Final term mcq calculus (Mth301) Solved By vulmshelp.com

FINALTERM EXAMINATION

MTH301- Calculus II

Question No: 1 (Marks: 1) - Please choose one

Q 1. Intersection of two straight lines is ----------

▶Surface

▶Curve

a. **▶Plane pg 13**

• ▶Point

Question No: 2 (Marks: 1) - Please choose one

Plane is a ---------- surface.

▶One-dimensional

▶Two-dimensional

▶Three-dimensional

▶Dimensionless

Question No: 3 (Marks: 1) - Please choose one

Let w = f(x, y, z) and x = g(r, s), y = h(r, s), z = t(r, s) then by chain rule

$\frac{\partial w}{\partial r} =$

▶ $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r}+\frac{\partial w}{\partial y}\frac{\partial y}{\partial r}+\frac{\partial w}{\partial z}\frac{\partial z}{\partial r}$ pg 50

▶ $\frac{\partial w}{\partial r}\frac{\partial x}{\partial r}+\frac{\partial w}{\partial r}\frac{\partial y}{\partial r}+\frac{\partial w}{\partial r}\frac{\partial z}{\partial r}$

▶ $\frac{\partial w}{\partial x}\frac{\partial x}{\partial r}\frac{\partial x}{\partial s}+\frac{\partial w}{\partial y}\frac{\partial y}{\partial r}\frac{\partial y}{\partial s}+\frac{\partial w}{\partial z}\frac{\partial z}{\partial r}\frac{\partial z}{\partial s}$

▶ $\frac{\partial w}{\partial r}\frac{\partial r}{\partial x}+\frac{\partial w}{\partial r}\frac{\partial r}{\partial y}+\frac{\partial w}{\partial r}\frac{\partial r}{\partial z}$

▶

Question No: 4 (Marks: 1) - Please choose one

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

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

▶ $x=\sin^2 t \quad , \quad y=1-\cos 2t \quad , \quad z=0$ pg 140

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

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

▶ $x=\sin^2 t \quad , \quad y=\cos 2t \quad , \quad z=1$

Question No: 5 (Marks: 1) - Please choose one

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

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

- $z = 2t-1 \quad , \quad x = -3\sqrt{t} \quad , \quad y = \sin 3t$
- $y = 2t-1 \quad , \quad x = -3\sqrt{t} \quad , \quad z = \sin 3t$
- $x = 2t-1 \quad , \quad z = -3\sqrt{t} \quad , \quad y = \sin 3t$
- $x = 2t-1 \quad , \quad y = -3\sqrt{t} \quad , \quad z = \sin 3t$ pg 140

Question No: 6 (Marks: 1) - Please choose one

What is the derivative of following vector-valued function?

$\vec{r}(t) = (\cos 5t,\ \tan t\ ,\ 6\sin t)$

- $\vec{r}'(t) = \left(\frac{\sin 5t}{5},\ \sec t\ ,\ 6\cos t\right)$

- $\vec{r}'(t) = (\frac{-\sin 5t}{5},\ \sec t\ ,\ 6\cos t)$
- $\vec{r}'(t) = (-5\sin 5t,\ \sec^2 t\ ,\ 6\cos t)$ According to formula at pg 145
- $\vec{r}'(t) = (\sin 5t,\ \sec^2 t\ ,\ -6\cos t)$

Question No: 7 (Marks: 1) - Please choose one

What is the derivative of following vector-valued function?

$$\vec{r}(t) = \left(t^4, \sqrt{t+1}, \frac{3}{t^2} \right)$$

$$\vec{r}'(t) = \left(4t^3, \frac{1}{\sqrt{t+1}}, \frac{-6}{t^3} \right)$$

▶

$$\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{6}{t^3} \right)$$

▶

$$\vec{r}'(t) = \left(4t^4, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3} \right)$$

▶

$$\vec{r}'(t) = \left(4t^3, \frac{1}{2\sqrt{t+1}}, \frac{-6}{t^3} \right)$$

▶ Correct answer according to derivative property

Question No: 8 (Marks: 1) - Please choose one

The following differential is exact

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

▶True

▶**False** **formula at pg 155**

Question No: 9 (Marks: 1) - Please choose one

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

▶ $$\int_0^{\frac{\pi}{2}} \sin^n x\, dx = \frac{\pi}{2} \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \cdots\cdots\cdots \frac{5}{6} \frac{3}{4} \frac{1}{2}$$ pg 182

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

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

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

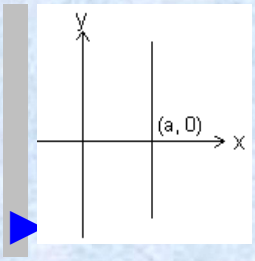
▶

Question No: 10 (Marks: 1) - Please choose one

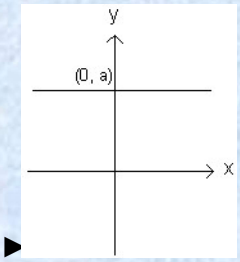
Match the following equation in polar co-ordinates with its graph.

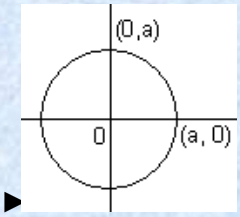
$r \cos\theta = a$

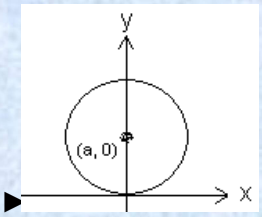
where a is an arbitrary cons $\tan t$



pg 126







Question No: 11 (Marks: 1) - Please choose one

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(r, \pi - \theta)$ then the curve is said to be symmetric about which of the following?

▶Initial line

▶y-axis pg 128

▶Pole

Question No: 12 (Marks: 1) - Please choose one

If the equation of a curve, in polar co-ordinates, remains unchanged after replacing (r, θ) by $(-r, \theta)$ then the curve is said to be symmetric about which of the following?

▶Initial line

▶y-axis

▶**Pole** **pg 128**

Question No: 13 (Marks: 1) - Please choose one

$$f(x) = \sin\frac{x}{3}$$

What is the amplitude of a periodic function defined by ?

▶0

▶1 pg 197

▶$\frac{1}{3}$

▶

▶Does not exist

Question No: 14 (Marks: 1) - Please choose one

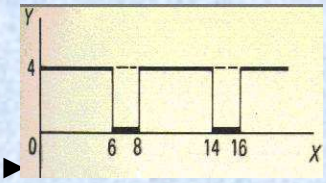
What is the period of a periodic function defined by $f(x) = 4\cos 3x$?

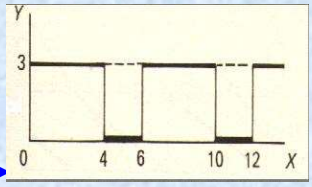
- $\frac{\pi}{4}$
- $\frac{\pi}{3}$
- $\frac{2\pi}{3}$ pg 197
- π

Question No: 15 (Marks: 1) - Please choose one

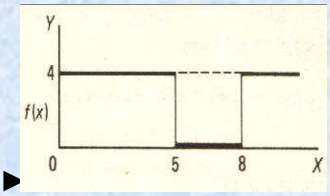
Match the following periodic function with its graph.

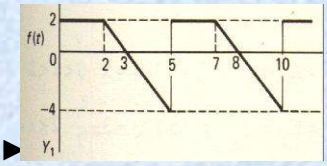
$$f(x) = \begin{cases} 3 & 0 < x < 4 \\ 0 & 4 < x < 6 \end{cases}$$

- 

- 

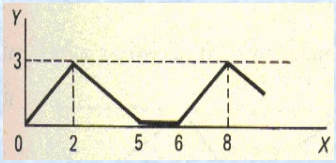
pg 197





Question No: 16 (Marks: 1) - Please choose one

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



▶2

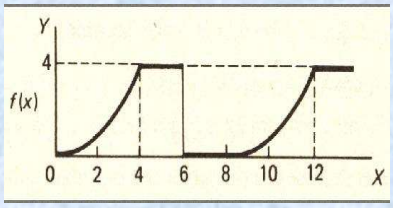
▶5

▶6 **pg 197**

▶8

Question No: 17 (Marks: 1) - Please choose one

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



▶0

▶4

▶6

▶8 pg 198

Question No: 18 (Marks: 1) - Please choose one

Let L denotes the Laplace Transform.

If $L\{F(t)\} = f(s)$ where s is a constant.and $\lim_{t\to 0}\left(\frac{F(t)}{t}\right)$ exists then which of the following equation holds?

$$L\left(\frac{F(t)}{t}\right) = f(s+a)$$

▶

$$L\left(\frac{F(t)}{t}\right)=f(s-a)$$

▶

$$L\left(\frac{F(t)}{t}\right)=\int_{s}^{\infty} f(s)\,ds$$

pg 227

▶

$$L\left(\frac{F(t)}{t}\right)=-\frac{d}{ds}\{f(s)\}$$

▶

Question No: 19 (Marks: 1) - Please choose one

Which of the following is Laplace inverse transform of the function $f(s)$ defined by $f(s)=\frac{3}{s-2}-\frac{2}{s}$?

▶$3te^{2t}-2$

▶$3e^{2t}-2t$

▶$3e^{2t}-2$ correct answer

▶None of these.

Question No: 20 (Marks: 1) - Please choose one

Let (x_1, y_1, z_1) and (x_2, y_2, z_2) be any two points in three dimensional space. What does the formula $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$ calculates?

▶Distance between these two points pg 11

▶Midpoint of the line joining these two points

▶Ratio between these two points

Question No: 21 (Marks: 1) - Please choose one

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

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

▶Zero pg 170

▶One

▶Infinite

Question No: 22 (Marks: 1) - Please choose one

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

- ▶ $L\{t\}=\frac{1}{s}$ pg 222 Laplace transform of constant =a/s
- ▶ $L\{t\}=\frac{1}{s^2}$
- ▶ $L\{t\}=e^{-s}$
- ▶ $L\{t\}=s$

Question No: 23 (Marks: 1) - Please choose one

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

- ▶ $L\{e^{5t}\}=\frac{1}{s-5}$ pg 222
- ▶ $L\{e^{5t}\}=\frac{s}{s^2+25}$
- ▶ $L\{e^{5t}\}=\frac{5}{s^2+25}$
- ▶ $L\{e^{5t}\}=\frac{5!}{s^6}$

Question No: 24 (Marks: 1) - Please choose one

$$\int_C (3x+2y)\,dx+(2x-y)\,dy$$

Evaluate the line integral where C is the line segment from (0, 0) to (0, 2).

▶1

▶0

▶2 keeping x=0,dx=0 and limits of y 0 to 2

▶-2

Question No: 25 (Marks: 1) - Please choose one

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

Evaluate the line integral where C is the line segment from (0, 0) to (2, 0).

▶0

▶-4

▶4 putting y=0,dy=0 and x from 0 to 2

▶Do not exist

Question No: 26 (Marks: 1) - Please choose one

Which of the following are direction ratios for the line joining the points $(1, 3, 5)$ and $(2, -1, 4)$?

▶3, 2 and 9

▶1, -4 and -1 pg 13

▶2, -3 and 20

▶0.5, -3 and 5/4

Question No: 27 (Marks: 1) - Please choose one

$If\ R = \{(x, y) / 0 \le x \le 2\ and\ 1 \le y \le 4\}, then$

$\iint_R (6x^2 + 4xy^3)dA =$

$\int_1^4 \int_0^2 (6x^2 + 4xy^3)dydx$

▶

$\int_0^2 \int_1^4 (6x^2 + 4xy^3)dxdy$

▶

$\int_1^4 \int_0^2 (6x^2 + 4xy^3)dxdy$ Correct answer

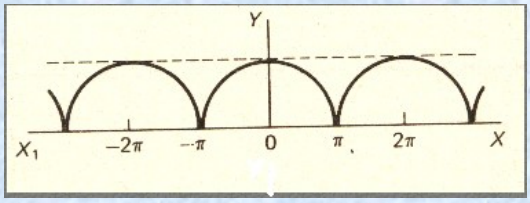
▶

$\int_2^4 \int_0^1 (6x^2 + 4xy^3)dxdy$

▶

Question No: 28 (Marks: 1) - Please choose one

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

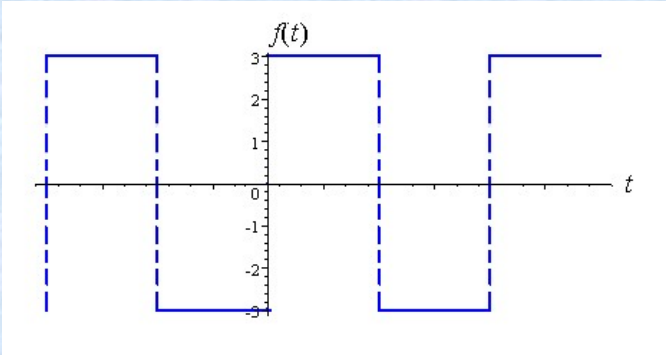


▶Even function pg 208

▶Odd function

▶Neither even nor odd function

Question No: 29 (Marks: 1) - Please choose one



Which of the following is true for a function whose graph is given above

▶An odd function pg 207

▶An even function

▶Neither even nor odd

Question No: 30 (Marks: 1) - Please choose one

At each point of domain, the function ----------

▶Is defined

▶Is continuous

▶Is infinite

▶Has a limit

Solution:

In domain function is always defined but may be discontinuous

Question No: 1 (Marks: 1) - Please choose one

π is an example of ----------

▶ Irrational numbers pg 3

▶ Rational numbers

▶ Integers

Question No: 2 (Marks: 1) - Please choose one

Straight line is a special kind of ----------

- ▶ Surface
- ▶ Curve
- ▶ Plane pg 13
- ▶ Parabola

An ordered triple corresponds to ---------- in three dimensional space.

- ▶ A unique point
- ▶ A point in each octant
- ▶ Three points
- ▶ Infinite number of points

Question No: 4 (Marks: 1) - Please choose one

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

- ▶ Direction cosines
- ▶ Direction ratios
- ▶ Direction angles pg 11

Question No: 5 (Marks: 1) - Please choose one

Is the function $f(x, y)$ continuous at origin? If not, why?

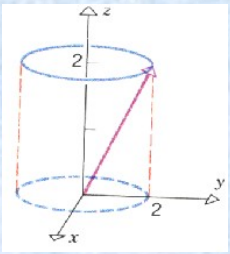
$f(x, y) = 4xy + \sin 3x^2 y$

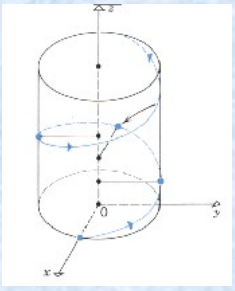
- ▶ $f(x, y)$ is continuous at origin
- ▶ $f(0, 0)$ is not defined
- ▶ $f(0, 0)$ is defined but $\lim_{(x,y)\to(0, 0)} f(x, y)$ does not exist
- ▶ $f(0, 0)$ is defined and $\lim_{(x,y)\to(0, 0)} f(x, y)$ exists but these two numbers are not equal.

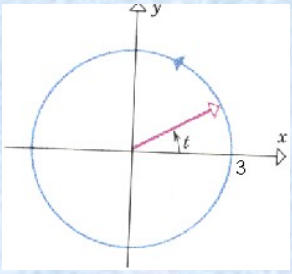
Question No: 6 (Marks: 1) - Please choose one

Match the following vector-valued function with its graph.

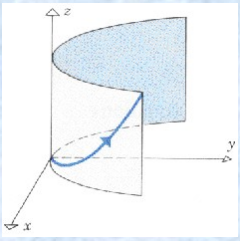
$r(t) = 3\cos t\,\hat{i} + 3\sin t\,\hat{j}$ and $0 \le t \le 2\pi$

- ▶ 

▶ 

▶ 

pg 141

▶ 

Question No: 9 (Marks: 1) - Please choose one

Is the following vector-valued function $\vec{r}(t)$ continuous at $t=0$? If not, why?

$\vec{r}(t)=(4\cos t,\ \sqrt{t}\ ,\ 4\sin t)$

▶ $\vec{r}(0)$ is not defined

- $\vec{r}(0)$ is defined but $\lim_{t\to 0}\vec{r}(t)$ does not exist

- $\vec{r}(0)$ is defined and $\lim_{t\to 0}\vec{r}(t)$ exists but these two numbers are not equal.

- $\vec{r}(t)$ is continuous at $t=0$

Question No: 13 (Marks: 1) - Please choose one

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

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

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

- $\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \frac{(n-1)}{n}\frac{(n-3)}{(n-2)}\frac{(n-5)}{(n-4)}\cdots\cdots\cdots\frac{6}{7}\frac{4}{5}\frac{2}{3}$ pg 182

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

▶

Question No: 14 (Marks: 1) - Please choose one

Which of the following is correct?

$$\int_0^{\frac{\pi}{2}} \sin^4 x\, dx = \frac{3}{16}$$

▶

$$\int_0^{\frac{\pi}{2}} \sin^4 x\, dx = \frac{3\pi}{16}$$ pg 181

▶

$$\int_0^{\frac{\pi}{2}} \sin^4 x\, dx = \frac{3}{8}$$

▶

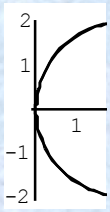
$$\int_0^{\frac{\pi}{2}} \sin^4 x\, dx = \frac{2\pi}{3}$$

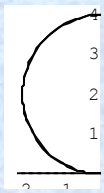
▶

Question No: 15 (Marks: 1) - Please choose one

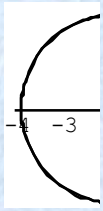
Match the following equation in polar co-ordinates with its graph.

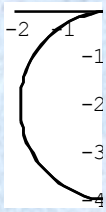
$r = 4\sin\theta$

▶ 

▶ 

not sure

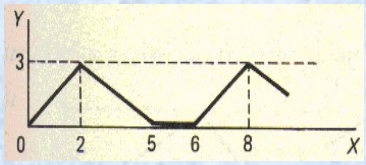
▶ 

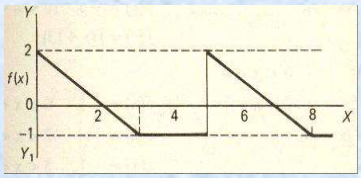
▶ 

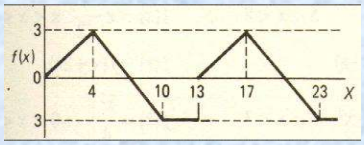
Question No: 18 (Marks: 1) - Please choose one

Match the following periodic function with its graph.

$$f(x)=\begin{cases}\frac{3}{4}x & 0<x<4\\ 7-x & 4<x<10\\ -3 & 10<x<13\end{cases}$$

▶ 

▶ 

▶ 

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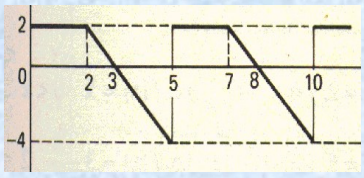
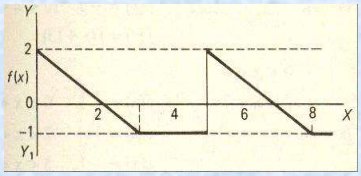
▶ 

Question No: 19 (Marks: 1) - Please choose one

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



▶ 2

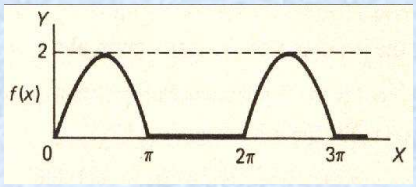
▶ 3

▶ 4

▶ 5 pg 198

Question No: 20 (Marks: 1) - Please choose one

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



▶ 0

▶ 2

▶ π

▶ 2π pg 198

Question No: 21 (Marks: 1) - Please choose one

$$\left(-2, \frac{-3\pi}{2}\right)$$

Polar co-ordinates of a point are . Which of the following is another possible polar co-ordinates representation of this point?

- $\left(2, \frac{-\pi}{4}\right)$
- $\left(2, \frac{-\pi}{2}\right)$
- $\left(2, \frac{-\pi}{3}\right)$
- $\left(2, \frac{3\pi}{4}\right)$ not sure

Question No: 22 (Marks: 1) - Please choose one

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

- Even function
- Odd function
- Neither even nor odd pg 209

Question No: 23 (Marks: 1) - Please choose one

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

- x-axis
- y-axis pg 207
- origin

Question No: 24 (Marks: 1) - Please choose one

At which point the vertex of parabola, represented by the equation $y = x^2 - 4x + 3$, occurs?

- $(0, 3)$
- $(2, -1)$ pg 9
- $(-2, 15)$
- $(1, 0)$

Question No: 25 (Marks: 1) - Please choose one

The equation $y = x^2 - 4x + 2$ represents a parabola. Find a point at which the vertex of given parabola occurs?

- $(2, -2)$ pg 9
- $(-4, 34)$
- $(0, 0)$
- $(-2, 14)$

Question No: 26 (Marks: 1) - Please choose one

Is the function $f(x, y)$ continuous at origin? If not, why?

$$f(x, y) = \frac{xy}{x^2 + y^2}$$

- $f(x, y)$ is continuous at origin
- $\lim_{(x,y)\to(0, 0)} f(x, y)$ limt does not exist pg 27
- $f(0, 0)$ is defined and $\lim_{(x,y)\to(0, 0)} f(x, y)$ exists but these two numbers are not equal.

Question No: 27 (Marks: 1) - Please choose one

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

- path of integration is divided into parts.
- path of integration is parallel to y-axis.
- direction of path of integration is reversed. Pg 175
- path of integration is parallel to x-axis.

Question No: 28 (Marks: 1) - Please choose one

What is Laplace transform of a function F(t)?

(s is a constant)

- $\int_0^s e^{-st}\ F(t)\ dt$
- $\int_0^\infty e^{st}\ F(t)\ dt$
- $\int_{-\infty}^\infty e^{-st}\ F(t)\ dt$
- $\int_0^\infty e^{-st}\ F(t)\ dt$ pg 222

Question No: 29 (Marks: 1) - Please choose one

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

- $L\{e^{5t}\} = \frac{1}{s-5}$ according to pg 223
- $L\{e^{5t}\} = \frac{s}{s^2+25}$
- $L\{e^{5t}\} = \frac{5}{s^2+25}$
- $L\{e^{5t}\} = \frac{5!}{s^6}$

Question No: 30 (Marks: 1) - Please choose one

What is the Laplace Inverse Transform of $\frac{1}{s+1}$

- ▶ $L^{-1}\left\{\frac{1}{s+1}\right\} = t+1$
- ▶ $L^{-1}\left\{\frac{1}{s+1}\right\} = e^{-t}+e^{t}$
- ▶ $L^{-1}\left\{\frac{1}{s+1}\right\} = e^{t}$
- ▶ $L^{-1}\left\{\frac{1}{s+1}\right\} = e^{-t}$ pg 231 formula

Question No: 31 (Marks: 1) - Please choose one

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

- ▶ $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \sin 5t$ pg 231
- ▶ $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \cos 5t$
- ▶ $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \sin 25t$
- ▶ $L^{-1}\left\{\frac{5}{s^2+25}\right\} = \cos 25t$

Question No: 32 (Marks: 1) - Please choose one

What is $L\{-6\}$ if L denotes Laplace Transform?

- $L\{-6\} = \frac{1}{s+6}$
- $L\{-6\} = \frac{-6}{s}$ pg 223
- $L\{-6\} = \frac{s}{s^2+36}$
- $L\{-6\} = \frac{-6}{s^2+36}$

Question No: 37 (Marks: 1) - Please choose one

To evaluate the line integral, the integrand is expressed in terms of x, y, z with

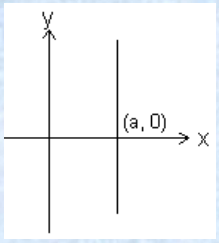
- $dr = dx\,\hat{i} + dy\,\hat{j}$
- $dr = dx\,\hat{i} + dy\,\hat{j} + dy\,\hat{k}$ pg 185
- $dr = dx + dy + dz$
- $dr = dx + dy$

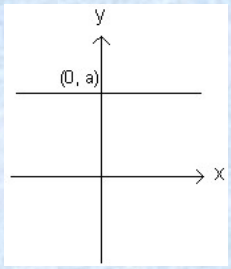
Question No: 38 (Marks: 1) - Please choose one

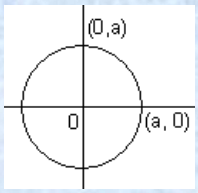
Match the following equation in polar co-ordinates with its graph.

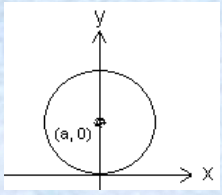
$r = a$

where a is an arbitrary constant.

▶ 

▶ 

▶ 

▶ 

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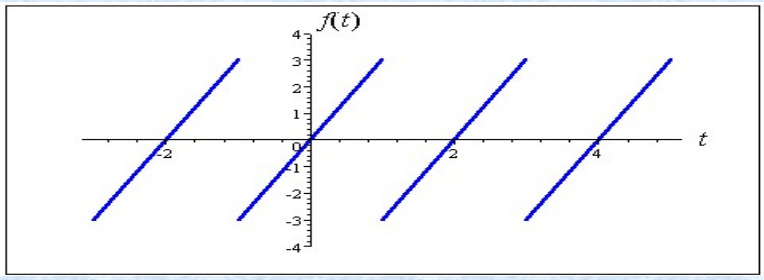
Question No: 40 (Marks: 1) - Please choose one



The graph of "saw tooth wave" given above is ----------

- ► An odd function because it is passing through the region
- ► An even function
- ► Neither even nor odd