 12: Proven
5.	If f and g are two decreas	ing function such that	fog is defined, then fog w	vill be-
	(A) increasing function		(B) decreasing function	
A	(C) neither increasing no	r decreasing	(D) None of these	zi (z) \
6.	If function $f(x) = 2x^2 + 3x^2$	x-mlogx is monotonic	decreasing in the interva	1(0, 1), then the least value
	of the parameter m is-			
_	(A) 7	(B) $\frac{15}{2}$	(C) $\frac{31}{4}$	(D) 8
7.	If $f(x) = x^3 - 10x^2 + 200x$	x - 10, then $f(x)$ is-	ODC C	YOUT
	(A) decreasing in $(-\infty, 1)$	0] and increasing in (10	,2BG	51001
	(B) increasing in $(-\infty, 10)$	o] and decreasing in (10	$(0,\infty)$	
	(C) increasing for every			
8	(A) f is not differentiable (C) f is even	ving statements does not $e$ at $x = 0$	(B) f is monotonic (D) f has an extremum	12 - 17 Investment
9	Number of critical poin	ts of the function, $f(x) =$	$= \frac{2}{3}\sqrt{x^3} - \frac{x}{2} + \int_{1}^{x} \left(\frac{1}{2} + \frac{1}{2}\right)^{x}$	$\cos 2t - \sqrt{t}$ dt
1	which lie in the interval (A) 2	(B) 4		(D) 8
	10. The value of K in order	that $f(x) = \sin x - \cos x$	- Kx + b decreases for al	l real values is given by-
	(A) K < 1	(B) K ≥ 1	(C) $K \ge \sqrt{2}$	(D) K < $\sqrt{2}$

11.	When $0 \le x \le 1$ , $f(x) =$	=  x  +  x - 1  is-	(31-1)				
1	(A) increasing	(B) decreasing	(C) constant	(D) None of these			
12.	Let f(x) and g(x) be	two continuous function	ns defined from $R \to R$	, such that $f(x_1) > f(x_2)$ and			
	$g(x_1) < g(x_2)$ , $\forall x_1 > x_2$ , then solution set of $f(g(\alpha^2 - 2\alpha)) > f(g(3\alpha - 4))$ is						
	(A) R	(B) ¢	(C) (1, 4)	(D) $R - [1, 4]$			
13.	If $2a + 3b + 6c = 0$ , th	en at least one root of the	equation $ax^2 + bx + c =$	0 lies in the interval-			
1	(A) (0, 1)	(B) (1, 2)	(C)(2,3)	(D) none			
14.	If the equation $a_n x^n$	If the equation $a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x = 0$ has a positive root $x = \alpha$ , then the equation					
	$na_n x^{n-1} + (n-1) a_{n-1} x$	$a_1 = 0$ has a pos	sitive root, which is-	Statement 2 : The fu			
	(A) Smaller than $\alpha$		(B) Greater than $\alpha$	Unctions in any inte			
	(C) Equal to α		(D) Greater than or e	The second secon			
15.	Landing Town Town Street Street	A value of C for which the conclusion of Mean values theorem holds for the function $f(x) = \log_e x$					
Jim	on the interval [1, 3]	-21 Space a jon of C themself	e : Statement 2 is true: S	(D) Statement 1 istin			
	(A) 2log <sub>3</sub> e	(B) $\frac{1}{2}\log_e 3$	(C) log <sub>3</sub> e	(D) $\log_e 3$			
	Give the constraint in a	Carried Total Park					
6	in fading to X of X smiths in	101 (x) = (x) 1 (x)	x cos	$\left(\frac{1}{x}\right)$ , $x \neq 0$ in the interval $x = 0$			
16.	The value of c in Lag	grange's theorem for the	function $f(x) = \begin{cases} 0 & \text{if } x > 0 \end{cases}$	(x) in the interval $y=0$			
VIII.	one a session Con will w)		a for which the function	to (exalter to see The Africa)			
	[-1, 1] is-						
	(A) 0		(B) $\frac{1}{2}$				
	Action to the leavest to		Create Centre	esitemo 2 + 21 + 25 = (2) t norman ant 11.			
	$(C) -\frac{1}{2}$		(D) Non existent in t	(D) Non existent in the interval			
-	LATE LATER TO			2 /2 · 1			
17.	If the function $f(x) = x^2$	$3-6x^2+ax+b$ defined or	n [1, 3], satisfies the roll	e's theorem for $c = \frac{2\sqrt{3} + 1}{\sqrt{3}}$ ,			
)		CT CHOICE TYPES		No			
	then- (A) $a = 11, b = 6$	(B) $a = -11$ , $b = 6$	(C) $a = 11, b \in R$	(D) None of these			
	(A) a - 11, b - 0	A STATE OF THE STA					
	(1	2/3	$\int \frac{\tan[x]}{x}$ , x	≠0			
18.	Given: $f(x) = 4 - \left(\frac{1}{2}\right)^{-1}$	-x	$g(x) = \begin{cases} \frac{\tan [x]}{x}, x \\ 1, x = \end{cases}$	The minder of 1000			
	198 (2) E (1)	and a long to		2 + (6)			
	$h(x) = \{x\}$		$k(x) = 5^{\log_2(x+3)}$	B 200 'R + R ' 200 d			
	then in [0, 1], Lagrange		(D) -1 1				
	(A) f, g, h	(B) h, k	(C) f, g	(D) g, h, k			
where [x] and $\{x\}$ denotes the greatest integer and fractional part function. 19. The function $f:[a,\infty) \to R$ where R denotes the range corresponding to the given domain, v							
19.				the given domain, with rule			
	$f(x) = 2x^3 - 3x^2 + 6$ , will have an inverse provided						
	$(A) a \ge 1$	(B) $a \ge 0$	(C) $a \le 0$	(D) $a \le 1$			

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<ul> <li>(A) increasing in its domain</li> <li>(B) decreasing in its domain</li> <li>(C) decreasing in (-∞, 0) and increasing in (0, ∞) (D) increasing in (-∞, 0) and decreasing in (0, ∞)</li> <li>21. Given f'(1) = 1 and d/dx (f(2x)) = f'(x) ∀ x &gt; 0. If f'(x) is differentiable then there exists a number c ∈ (2, 4) such that f" (c) equals (A) – 1/4 (B) – 1/8 (C) 1/4 (D) 1/8</li> <li>22. Statement 1: The function x²(e² + e²²) is increasing for all x &gt; 0. [JEE-MAIN Online 2013] Statement 2: The functions x²e² and x²e² are increasing for all x &gt; 0 and the sum of two increasing functions in any interval (a, b) is an increasing function in (a, b).</li> <li>(A) Statement 1 is false; Statement 2 is false.</li> <li>(C) Statement 1 is true; Statement 2 is true; Statement 2 is a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is not 2 is not 2 is not 3 i</li></ul>	20.	The function $f(x) = \tan^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ is	OFFI OCTANI - xi+  xi						
<ul> <li>(C) decreasing in (-∞, 0) and increasing in (0, ∞) (D) increasing in (-∞, 0) and decreasing in (0, ∞)</li> <li>21. Given f'(1) = 1 and d/dx (f(2x)) = f'(x) ∀ x &gt; 0. If f'(x) is differentiable then there exists a number c∈ (2, 4) such that f" (c) equals (A) - 1/4 (B) - 1/8 (C) 1/4 (D) 1/8</li> <li>22. Statement 1: The function x²(e² + e²x) is increasing for all x &gt; 0. [JEE-MAIN Online 2013] Statement 2: The functions x²e² and x²e² are increasing for all x &gt; 0 and the sum of two increasing functions in any interval (a, b) is an increasing function in (a, b). (A) Statement 1 is false; Statement 2 is true.</li> <li>(B) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1 if f(x₀) = g (x₀) and f' (x) &gt; g' (x) for all x &gt; x₀. (B) f(x) = g (x) for some x &gt; x₀. (C) f(x) &gt; g (x) for some x &gt; x₀. (D) f(x) &gt; g (x) for some x &gt; x₀. (C) f(x) &gt; g (x) only for some x &gt; x₀. (D) f(x) &gt; g (x) for all x &gt; x₀.</li> <li>24. The set of value(s) of 'a' for which the function f(x) = ax²/3 + (a + 2)x² + (a - 1)x + 2 posses a negative point of inflection. (A) (-∞, -2) ∪ (0, ∞) (B) {-4/5} (C) (-2, 0) (D) empty set</li> <li>25. If the function f(x) = 2x² + 3x + 5 satisfies LMVT at x = 2 on the closed interval [1, a], then the value of 'a' is equal to (A) 3 (B) 4 (C) 6 (D) 1 (D) 0</li> <li>26. EXERCISE (O-2) [SINGLE CORRECT CHOICE TYPE]</li> <li>37. The equation sin x + x cos x = 0 has at least one root in (A) (-x) - x + x + x + x + x + x + x + x + x + x</li></ul>		(A) increasing in its domain	(B) decreasing in it	s domain					
<ul> <li>21. Given f'(1) = 1 and d/dx (f(2x)) = f'(x) ∀x &gt; 0. If f'(x) is differentiable then there exists a number c ∈ (2, 4) such that f" (c) equals (A) - 1/4 (B) - 1/8 (C) 1/4 (D) 1/8</li> <li>22. Statement 1: The function x²e² + e²x² is increasing for all x &gt; 0. [JEE-MAIN Online 2013] Statement 2: The functions x²e² and x²e² are increasing for all x &gt; 0 and the sum of two increasing functions in any interval (a, b) is an increasing function in (a, b). (A) Statement 1 is false; Statement 2 is true. (B) Statement 1 is true; Statement 2 is rue; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not a correct explanation for Statement 1. (D) Statement 1 is true; Statement 2 is not</li></ul>		(C) decreasing in $(-\infty, 0)$ and increasing	(C) decreasing in $(-\infty, 0)$ and increasing in $(0, \infty)$ (D) increasing in $(-\infty, 0)$ and decreasing in $(0, \infty)$						
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<ul> <li>Statement 1: The function x²(e<sup>x</sup> + e<sup>-x</sup>) is increasing for all x &gt; 0. [JEE-MAIN Online 2013] Statement 2: The functions x²e<sup>x</sup> and x²e<sup>-x</sup> are increasing for all x &gt; 0 and the sum of two increasing functions in any interval (a, b) is an increasing function in (a, b).</li> <li>(A) Statement 1 is false; Statement 2 is fuce.</li> <li>(B) Statement 1 is true; Statement 2 is false.</li> <li>(C) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1.</li> <li>(D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1. Let f (x) and g (x) are two function which are defined and differentiable for all x ≥ x₀. If f(x₀) = g (x₀) and f¹ (x) &gt; g¹ (x₀) for all x &gt; x₀ then (A) f(x) &lt; g (x) for some x &gt; x₀. (B) f(x) = g (x) for some x &gt; x₀. (C) f(x) &gt; g (x) for some x &gt; x₀. (D) f(x) &gt; g (x) for all x &gt; x₀.</li> <li>24. The set of value(s) of 'a' for which the function f(x) = ax³/3 + (a+2)x² + (a-1)x + 2 posses a negative point of inflection. (A) (-∞, -2) ∪ (0, ∞) (B) {-4/5} (C) (-2, 0) (D) empty set</li> <li>25. If the function f(x) = 2x² + 3x + 5 satisfies LMVT at x = 2 on the closed interval [1, a], then the value of 'a' is equal to (A) 3 (B) 4 (C) 6 (D) 1 EXERCISE (O-2)</li> <li>[SINGLE CORRECT CHOICE TYPE]</li> <li>1. The equation sin x + x cos x = 0 has at least one root in (A) (-∞, -2) (B) (B) (0, π) (C) (π, 3π/2) (D) (0, π/2)</li> <li>2. The number of roots of the equation x² - 2x - log<sub>2</sub> 1 - x  = 3 is (A) 4 (B) 2 (C) 1 (D) 0</li> <li>3. If f: R → R* be a differentiable function and g(x) = e²x(2f(x) - 3(f(x))² + 2(f(x))³) ∀ x ∈ R, the which of the following is/are always correct - (A) g(x) is increasing wherever f(x) is increasing (C) is decreasing wherever f(x) is decreasing (C) g(x) is decreasing wherever f(x) is decreasing</li> <li>(C) g(x) is decreasing wherever f(x) is decreasing</li> </ul>			(C) 1/4	(D) 1/8					
Statement 2: The functions $x^2e^x$ and $x^2e^{-x}$ are increasing for all $x > 0$ and the sum of two increasing functions in any interval $(a, b)$ is an increasing function in $(a, b)$ .  (A) Statement 1 is false; Statement 2 is full.  (B) Statement 1 is true; Statement 2 is false.  (C) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explanation for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explaintion for Statement 1.  (E) Explain the statement 2 is rue; Statement 2 is not a correct explaintion for Statement 1.  (E) Expl	22.	Statement 1 • The function $v^2(e^x + e^{-x})$	) is increasing for all $x > 0$ .	[JEE-MAIN Online 2013]					
functions in any interval (a, b) is an increasing function in (a, b).  (A) Statement 1 is false; Statement 2 is true.  (B) Statement 1 is true; Statement 2 is false.  (C) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  (D) Statement 1 is true; Statement 2 is true; Statement 2 is not a correct explanation for Statement 1.  23. Let $f(x)$ and $g(x)$ are two function which are defined and differentiable for all $x \ge x_0$ . If $f(x_0) = g(x_0)$ and $f'(x) > g'(x)$ for all $x > x_0$ then  (A) $f(x) < g(x)$ for some $x > x_0$ (B) $f(x) = g(x)$ for some $x > x_0$ (C) $f(x) > g(x)$ only for some $x > x_0$ (D) $f(x) > g(x)$ for all $x > x_0$ 24. The set of value(s) of a for which the function $f(x) = \frac{ax^3}{3} + (a+2)x^2 + (a-1)x + 2$ posses a negative point of inflection.  (A) $(-\infty, -2) \cup (0, \infty)$ (B) $\{-4/5\}$ (C) $(-2, 0)$ (D) empty set  25. If the function $f(x) = 2x^2 + 3x + 5$ satisfies LMVT at $x = 2$ on the closed interval $[1, a]$ , then the value of a is equal to (A) 3 (B) 4 (C) 6 (D) 1  EXERCISE (O-2)  [SINGLE CORRECT CHOICE TYPE]  1. The equation $\sin x + x \cos x = 0$ has at least one root in  (A) $\left(-\frac{\pi}{2}, 0\right)$ (B) $(0, \pi)$ (C) $\left(\pi, \frac{3\pi}{2}\right)$ (D) $\left(0, \frac{\pi}{2}\right)$ 2. The number of roots of the equation $x^2 - 2x - \log_2 1 - x  = 3$ is (A) 4 (B) 2 (C) 1 (D) 0  3. If $f: R \to R^+$ be a differentiable function and $g(x) = e^{2x}(2f(x) - 3(f(x))^2 + 2(f(x))^3) \forall x \in R$ , the which of the following is/are always correct (A) $g(x)$ is increasing wherever $f(x)$ is decreasing (C) $g(x)$ is decreasing wherever $f(x)$ is decreasing (C) $g(x)$ is decreasing wherever $f(x)$ is decreasing		Statement 2: The functions $x^{2} = x^{2}$ and $x^{2} = x^{2}$ are increasing for all $x > 0$ and the sum of two in							
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of 'a' is equal to  (A) 3  (B) 4  (C) 6  (D) 1  EXERCISE (O-2)  [SINGLE CORRECT CHOICE TYPE]  1. The equation $\sin x + x \cos x = 0$ has at least one root in  (A) $\left(-\frac{\pi}{2}, 0\right)$ (B) $(0, \pi)$ (C) $\left(\pi, \frac{3\pi}{2}\right)$ (D) $\left(0, \frac{\pi}{2}\right)$ 2. The number of roots of the equation $x^2 - 2x - \log_2  1 - x  = 3$ is  (A) 4  (B) 2  (C) 1  (D) 0  3. If $f: \mathbb{R} \to \mathbb{R}^+$ be a differentiable function and $g(x) = e^{2x}(2f(x) - 3(f(x))^2 + 2(f(x))^3) \ \forall \ x \in \mathbb{R}$ , the which of the following is/are always correct  (A) $g(x)$ is increasing wherever $f(x)$ is increasing  (B) $g(x)$ is increasing wherever $f(x)$ is decreasing  (C) $g(x)$ is decreasing wherever $f(x)$ is decreasing		(A) $(-\infty, -2) \cup (0, \infty)$ (B) $\{-4/5\}$	(C)(-2,0)						
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