AI24BTECH11002 - K. Akshay Teja

1) Let A and B be two similar square matrices of order two. If 1 and -2 are the eigenvalues of A,

2) The root of ax + b = 0 (a, b constants), can be found by the Newton-Raphson method with a

 $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}, x \in \mathbb{R}$

c) 1

c) 3 iterations

d) 2

d) an undeterminable number of iterations

then the Trace of B is

a) -2

minimum of

a) 1 iteration

b) 2 iterations

b) -1

3) The solution u(x,t) of the one-dimensional heat equation,

with a Gaussian initial condition.

a) travels with fi	nite constant wave-spec	ed							
b) travels with finite variable wave-speed									
c) spreads in both directions, with the magnitude of the peak increasing with time									
d) spreads in both directions, with the magnitude of the peak decreasing with time									
4) Let C be the boundary of the square given by $0 \le x \le 1$, $0 \le y \le 1$. Then $\oint_C (x dy - y dx)$ equals									
a) -2	b) 0	c) 1	d) 2						
5) Let the eigenvalues of a square matrix A of order two be 1 and 2. The corresponding eigenvectors									
are $\begin{pmatrix} 0.6 \\ 0.8 \end{pmatrix}$ and $\begin{pmatrix} 0.8 \\ -0.6 \end{pmatrix}$, respectively. Then, the element A(2, 2) is									
a) -0.48	b) 0.48	c) 1.36	d) 1.64						
6) Let $y_1(x)$ and $y_2(x)$ be two linearly independent solutions of									
$\frac{d^2y}{dx^2} + \frac{6}{x}\frac{dy}{dx} + q(x)y = 0, x \in (1,3)$									
where $q(x)$ is a continuous function in (1,3). If the Wronskian of $y_1(x)$ and $y_2(x)$ at $x = 1$, denoted by $W(y_1, y_2)(1)$, is 1, then $W(y_1, y_2)(2)$ is									
a) $\frac{1}{2^6}$	b) $\frac{1}{2^3}$	c) $\frac{1}{2}$	d) 2						
7) Simpson's $\frac{1}{3}$ rule applied to $\int_{-1}^{1} (3x^2 + 5) dx$ with sub-interval $h = 1$, will give									

$div(\overrightarrow{u} \times \overrightarrow{v})$ equals a) 0 b) $2\omega^2 y$ c) $4\omega^2 y$ d) $-4\omega^2 y$ 11) The infinite series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is a) Divergent for all x c) Convergent for all x b) Convergent only for $x \ge 1$ d) Divergent only for $-1 \le x \le 1$ 12) Let $f(x)$ be continuous and satisfy $m \le f(x) \le M$ in $1 \le x \le 10$. Then, $\mu = \frac{\int_1^{10} (f(x)x^2) dx}{\int_1^{10} (x^2) dx}$ satisfy		a) the exact resultb) error between 0.01%	to 0.1%		error between 0.1% t error > 1.0%	o 1	.0%			
 9) If a complex function f(z) = u(x,y) + iv(x,y) is analytic, then a) i ∂u/∂x + ∂v/∂x = ∂u/∂y + i ∂v/∂y b) i ∂u/∂x + ∂v/∂x = -∂u/∂y - i ∂v/∂y c) ∂u/∂x + i ∂v/∂x = -i ∂u/∂y + ∂v/∂y d) ∂u/∂x + i ∂v/∂x = i ∂u/∂y - i ∂v/∂y c) 10) Let u = -ωyî + ωxĵ and v = ωzĵ - ωyk̂ be two given vectors, where ω is a constant. The div(u × v) equals a) 0 b) 2ω²y c) 4ω²y d) -4ω²y 11) The infinite series ∑m=1 (-1)^mx² (1+x²)^m is a) Divergent for all x b) Convergent only for x ≥ 1 d) Divergent only for -1 ≤ x ≤ 1 12) Let f(x) be continuous and satisfy m ≤ f(x) ≤ M in 1 ≤ x ≤ 10. Then, μ = ∫10 (f(x)x²) dx / ∫10 (x²) dx satisfy 	8) The probability that a six-sided dice is thrown n times without giving a '6', even once, is									
a) $i\frac{\partial u}{\partial x} + \frac{\partial v}{\partial x} = \frac{\partial u}{\partial y} + i\frac{\partial v}{\partial y}$ b) $i\frac{\partial u}{\partial x} + \frac{\partial v}{\partial x} = -\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ c) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = -i\frac{\partial u}{\partial y} + \frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial x}$ a) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial x}$ a) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial x}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial x}$ d) $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x} = i\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial x}$ d) $-4\omega^2 y$ d) $-4\omega^2 y$ d) $-4\omega^2 y$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent for all x d) Divergent only for $-1 \le x \le 1$ d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is d) Divergent only for $-1 \le x \le 1$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ limits series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ limits series $\sum_{m=1}^{\infty} (-1)^m x^2$		a) $\left(\frac{5}{6}\right)^n$	b) $\frac{5}{6} \left(\frac{1}{6}\right)^n$	c)	$\frac{(n-1)!}{n!} \left(\frac{1}{6}\right)^n$	d)	$1 - \frac{(n-1)!}{n!} \left(\frac{5}{6}\right)^n$			
 10) Let \$\vec{u} = -ωy\hat{i} + ωx\hat{j}\$ and \$\vec{v} = ωz\hat{j} - ωy\hat{k}\$ be two given vectors, where ω is a constant. The div (\$\vec{u} \times \vec{v}\$) equals a) 0 b) 2ω²y c) 4ω²y d) -4ω²y 11) The infinite series \$\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}\$ is a) Divergent for all x c) Convergent for all x b) Convergent only for \$x \geq 1\$ d) Divergent only for \$-1 \leq x \leq 1\$ 12) Let \$f(x)\$ be continuous and satisfy \$m \leq f(x) \leq M\$ in \$1 \leq x \leq 10\$. Then, \$\vec{\mu} = \frac{\int_1^{10} (f(x)x^2) dx}{\int_1^{10} (x^2) dx}\$ satisfy \$\vec{\mu} \leq f(x)\$ be continuous and satisfy \$\vec{\mu} \leq f(x) \leq M\$ in \$1 \leq x \leq 10\$. Then, \$\vec{\mu} = \frac{\int_1^{10} (f(x)x^2) dx}{\int_1^{10} (x^2) dx}\$ satisfy \$\vec{\mu} \leq f(x)\$ be continuous and satisfy \$\vec{\mu} \leq f(x)\$ in \$1 \leq x \leq 10\$. Then, \$\vec{\mu} = \frac{\int_1^{10} (f(x)x^2) dx}{\int_1^{10} (x^2) dx}\$ satisfy \$\vec{\mu} \leq f(x)\$ is \$\vec{\mu} \text{ for all } x\$. 	9)	9) If a complex function $f(z) = u(x, y) + iv(x, y)$ is analytic, then								
$div(\overrightarrow{u} \times \overrightarrow{v})$ equals a) 0 b) $2\omega^2 y$ c) $4\omega^2 y$ d) $-4\omega^2 y$ 11) The infinite series $\sum_{m=1}^{\infty} \frac{(-1)^m x^2}{(1+x^2)^m}$ is a) Divergent for all x c) Convergent for all x b) Convergent only for $x \ge 1$ d) Divergent only for $-1 \le x \le 1$ 12) Let $f(x)$ be continuous and satisfy $m \le f(x) \le M$ in $1 \le x \le 10$. Then, $\mu = \frac{\int_1^{10} (f(x)x^2) dx}{\int_1^{10} (x^2) dx}$ satisfy		a) $i\frac{\partial u}{\partial x} + \frac{\partial v}{\partial x} = \frac{\partial u}{\partial y} + i\frac{\partial v}{\partial y}$	b) $i\frac{\partial u}{\partial x} + \frac{\partial v}{\partial x} = -\frac{\partial u}{\partial y} - i\frac{\partial v}{\partial y}$	c)	$\frac{\partial u}{\partial x} + i \frac{\partial v}{\partial x} = -i \frac{\partial u}{\partial y} + \frac{\partial v}{\partial y}$	d)	$\frac{\partial u}{\partial x} + i \frac{\partial v}{\partial x} = i \frac{\partial u}{\partial y} - \frac{\partial v}{\partial y}$			
 11) The infinite series ∑_{m=1}[∞] (-1)^mx²/(1+x²)^m is a) Divergent for all x b) Convergent for all x d) Divergent only for -1 ≤ x ≤ 1 12) Let f(x) be continuous and satisfy m ≤ f(x) ≤ M in 1 ≤ x ≤ 10. Then, μ = ∫₁¹⁰(f(x)x²)dx / ∫₁¹⁰(x²)dx 	10) Let $\overrightarrow{u} = -\omega y \hat{i} + \omega x \hat{j}$ and $\overrightarrow{v} = \omega z \hat{j} - \omega y \hat{k}$ be two given vectors, where ω is a constant. Ther $div(\overrightarrow{u} \times \overrightarrow{v})$ equals									
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J1 (*)			$x \ge 1$		•	1 ≤	$x \le 1$			
a) $u < 333m$ b) $333u > M$ c) $m < u < M$ d) $m < u < \frac{M}{322}$	12) Let $f(x)$ be continuous and satisfy $m \le f(x) \le M$ in $1 \le x \le 10$. Then, $\mu = \frac{\int_1^{10} (f(x)x^2) dx}{\int_1^{10} (x^2) dx}$ satisfies									
7, 11, 11, 11, 11, 11, 11, 11, 11, 11, 1		a) $\mu \le 333m$	b) $333\mu \ge M$	c)	$m \le \mu \le M$	d)	$m \le \mu \le \frac{M}{333}$			