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EXAM TARGET	SUBJECT	TIME	FACULTY
ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
GATE 2024-25	NETWORK THEORY	6:00 PM	RAVI SIR
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ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
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GATE 2024-25	STEEL STRUCTURE	6.00 PM	REHAN SIR
GATE 2024-25	ENVIRONMENT	8:00 PM	PRATIK SIR
GATE 2024-25	SOM	9:00 PM	MUKESH SIR

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MECHANICAL ENGINEERING

EXAM TARGET	SUBJECT	TIME	FACULTY
ALL PSUs	ENGINEERING MATHS	10:00 AM	ANANT SIR
ALL PSUs	PRODUCTION	11:30 PM	GAURAV SIR
ALL PSUs	THERMODYNAMICS	3:00 PM	KANISTH SIR
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HMT	MONDAY Live @11AM	YOGESH SIR
PRODUCTION	TUESDAY Live @11AM	GAURAV SIR
SOM	WEDNESDAY Live @8PM	MUKESH SIR
THERMODYNAMICS	THURSDAY Live @11AM	KANISTH SIR
ENGINEERING MATHEMATICS	FRIDAY Live @11AM	ANANT SIR

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NETWORK THEORY	SATURDAY Live @11AM	RAVI SIR
COMMUNICATION	WEDNESDAY Live @8PM	RENU SIR
ANALOG ELECTRONICS	THURSDAY Live @8PM	LAWRENCE SIR
ENGINEERING MATHEMATICS	FRIDAY Live @11AM	ANANT SIR
ELECTRICAL MACHINE	MONDAY Live @8PM	SANTAN SIR

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CIVIL ENGINEERING

SOM	WEDNESDAY Live @8PM	MUKESH SIR
ENVIRONMENT	THURSDAY Live @8PM	PRATIK SIR
STEEL STRUCTURE	FRIDAY Live @8PM	REHAN SIR
GEOTECHNICAL	SATURDAY Live @11AM	RUDRA SIR
ENGINEERING MATHEMATICS	FRIDAY Live @11AM	ANANT SIR

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Q:48

While minimizing the function f(x), necessary and sufficient conditions for a point x_0 to be minima are

(a) $f'(x_0) > 0$ and $f''(x_0) = 0$

(b) $f'(x_0) < 0$ and $f''(x_0) = 0$

(c) $f'(x_0) = 0$ and $f''(x_0) < 0$

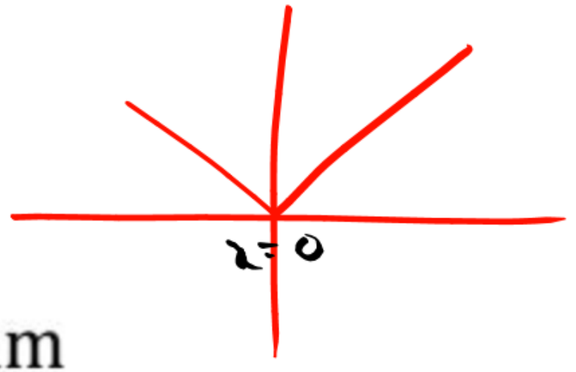
(d) $f'(x_0) = 0$ and $f''(x_0) > 0$

$f'(x=x_0)=0$

$f''(x_0)=+ve \leftarrow$ minima

Q:49 At x = 0, the function f(x) = |x| has -

(a) a minimum
(b) a maximum
(c) a point of inflection
(d) neither a maximum nor minimum



At $x=0$ function $f(x)=|x|$ is non-differentiable. so it Can't to be stationary point so it does not have a maxima or minima at $x=0$.

but it has a minimum value

Q:50 The function $f(x) = 2x - x^2 + 3$ has -

(a) a maxima at x = 1 and a minima at x = 5

(b) a maxima at x = 1 and a minima at x = -5

(c) only a maxima at x = 1

(d) only a minima at x = 1

$\frac{d}{dx} f(x) = 0$

$2 - 2x = 0$

$x = 1$

at $x = 1$

$f''(x=1) = -2 < 0$

Q:51

If the sum of the diagonal elements of a 2 × 2 symmetric matrix is - 6, then the maximum possible value of determinant of the matrix is _____.

$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}_{2\times 2}$

for symmetric matrix $a_{ij} = a_{ji}$

$b = c$

$\begin{bmatrix} a & b \\ b & d \end{bmatrix}$

-Irace = - 6

$a + d = -6$

$|A| = ad - b^2$

for $|A|$ to be maximum

$b^2 = 0$

$|A| = ad$

$|A| = a(-a-6) = -a^2 - 6a$

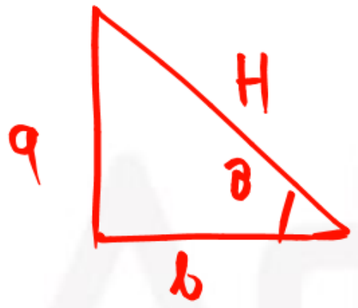
$-2a - 6 = 0 \Rightarrow a = -3$

$d = -3$

$|A| = 9$

Q:52 For a right angled triangle, if the sum of the lengths of the hypotenuse and a side is kept constant in order to have maximum area of the triangle, the angle between the hypotenuse and the side is -

(a) 12°
(b) 36°
(c) 60°
(d) 45°



$H + b = K$ (constant)

$H = K - b$

$q = \sqrt{H^2 - b^2}$

$\text{Area} = \frac{1}{2} \times \text{width} \times \text{hight}$

$= \frac{1}{2} \times b \times q$

$\text{Area} = \frac{1}{2} \times b \times \sqrt{H^2 - b^2}$

$f(b) = \frac{1}{2} \times b \sqrt{(K-b)^2 - b^2} = \frac{b}{2} \sqrt{K^2 - 2Kb}$

$f'(b) = \frac{1}{2}\left[\sqrt{K^2 - 2Kb} + \frac{b}{2\sqrt{K^2 - 2Kb}} \cdot (-2K)\right] = 0$

$2(K^2 - 2Kb) - 2Kb = 0$

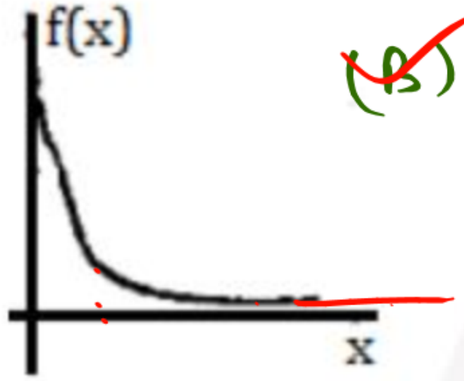
$2(K^2 - 2Kb) = 2Kb$

$4Kb = 4K^2$

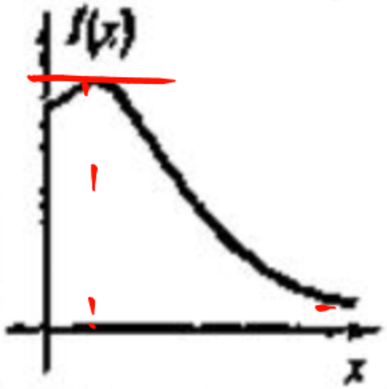
$b = K$

Q:53 Which one of the following graphs describes the function $f(x) = e^{-x}(x^2 + x + 1)$?

(A)



(B)



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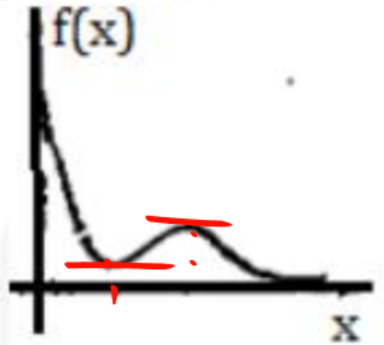
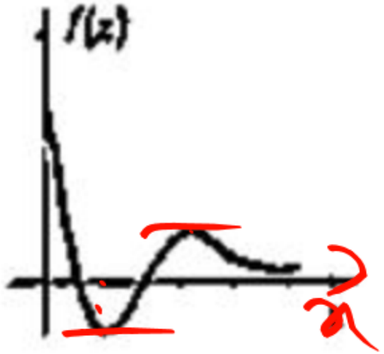


(D)



$y = e^{-x}(x^2+x+1)$

$\frac{dy}{dx} = e^{-x}(2x+1) - (x^2+x+1)e^{-x} = 0$

$e^{-x}[-x^2+x] = 0$

$e^{-x} = 0$

$x = \infty$

$-x^2+x = 0$

$x(-x+1) = 0$

$x = 0, x = 1$

$x = 0, 1, \infty$

Q:54 The function $f(x) = 2x^3 - 3x^2 - 36x + 2$ has its maxima at -

(a) x = - 2 only
(b) x = 0 only
(c) x = 3 only
(d) both x = - 2 and x = 3

$\frac{dy}{dx} = 0$

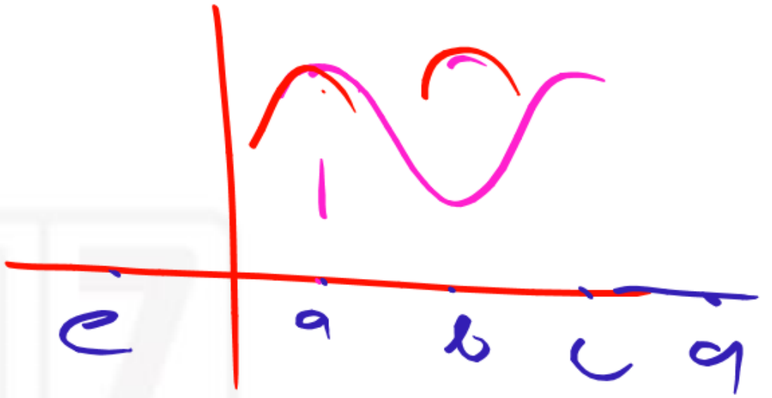
$6x^2 - 6x - 36 = 0$

$x^2 - x - 6 = 0$

$x^2 - 3x + 2x - 6 = 0$

$(x-3)(x+2) = 0$

$x = 3, -2$ are stationary points.



$f''(x) = 2x - 1$

$f''(3) = 5$ (minima)

$f''(-2) = -5$ (maxima)

Q:55 The minimum value of function $y = x^2$ in the interval [1,5] is -

(a) 0

(b) 1

(c) 25

(d) undefined

Q:56 At $x = 0$, the function $f(x) = x^3 + 1$ has -

(a) a maximum value

(b) a minimum value

(c) a singularity

(d) a point of inflection

Q:57 For the function $f(x) = x^2 e^{-x}$, the maximum occurs when x is equal to -

(a) 2

(b) 1

(c) 0

(d) - 1

Q:58 Consider function $f(x) = (x^2 - 4)^2$ where x is a real number. Then the function has -

(a) only one minimum

(b) only two minima

(c) three minima

(d) three maxima

Q:59 A cubic polynomial with real coefficients -

(a) can possibly have no extrema and no zero crossings

(b) may have up to three extrema and upto 2 zero crossings

(c) cannot have more than two extrema and more than three zero crossings

(d) will always have an equal number of extrema and zero crossings

THANKS FOR

Watching

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