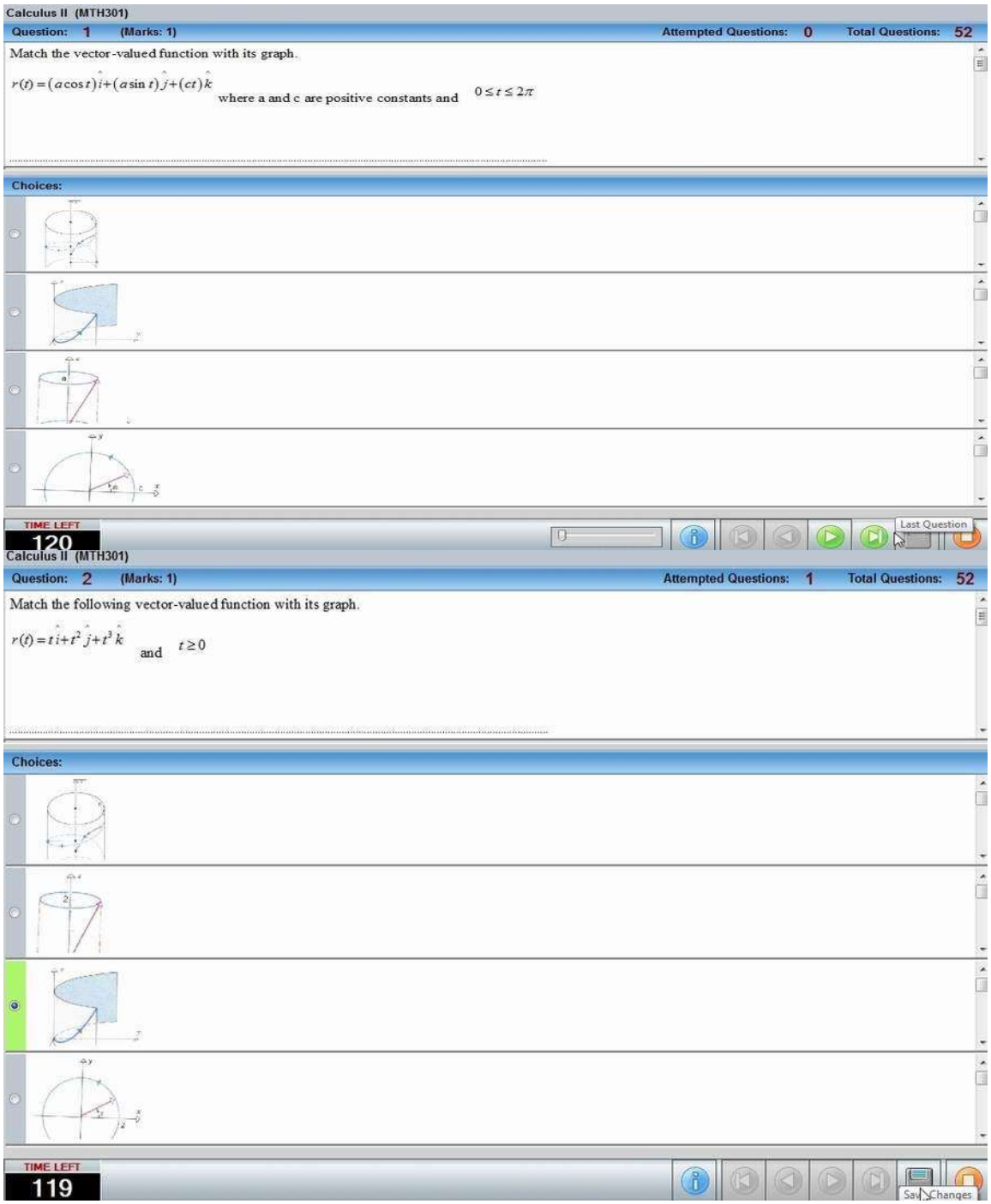
MTH301 FINAL TERM SOLVED PAPER

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Calculus II (MTH301)

Question: 3 (Marks: 1) Attempted Questions: 2 Total Questions: 52

What are the parametric equations that correspond to the following vector equation?

$\vec{r}(t) = \sin^2 t\,\hat{i} + (1-\cos 2t)\,\hat{j}$

Choices:

- $x = \sin^2 t \;,\quad y = 1-\cos 2t \;,\quad z = 0$
- $y = \sin^2 t \;,\quad x = 1-\cos 2t \;,\quad z = 0$
- $x = \sin^2 t \;,\quad y = 1-\cos 2t \;,\quad z = 1$
- $x = \sin^2 t \;,\quad y = \cos 2t \;,\quad z = 1$

TIME LEFT 119

Calculus II (MTH301)

Question: 4 (Marks: 1) Attempted Questions: 3 Total Questions: 52

What are the parametric equations that correspond to the following vector equation?

$r(t) = (2t-1)\,\hat{i} - 3\sqrt{t}\,\hat{j} + \sin 3t\,\hat{k}$

Choices:

- $z = 2t-1 \;,\quad x = -3\sqrt{t} \;,\quad y = \sin 3t$
- $y = 2t-1 \;,\quad x = -3\sqrt{t} \;,\quad z = \sin 3t$
- $x = 2t-1 \;,\quad z = -3\sqrt{t} \;,\quad y = \sin 3t$
- $x = 2t-1 \;,\quad y = -3\sqrt{t} \;,\quad z = \sin 3t$

TIME LEFT 118

Calculus II (MTH301)

Question: 6 (Marks: 1) Attempted Questions: 5 Total Questions: 52

The following differential is exact

$dz = (x^2y + y)\,dx - x\,dy$

Choices:

True

False

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TIME LEFT 116

Calculus II (MTH301)

Question: 7 (Marks: 1) Attempted Questions: 6 Total Questions: 52

The following differential is exact

$dz = (x^2 + y^2)\,dx - 2xy\,dy$

Choices:

True

False

TIME LEFT 116

Calculus II (MTH301)

Question: 9 (Marks: 1) Attempted Questions: 8 Total Questions: 52

Which one of the following is correct Wallis Cosine formula when n is even and $n \geq 2$?

Choices:

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$$\int_0^{\pi/2} \cos^n x\,dx = \frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{-------}\frac{6}{7}\frac{4}{5}\frac{2}{3}$$

$$\int_0^{\pi/2} \cos^n x\,dx = \frac{\pi}{2}\frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{-------}\frac{5}{6}\frac{3}{4}\frac{1}{2}$$

$$\int_0^{\pi/2} \cos^n x\,dx = \frac{\pi}{2}\frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{-------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$$

$$\int_0^{\pi/2} \cos^n x\,dx = \frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{-------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$$

TIME LEFT 115

Calculus II (MTH301)

Question: 10 (Marks: 1) Attempted Questions: 11 Total Questions: 52

Which one of the following is correct Wallis Cosine formula when n is odd and $n \geq 3$?

Choices:

$$\int_0^{\pi/2} \cos^n x\,dx = \frac{\pi}{2}\frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{-------}\frac{5}{6}\frac{3}{4}\frac{1}{2}$$

$$\int_0^{\pi/2} \cos^n x\,dx = \frac{\pi}{2}\frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{-------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$$

$$\int_0^{\pi/2} \cos^n x\,dx = \frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\text{-------}\frac{6}{5}\frac{4}{3}\frac{2}{1}$$

$$\int_0^{\pi/2} \cos^n x\,dx = \frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\text{-------}\frac{6}{7}\frac{4}{5}\frac{2}{3}$$

TIME LEFT 113

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Calculus II (MTH301)

Question: 12 (Marks: 1) Attempted Questions: 11 Total Questions: 52

Which of the following condition must be satisfied for a vector field $\vec{F}$ to be a conservative vector field?

Choices:

- $\vec{F} = 0$
- $grad\ \vec{F} = 0$
- $div\ \vec{F} = 0$
- $curl\ \vec{F} = 0$

TIME LEFT 113

Calculus II (MTH301)

Question: 13 (Marks: 1) Attempted Questions: 12 Total Questions: 52

What is the amplitude of a periodic function defined by $f(x) = \sin\frac{x}{3}$?

Choices:

- 0
- 1
- $\frac{1}{3}$
- Does not exist

TIME LEFT 112

Calculus II (MTH301)

Question: 15 (Marks: 1) Attempted Questions: 14 Total Questions: 52

What is the period of a periodic function defined by $f(x) = \sin\frac{x}{2}$?

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Choices:

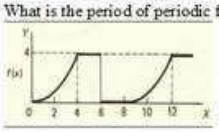
- $\frac{\pi}{2}$
- π
- $\frac{3\pi}{2}$
- 4π

TIME LEFT 111

Calculus II (MTH301)

Question: 16 (Marks: 1) Attempted Questions: 16 Total Questions: 52

What is the period of periodic function whose graph is as below?



Choices:

- 0
- 4
- 6
- 8

TIME LEFT 111

Next Question

Calculus II (MTH301)

Question: 18 (Marks: 1) Attempted Questions: 17 Total Questions: 52

Let L denotes the Laplace Transform.
If $L\{F(t)\} = f(s)$ where s is a constant, then which of the following equation holds?

Choices:

- $L\{t\,F(t)\} = -\frac{d}{ds}\{f(s)\}$
- $L\{t\,F(t)\} = f(s+t)$
- $L\{t\,F(t)\} = f(s)$
- $L\{t\,F(t)\} = \int_s^\infty f(s)\,ds$

TIME LEFT 111

Calculus II (MTH301)

Question: 19 (Marks: 1) Attempted Questions: 18 Total Questions: 52

The function $f(x) = x^3 e^x$ is ----------

Choices:

- Even function
- Odd function
- Neither even nor odd

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TIME LEFT 111

Calculus II (MTH301)

Question: 21 (Marks: 1) Attempted Questions: 20 Total Questions: 52

Sign of line integral is reversed when ----------

Choices:

path of integration is divided into parts.

path of integration is parallel to y-axis.

direction of path of integration is reversed.

path of integration is parallel to x-axis.

TIME LEFT 108

Calculus II (MTH301)

Question: 22 (Marks: 1) Attempted Questions: 21 Total Questions: 52

Let the functions $P(x, y)$ and $Q(x, y)$ are finite and continuous inside and at the boundary of a closed curve C in the xy-plane. If $(P\,dx + Q\,dy)$ is an exact differential then

$$\oint_C (P\,dx + Q\,dy) =$$

Choices:

Zero

One

Infinite

TIME LEFT 108

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Calculus II (MTH301)

Question: 24 (Marks: 1) Attempted Questions: 23 Total Questions: 52

What is the value of $L\{e^{5t}\}$ if L denotes laplace transform?

Choices:

- $L\{e^{5t}\} = \frac{1}{s-5}$
- $L\{e^{5t}\} = \frac{s}{s^2+25}$
- $L\{e^{5t}\} = \frac{5}{s^2+25}$
- $L\{e^{5t}\} = \frac{5!}{s^5}$

TIME LEFT 107

Calculus II (MTH301)

Question: 25 (Marks: 1) Attempted Questions: 24 Total Questions: 52

What is Laplace Inverse Transform of $\frac{5}{s^2+25}$

Choices:

- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \sin 5t$
- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \cos 5t$
- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \sin 25t$
- $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \cos 25t$

TIME LEFT 106

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Calculus II (MTH301)

Question: 27 (Marks: 1) Attempted Questions: 26 Total Questions: 52

$$\int_C (xy)\,dx + y^2\,dy$$

Evaluate the line integral where C is the line segment from (0, 0) to (0, 3).

Choices:

9

4

0

-4

TIME LEFT 103

Calculus II (MTH301)

Question: 28 (Marks: 1) Attempted Questions: 27 Total Questions: 52

A vector field is a vector each of whose components is a scalar field

Choices:

True

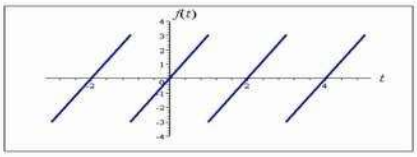
False

TIME LEFT 103

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Calculus II (MTH301)

Question: 30 (Marks: 1) Attempted Questions: 29 Total Questions: 52



Choices:

- An odd function
- An even function
- Neither even nor odd

TIME LEFT 103

Calculus II (MTH301)

Question: 31 (Marks: 1) Attempted Questions: 30 Total Questions: 52

How many real numbers exist between two consecutive integers?

Choices:

- 0
- 1
- Infinite
- None

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TIME LEFT 102

Calculus II (MTH301)

Question: 33 (Marks: 1) Attempted Questions: 32 Total Questions: 52

The angles which a line makes with positive x ,y and z-axes are known as ----------

Choices:

- Direction cosines
- Direction ratios
- Direction angles

TIME LEFT 102

Calculus II (MTH301)

Question: 34 (Marks: 1) Attempted Questions: 32 Total Questions: 52

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If the spherical coordinates of a point are $\left(2, \frac{\pi}{4}, 0\right)$, then z-coordinate in rectangular coordinate system is . . . . . .

Choices:

- 0
- -2
- 2
- $\sqrt{2}$

TIME LEFT 101

Calculus II (MTH301)

Question: 36 (Marks: 1) Attempted Questions: 35 Total Questions: 52

Tthe direction of gradient at any point on the surface is . . . . . to the tangent plane at that point.

Choices:

parallel

perpendicular

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opposite direction

None of these.

TIME LEFT 100

Calculus II (MTH301)

Question: 37 (Marks: 1) Attempted Questions: 36 Total Questions: 52

Two surfaces are said to be orthogonal at the point of their intersection if their normals at that point are ---------

Choices:

Parallel

Perpendicular

In opposite direction

Overlapping

TIME LEFT 100

Calculus II (MTH301)

Question: 39 (Marks: 1) Attempted Questions: 38 Total Questions: 52

Let x, y, z be the length, width and height of an open rectangular box. The surface area of the box will be . . . . . .

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Choices:

- $A = xy + 2yz + 2xz$
- $A = yz + 4$
- $A = xz + yz + zx$
- $A = xyz$

TIME LEFT 99

Calculus II (MTH301)

Question: 40 (Marks: 1) Attempted Questions: 39 Total Questions: 52

Double integral of a function $f(x, y)$ represents . . . . . of the region between the surface defined by the function and the plane which contains its domain.

Choices:

- Perimeter
- Volume
- Area
- Circumference

TIME LEFT 99

Calculus II (MTH301)

Question: 42 (Marks: 2) Attempted Questions: 40 Total Questions: 52

Evaluate

$$\int_{-\pi}^{\pi} \sin nx \, dx$$

where n is an integer other than zero.

Calculus II (MTH301)

Question: 43 (Marks: 2) Attempted Questions: 40 Total Questions: 52

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Find Laplace Transform of the function $F(t)$ if $F(t) = t^4$

Calculus II (MTH301)

Question: 45 (Marks: 3) Attempted Questions: 40 Total Questions: 52

Determine the fourier co-efficient a_0, of periodic function defined by

$f(x) = x \qquad 0 < x < 1$

Calculus II (MTH301)

Question: 46 (Marks: 3) Attempted Questions: 40 Total Questions: 52

Find $curl\ \vec{F}$, if $\vec{F} = x^2\hat{i} + 4xy^3\hat{j} + y^2x\hat{k}$

Calculus II (MTH301)

Question: 48 (Marks: 3) Attempted Questions: 40 Total Questions: 52

Find the limit, if (x, y) approaches to $(0, 0)$ along the line $y = x$

$$\lim_{(x,y)\to(0,0)} \frac{4x^3y}{2x^4 + 3y^4}$$

Answer:

Calculus II (MTH301)

Question: 49 (Marks: 5) Attempted Questions: 40 Total Questions: 52

Evaluate the line integral $\int_C (x-y)\,dx + x\,dy$ along $y^2 = x$ from the point $(4, -2)$ to the point $(4, 2)$

Calculus II (MTH301)

Question: 51 (Marks: 5) Attempted Questions: 40 Total Questions: 52

Determine whether the following vector field $\vec{F}$ is conservative or not.

$\vec{F}(x, y, z) = x^2 z\,\hat{i} + y^2 x\,\hat{j} + (y+2z)\,\hat{k}$

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Answer:

Calculus II (MTH301)

Question: 52 (Marks: 5) Attempted Questions: 40 Total Questions: 52

Let $f(x, y) = x^2 y - y^2$ where $x = t^2$ and $y = 2t$. Use chain rule to find $\frac{df}{dt}$ and express the answer in variable t only.

Calculus II (MTH301)

Question: 5 (Marks: 1) Attempted Questions: 4 Total Questions: 52

Is the following vector-valued function $\vec{r}(t)$ continuous at $t=1$? If not, why?

$\vec{r}(t)=\left(\frac{t+1}{t-1}, t^2, 2t\right)$

Choices:

- $\vec{r}(t)$ is continuous at $t=1$
- $\vec{r}(1)$ is not defined
- $\vec{r}(1)$ is defined but $\lim_{t\to 1}\vec{r}(t)$ does not exist
- $\vec{r}(1)$ is defined and $\lim_{t\to 1}\vec{r}(t)$ exists but these two numbers are not equal.

TIME LEFT 118

Calculus II (MTH301)

Question: 8 (Marks: 1) Attempted Questions: 7 Total Questions: 52

Which one of the following is correct Wallis Sine formula when n is odd and $n\geq 3$?

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Choices:

- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx=\frac{\pi}{2}\frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\cdots\cdots\cdots\frac{5}{6}\frac{3}{4}\frac{1}{2}$
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx=\frac{\pi}{2}\frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\cdots\cdots\cdots\frac{6}{5}\frac{4}{3}\frac{2}{1}$
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx=\frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\cdots\cdots\cdots\frac{6}{7}\frac{4}{5}\frac{2}{3}$
- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx=\frac{(n)}{(n-1)}\frac{(n-2)}{(n-3)}\frac{(n-4)}{(n-5)}\cdots\cdots\cdots\frac{6}{5}\frac{4}{3}\frac{2}{1}$

TIME LEFT 115

Calculus II (MTH301)

Question: 11 (Marks: 1) Attempted Questions: 11 Total Questions: 52

What is the amplitude of a periodic function defined by $f(x) = 4\sin 2x$?

Choices:

2

4

8

16

TIME LEFT 113

Calculus II (MTH301)

Question: 14 (Marks: 1) Attempted Questions: 14 Total Questions: 52

What is the amplitude of a periodic function defined by $f(x) = 4\cos 3x$?

Choices:

1

3

4

12

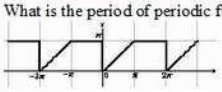
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TIME LEFT 112

Calculus II (MTH301)

Question: 17 (Marks: 1) Attempted Questions: 16 Total Questions: 52

What is the period of periodic function whose graph is as below?



Choices:

- π
- $-\pi$
- 2π
- -2π

TIME LEFT 111

Calculus II (MTH301)

Question: 20 (Marks: 1) Attempted Questions: 19 Total Questions: 52

The graph of an even function is symmetrical about ----------

Choices:

- x-axis
- y-axis
- origin

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TIME LEFT 111

Calculus II (MTH301)

Question: 23 (Marks: 1) Attempted Questions: 22 Total Questions: 52

What is Laplace transform of the function $F(t)$ if $F(t)=t$?

Choices:

$L\{t\}=\frac{1}{s}$

$L\{t\}=\frac{1}{s^2}$

$L\{t\}=e^{-s}$

$L\{t\}=s$

TIME LEFT 108

Calculus II (MTH301)

Question: 26 (Marks: 1) Attempted Questions: 25 Total Questions: 52

Evaluate the line integral $\int_C (xy)\,dx+(1+y^2)\,dy$ where C is the line segment from (1, 0) to (3, 0).

Choices:

-4

0

4

Do not exist

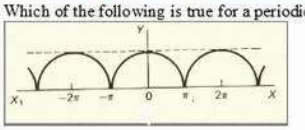
TIME LEFT 104

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Calculus II (MTH301)

Question: 29 (Marks: 1) Attempted Questions: 28 Total Questions: 52

Which of the following is true for a periodic function whose graph is as below?



Choices:

- Even function
- Odd function
- Neither even nor odd function

TIME LEFT 103

Calculus II (MTH301)

Question: 32 (Marks: 1) Attempted Questions: 31 Total Questions: 52

The axis of symmetry of the parabola $y=-2x^2+4x+1$ is .....

Choices:

- $x=2$
- $x=-1$
- $x=4$
- $x=1$

TIME LEFT 102

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Calculus II (MTH301)

Question: 35 (Marks: 1) Attempted Questions: 34 Total Questions: 52

The function $f(x, y) = \sqrt{y - x}$ is continuous in the region --------- and discontinuous elsewhere.

Choices:

- $x \neq y$
- $x \leq y$
- $x > y$
- $x \geq y$

TIME LEFT 101

Calculus II (MTH301)

Question: 38 (Marks: 1) Attempted Questions: 37 Total Questions: 52

For a function to have a relative extremum at a point C, the point must be a . . . . . .

Choices:

- Saddle point
- Critical point
- Negative point
- Stationary point

TIME LEFT 100

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Calculus II (MTH301)

Question: 41 (Marks: 2) Attempted Questions: 40 Total Questions: 52

Let the functions $P(x, y)$ and $Q(x, y)$ have continuous first partial derivatives inside and the boundary C of a region R in the xy-plane. State the condition when the line integral $\int_C (P\,dx + Q\,dy)$ is independent of path.

Answer:

Calculus II (MTH301)

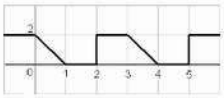
Question: 44 (Marks: 2) Attempted Questions: 40 Total Questions: 52

Find the domain of $f(x, y)$ where $f(x, y) = xe^{x^2+5xy+y^3}$

Calculus II (MTH301)

Question: 47 (Marks: 3) Attempted Questions: 40 Total Questions: 52

Define the periodic function whose graph is shown below.



Calculus II (MTH301)

Question: 50 (Marks: 5) Attempted Questions: 40 Total Questions: 52

Determine the fourier co-efficient b_n of the following periodic function.

$f(x) = x \qquad 0 < x < 1$

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