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All Dearz fellows

ALL IN ONE MTH301

Final term PAPERS & MCQz

Created BY Farhan & Ali

BS (cs) 2nd sem

Hackers Group

From Mandi Bahauddin

Remember us in your prayers

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VU Students.net

FINALTERM EXAMINATION

Spring 2010

MTH301- Calculus II

Time: 90 min

Marks: 60

Student Info	
Student ID:	
Center:	
Exam Date:	

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Q No.	1	2	3	4	5	6	7	8	Total
Marks									
Q No.	9	10	11	12	13	14	15	16	
Marks									
Q No.	17	18	19	20	21	22	23	24	
Marks									
Q No.	25	26	27	28	29	30	31	32	
Marks									
Q No.	33	34	35	36	37	38	39		
Marks									



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

Intersection of two straight lines is -----

- ▶ Surface
- ▶ Curve
- ▶ Plane
- ▶ **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

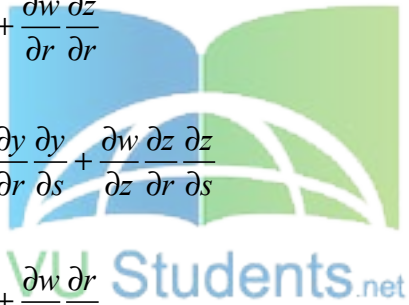
$$\frac{\partial w}{\partial r} =$$

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

What is the derivative of following vector-valued function?

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

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

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

▶ $\vec{r}'(t) = (-5 \sin 5t, \sec^2 t, 6 \cos t)$

▶ $\vec{r}'(t) = (\sin 5t, \sec^2 t, -6 \cos t)$

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

What is the derivative of following vector-valued function?

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

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

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

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

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

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

The following differential is exact

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

► True

► False

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

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

► $\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{\pi}{2} \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \dots \frac{5}{6} \frac{3}{4} \frac{1}{2}$ page #182

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

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

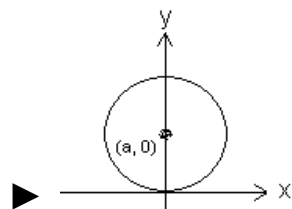
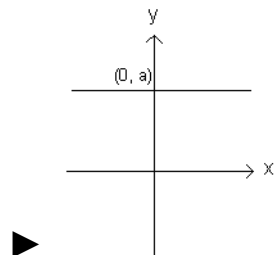
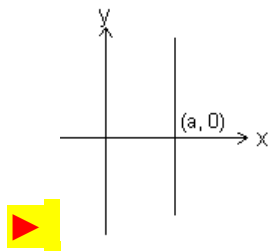
► $\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{(n)}{(n-1)} \frac{(n-2)}{(n-3)} \frac{(n-4)}{(n-5)} \dots \frac{6}{5} \frac{4}{3} \frac{2}{1}$

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 constant



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 <http://www.vustudents.net>
- ▶ **Y-axis**
- ▶ 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**



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

What is the amplitude of a periodic function defined by

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

- ▶ **0**
- ▶ 1

- ▶ $\frac{1}{3}$
- ▶ Does not exist

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

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

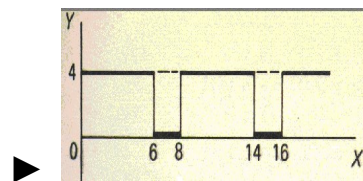
- ▶ $\frac{\pi}{4}$
- ▶ $\frac{\pi}{3}$
- ▶ $\frac{2\pi}{3}$
- ▶ π

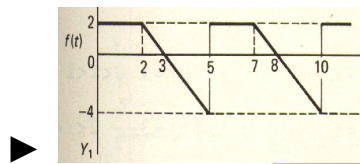
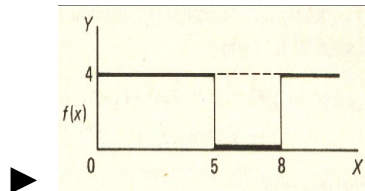
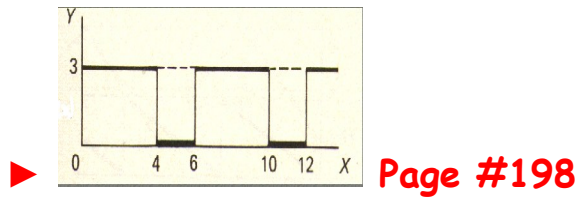


Question No: 15 (Marks: 1) - Please choose one

Match the following periodic function with its graph.

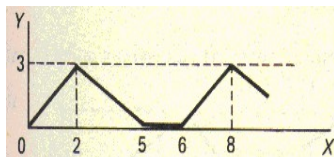
$$f(x) = \begin{cases} 3 & 0 < x < 4 \\ 0 & 4 < x < 6 \end{cases}$$





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

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



▶ 2

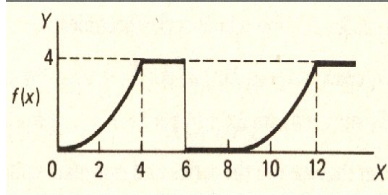
▶ 5

▶ 6

▶ 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



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 $\lim_{t \rightarrow 0} \left(\frac{F(t)}{t} \right)$ exists then which of the following equation holds?

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

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

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

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

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

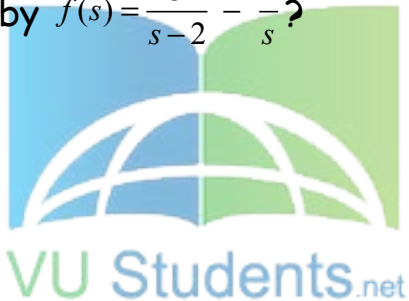
Which of the following is Laplace inverse transform of the function $f(s)$ defined by $f(s) = \frac{3}{s-2} - \frac{2}{s}$?

▶ $3te^{2t} - 2$

▶ $3e^{2t} - 2t$

$3e^{2t} - 2$

▶ 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

- ▶ 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
- ▶ One
- ▶ Infinite



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

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

▶ $L\{t\} = \frac{1}{s}$

▶ $L\{t\} = \frac{1}{s^2}$

▶ $L\{t\} = e^{-s}$

▶ $L\{t\} = s$

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

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

▶ $L\{e^{5t}\} = \frac{1}{s-5}$

▶ $L\{e^{5t}\} = \frac{s}{s^2+25}$

▶ $L\{e^{5t}\} = \frac{5}{s^2+25}$

▶ $L\{e^{5t}\} = \frac{5!}{s^6}$



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

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

▶ 1

▶ 0

▶ 2

▶ -2

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

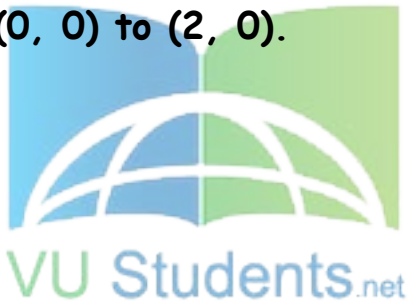
Evaluate the line integral $\int_C (2x+y) dx + (x^2-y) dy$ where C is the line segment from $(0, 0)$ to $(2, 0)$.

▶ 0

▶ -4

▶ 4

▶ 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

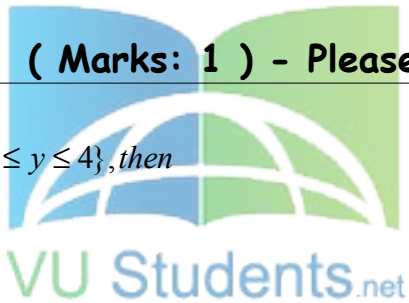
▶ 2, -3 and 20

▶ 0.5, -3 and 5/4

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

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

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



▶ $\int_1^4 \int_0^2 (6x^2 + 4xy^3) dy dx$

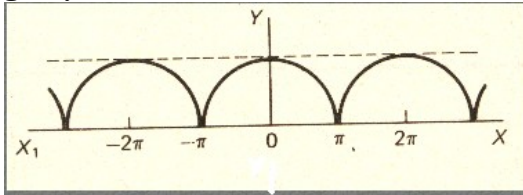
▶ $\int_0^2 \int_1^4 (6x^2 + 4xy^3) dx dy$

▶ $\int_1^4 \int_0^2 (6x^2 + 4xy^3) dx dy$

▶ $\int_2^4 \int_0^1 (6x^2 + 4xy^3) dx dy$

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

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



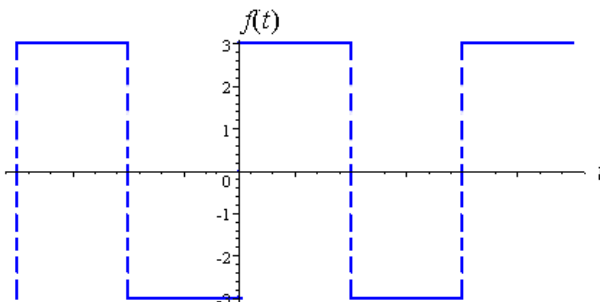
▶ **Even function** page209

▶ 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 212

- ▶ 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

Question No: 31 (Marks: 2)

Determine whether the following differential is exact or not.

$$dz = 4x^3y^3 dx + 3x^4y^2 dy$$

Solution:

$$dz = 4x^3y^3 dx + 3x^4y^2 dy$$

$$\frac{\partial p}{\partial y} = 12x^3y^2$$

$$\frac{\partial Q}{\partial X} = 12x^3y^2$$

$$\frac{\partial p}{\partial y} = \frac{\partial Q}{\partial X}$$

yes

Question No: 32 (Marks: 2)

Evaluate

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

where n is an integer other than zero.

Solution:



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

$$= \left[\frac{-\cos nx}{n} \right]_{-\pi}^{\pi}$$

$$= \left[\frac{-\cos n\pi}{n} + \frac{\cos n\pi}{n} \right]$$

$$= \frac{1}{n} (-\cos n\pi + \cos n\pi)$$

$$= 0$$

Question No: 33 (Marks: 2)

Find Laplace transform of the function $F(t)$ if $F(t) = e^{3t}$

Solution:

$$\begin{aligned}
L(e^{3t}) &= \int_0^{\infty} e^{3t} - e^{-st} \\
&= \int_0^{\infty} e^{-(s-3)t} .dt \\
&= \left\{ \frac{e^{-(s-3)t}}{-(s-3)} \right\} \lim_{0 \rightarrow \infty} \\
&= \frac{-1}{s-3} \left(\frac{1}{e^{(s-3)t}} \right) \\
&= \frac{-1}{s-3} (0-1) \\
&= \frac{1}{s-3} \dots \dots \text{Ans}
\end{aligned}$$



Question No: 34 (Marks: 3)

Determine the Fourier co-efficient a_0 of the periodic function defined below:

$$f(x) = 2x + 1 \quad 0 < x < 2$$

Solution:

$$a_0 = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) dx$$

$$f(x) = (2x + 1)$$

$$(0, 2)$$

$$= \int_0^2 (2x + 1) dx$$

$$= [x^2 + x]_0^2$$

$$= 6$$

Question No: 35 (Marks: 3)

Determine whether the following differential is exact or not.

$$dz = (3x^2e^{2y} - 2y^2e^{3x}) dx + (2x^3e^{2y} - 2ye^{3x}) dy$$

Solution:

$$dz = Pdx + Qdy$$

Therefore,

For dz to be an exact differential it must satisfy $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}$

But this test fails because $\frac{\partial P}{\partial y} \neq \frac{\partial Q}{\partial x}$

Not Exact

Question No: 36 (Marks: 3)

Use Wallis sine formula to evaluate $\int_0^{\frac{\pi}{2}} (\sin^3 x + \sin^5 x) dx$

Solution:

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

$$= \frac{n-1}{n}$$

$$= \frac{3-1}{3}$$

$$= \frac{2}{3}$$

$$\int_0^{\frac{\pi}{2}} \sin^5 x dx$$

$$= \frac{n-1}{n} \cdot \frac{n-3}{n-2}$$

$$= \frac{5-1}{5} \cdot \frac{5-3}{5-2}$$

$$= \frac{4}{5} \cdot \frac{2}{3}$$

$$\int_0^{\frac{\pi}{2}} (\sin^3 x + \sin^5 x) dx$$

$$= \frac{2}{3} + \frac{4}{5} \cdot \frac{2}{3}$$



Question No: 37 (Marks: 5)

Evaluate the following line integral which is independent of path.

$$\int_{(0,0)}^{(3,2)} (2xe^y) dx + (x^2e^y) dy$$

Solution:

$$p = \frac{\partial z}{\partial x} = 2e^y \quad \int 2e^y dx$$

$$Q = \frac{\partial z}{\partial y} = x^2 e^y \quad \int x^2 e^y dy$$

$$z = \int_{(0,0)}^{(3,2)} 2xe^y + x^2 ye^y$$

$$z = 6e^2 + 18e^2$$

$$z = 24e^2$$

Question No: 38 (Marks: 5)

Determine the Fourier coefficients b_n for a periodic function $f(t)$ of period 2 defined by

$$f(t) = \begin{cases} 4(1+t) & -1 < t < 0 \\ 0 & 0 < t < 1 \end{cases}$$



Solution:

$$b_n = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \sin nx dx$$

$$= \frac{1}{\pi} \int_{-1}^1 4(1+t) \sin nx dx$$

$$= \frac{1}{\pi} \left[\frac{-4(1+t) \cos nx}{n} \right]_{-1}^1$$

$$= \frac{-4(1+t)}{\pi n} [\cos n(1) - \cos n(-1)]$$

$$= \frac{-4(1+t)}{\pi n} (\cos n + \cos n)$$

Question No: 39 (Marks: 5)

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

$$\vec{F}(x, y, z) = (4x - z)\hat{i} + (3y + z)\hat{j} + (y - x)\hat{k}$$

.....

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Final term PAPERS & MCQz
Created BY Farhan & Ali
BS (cs) 2nd sem
Hackers Group
From Mandi Bahauddin
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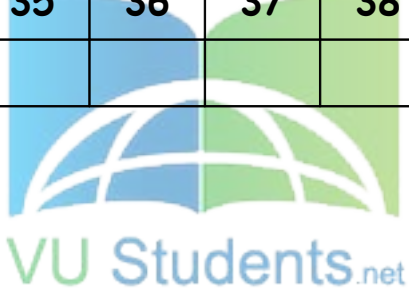
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FINALTERM EXAMINATION
Spring 2010
MTH301- Calculus II (Session - 2)

Time: 90 min
Marks: 60

Student Info	
StudentID:	\$\$
Center:	OPKST
ExamDate:	19 Aug 2010

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Q No.	1	2	3	4	5	6	7	8	Total
Marks									
Q No.	9	10	11	12	13	14	15	16	
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Q No.	25	26	27	28	29	30	31	32	
Marks									
Q No.	33	34	35	36	37	38	39		
Marks									



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

----- planes intersect at right angle to form three dimensional space.

- ▶ **Three**
- ▶ Four
- ▶ Eight
- ▶ Twelve

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

If the positive direction of x, y axes are known then ----- the positive direction of z-axis.

- ▶ Horizontal rightward direction is
- ▶ Vertical upward direction is
- ▶ **Left hand rule tells**
- ▶ Right hand rule tells

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

What is the distance between points (3, 2, 4) and (6, 10, -1)?

- ▶ **$7\sqrt{2}$**
- ▶ $2\sqrt{6}$
- ▶ $\sqrt{34}$
- ▶ $7\sqrt{3}$

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

The equation $ax+by+cz+d=0$, where a,b,c,d are real numbers, is the general equation of which of the following?

▶ **Plane page # 12**

- ▶ Line
- ▶ Curve
- ▶ Circle

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

The spherical co-ordinates of a point are $\left(\sqrt{3}, \frac{\pi}{3}, \frac{\pi}{2}\right)$. What are its cylindrical co-ordinates?

▶ $\left(\frac{\sqrt{3}}{2}, \frac{3}{2}, 0\right)$

▶ $\left(\sqrt{3} \cos \frac{\pi}{3}, \sqrt{3} \sin \frac{\pi}{3}, 0\right)$

▶ $\left(\sqrt{3} \sin \frac{\pi}{3}, \frac{\pi}{2}, \sqrt{3} \cos \frac{\pi}{3}\right)$

▶ $\left(\sqrt{3}, \frac{\pi}{3}, 0\right)$



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

Domain of the function $f(x, y) = \sqrt{y-x^2}$ is

▶ $y < x^2$

▶ $y \geq x^2$

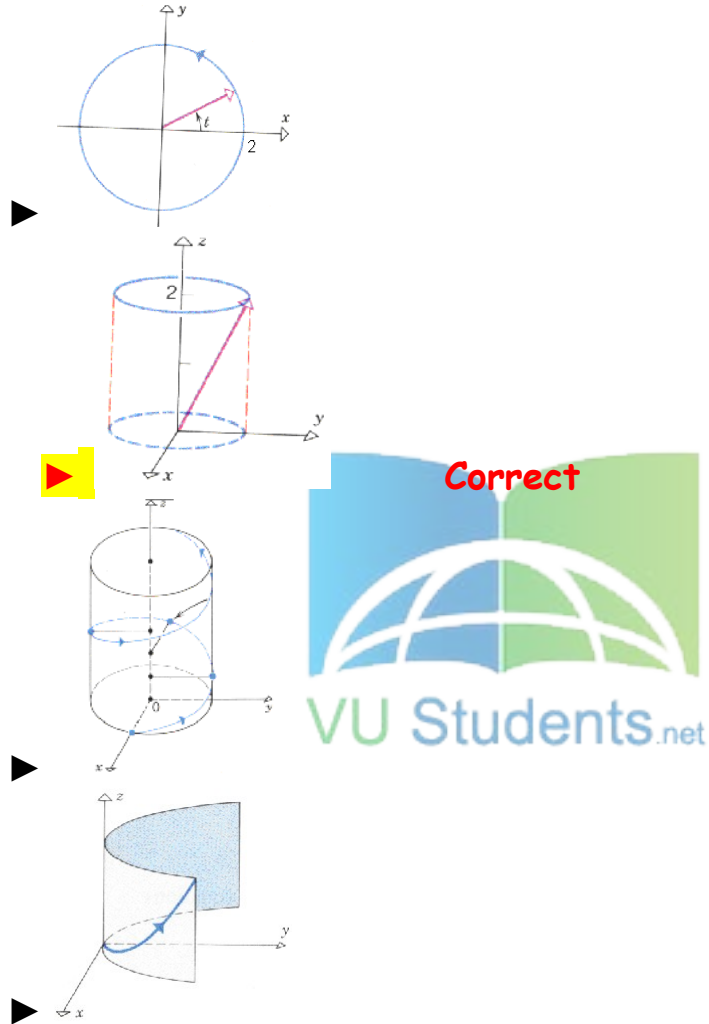
▶ $y \neq x^2$

▶ Entire space

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

Match the following vector-valued function with its graph.

$$\vec{r}(t) = \cos t \hat{i} + \sin t \hat{j} + 2t \hat{k} \quad \text{And } 0 \leq t \leq 2\pi$$



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

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

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

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

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

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

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

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

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

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

Is the following vector-valued function $\vec{r}(t)$ continuous at $t=1$?

If not, why?

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

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

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

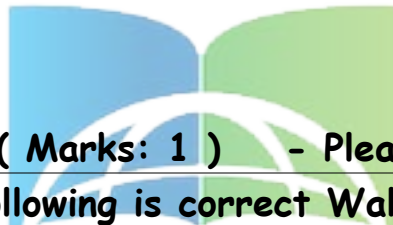
Which one of the following is correct Wallis Sine formula when n is even and $n \geq 2$?

$$\int_0^{\frac{\pi}{2}} \sin^n x \, dx = \frac{\pi}{2} \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \dots \frac{5}{6} \frac{3}{4} \frac{1}{2} \quad \text{page 183}$$

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

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

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



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

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

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

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

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

$$\int_0^{\frac{\pi}{2}} \cos^n x \, dx = \frac{(n-1)}{n} \frac{(n-3)}{(n-2)} \frac{(n-5)}{(n-4)} \dots \frac{6}{7} \frac{4}{5} \frac{2}{3} \quad \text{page 183}$$

Question No: 13 (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**
- ▶ Pole

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

If $a > 0$, then the equation, in polar co-ordinates, of the form $r^2 = a^2 \cos 2\theta$ represent which of the following family of curves?

- ▶ **Lemiscate** **page 130**
- ▶ Cardioids
- ▶ Rose curves
- ▶ Spiral



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

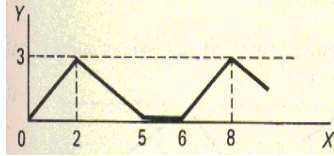
What is the period of a periodic function defined by $f(x) = \sin \frac{x}{2}$

?

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

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

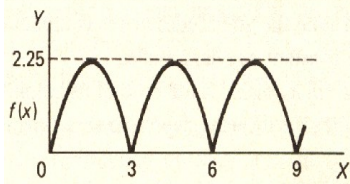
What is the period of periodic function whose graph is as below?



- ▶ 2
- ▶ 5
- ▶ 6
- ▶ 8

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

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



- ▶ 0
- ▶ 2.25
- ▶ 3
- ▶ 6

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, then which of the following equation holds?

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

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

The graph of an odd function is symmetrical about

- ▶ x-axis
- ▶ y-axis
- ▶ **origin**

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

Consider the function $f(x, y, z) = \sqrt{1-x^2-y^2-z^2}$. What is the value of $f\left(0, \frac{1}{2}, \frac{1}{2}\right)$ □

▶ $f\left(0, \frac{1}{2}, \frac{1}{2}\right) = \sqrt{\frac{1}{2}}$

▶ $f\left(0, \frac{1}{2}, \frac{1}{2}\right) = 2$

▶ $f\left(0, \frac{1}{2}, \frac{1}{2}\right) = \frac{1}{2}$

▶ $f\left(0, \frac{1}{2}, \frac{1}{2}\right) = 0$



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

The path of integration of a line integral must be

- ▶ straight and single-valued
- ▶ **continuous and single-valued**
- ▶ straight and multiple-valued
- ▶ continuous and multiple-valued

Question No: 22 (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.**
- ▶ path of integration is parallel to x-axis.

Question No: 23 (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**
- ▶ One
- ▶ Infinite



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

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

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

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

What is laplace transform of the function $F(t)$ if $F(t) = \sin 3t$?

- ▶ $L\{\sin 3t\} = \frac{3}{s^2+9}$
- ▶ $L\{\sin 3t\} = \frac{s}{s^2+9}$

- ▶ $L\{\sin 3t\} = \frac{1}{s-3}$
- ▶ $L\{\sin 3t\} = \frac{3!}{s^4}$

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

If L denotes laplace transform then

$L\{te^{5t}\} =$

- ▶ $L\{te^{5t}\} = \frac{1}{s^2-5}$
- ▶ $L\{te^{5t}\} = \frac{1}{s^2+5}$
- ▶ $L\{te^{5t}\} = \frac{1}{(s+5)^2}$
- ▶ $L\{te^{5t}\} = \frac{1}{(s-5)^2}$



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

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

- ▶ 1
- ▶ 0
- ▶ 2
- ▶ -2

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

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

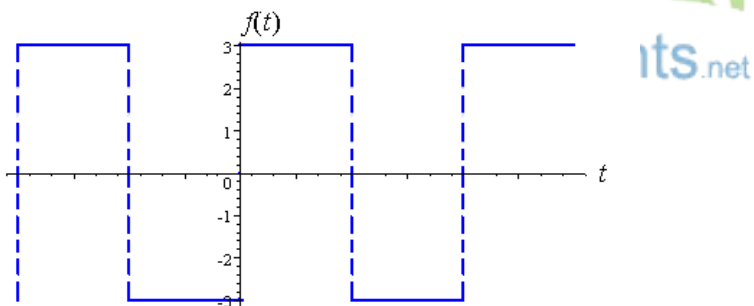
- ▶ -4
- ▶ **-2**
- ▶ 0
- ▶ 2

Question No: 29 (Marks: 1) - Please choose one
Divergence of a vector function is always a -----

- ▶ Scalar
- ▶ **Vector**



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



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

- ▶ **An odd function**
- ▶ An even function
- ▶ Neither even nor odd

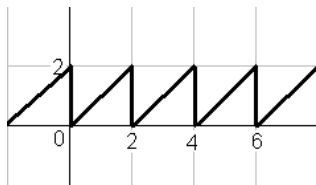
Question No: 31 (Marks: 2)

Does the following limit exist? If yes find its value, if no give reason

$$\lim_{t \rightarrow 0} \left[(e^{2t} + 5)\hat{i} + (t^2 + 2t - 3)\hat{j} + \left(\frac{1}{t}\right)\hat{k} \right]$$

Question No: 32 (Marks: 2)

Define the periodic function whose graph is shown below.



Question No: 33 (Marks: 2)

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

Solution:

The Laplace transform of the given function will be:

$$f(t) = t^4$$

$$L\{t^4\} = \frac{4!}{s^5}$$

Question No: 34 (Marks: 3)

Determine whether the following differential is exact or not.

$$dz = (4x^3y + 2xy^3) dx + (x^4 + 3x^2y^2) dy$$

Question No: 35 (Marks: 3)

Use Wallis sine formula to evaluate $\int_0^{\frac{\pi}{2}} (\sin^3 x + \sin^5 x) dx$

Solution:

$$\int_0^{\frac{\pi}{2}} \sin^8 x dx = \frac{7}{8} \cdot \frac{5}{6} \cdot \frac{3}{4} \cdot \frac{1}{2} \cdots \frac{\pi}{2}$$

Question No: 36 (Marks: 3)

Find Laplace transform of the function $F(t)$ if

$$F(t) = e^{2t} \sin 3t$$

Solution:

Laplace transform will be

$$L(t) = e^{2t} \cdots \cdots \cdots 1$$

$$= \frac{1}{s-2}$$

$$L(t) = \sin 3t \cdots \cdots \cdots 2$$

$$L(t) = \frac{a}{s^2 + 3^2}$$

$$L(t) = \frac{a}{s^2 + 9}$$

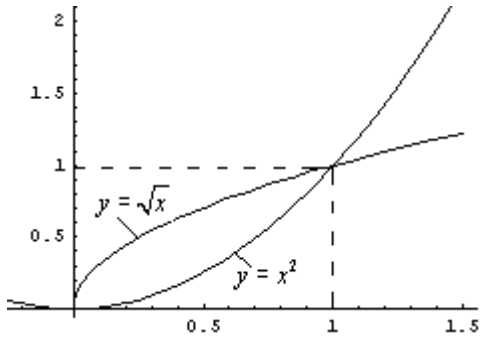
Combining,

$$L(t) = \left(\frac{1}{s-2}\right) \left(\frac{a}{s^2 + 9}\right)$$



Question No: 37 (Marks: 5)

Using definite integral, find area of the region that is enclosed between the curves $y = x^2$ and $y = \sqrt{x}$



Question No: 38 (Marks: 5)

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

$$f(x) = x^2 \quad 0 < x < 2\pi$$



Question No: 39 (Marks: 5)

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

$$\vec{F}(x, y, z) = (4x - z)\hat{i} + (3y + z)\hat{j} + (y - x)\hat{k}$$

ASSALAM O ALAIKUM
All Dearz fellows
ALL IN ONE MTH301
Final term PAPERS & MCQz
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Hackers Group

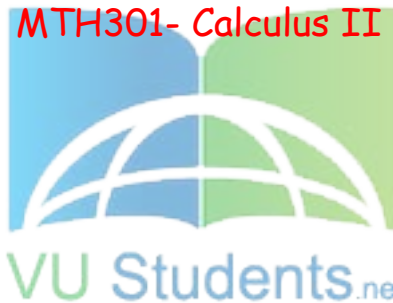
From Mandi Bahauddin
Remember us in your prayers

Mindhacker124@gmail.com
Hearthacker124@gmail.com

FINALTERM EXAMINATION

Fall 2009

MTH301- Calculus II



Time: 120 min

Marks: 80

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

π is an example of -----

- ▶ **Irrational numbers**
- ▶ Rational numbers
- ▶ Integers
- ▶ Natural numbers

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

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

- ▶ Surface
- ▶ **Curve**
- ▶ Plane
- ▶ Parabola



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

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**



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

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

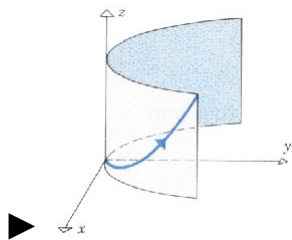
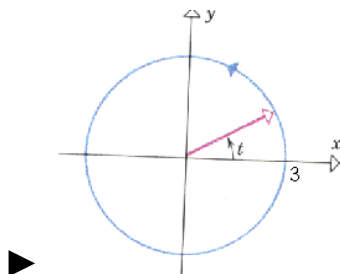
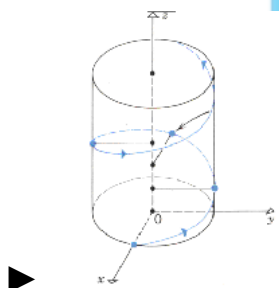
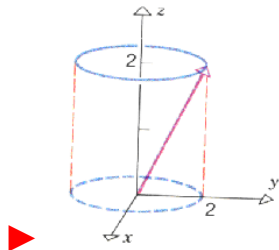
$$f(x, y) = 4xy + \sin 3x^2y$$

- ▶ $f(x, y)$ **is continuous at origin**
- ▶ $f(0, 0)$ is not defined
- ▶ $f(0, 0)$ is defined but $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ does not exist
- ▶ $f(0, 0)$ is defined and $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ 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.

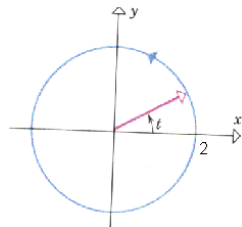
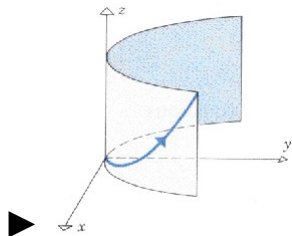
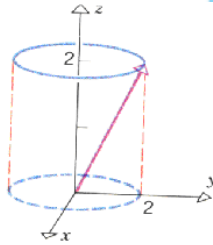
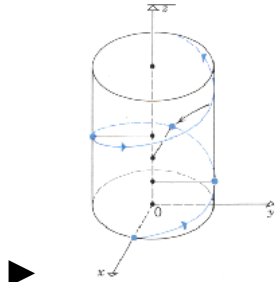
$$r(t) = 3 \cos t \hat{i} + 3 \sin t \hat{j} \quad \text{And} \quad 0 \leq t \leq 2\pi$$



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

Match the following vector-valued function with its graph.

$$r(t) = t\hat{i} + t^2\hat{j} + t^3\hat{k} \quad \text{and} \quad t \geq 0$$



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

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

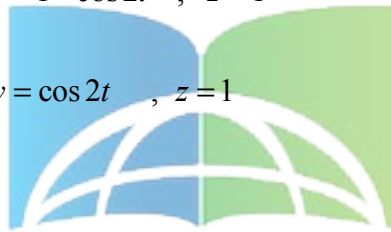
$$\vec{r}(t) = \sin^2 t \hat{i} + (1 - \cos 2t) \hat{j}$$

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

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

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

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



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 $\lim_{t \rightarrow 0} \vec{r}(t)$ does not exist

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

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

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

What is the derivative of following vector-valued function?

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

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

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

▶ $\vec{r}'(t) = (-5 \sin 5t, \sec^2 t, 6 \cos t)$

▶ $\vec{r}'(t) = (\sin 5t, \sec^2 t, -6 \cos t)$

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

The following differential is exact

$$dz = (3x^2y + 2) dx + (x^3 + y) dy$$

- ▶ True
- ▶ False

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

The following differential is exact

$$dz = (3x^2 + 4xy) dx + (2x^2 + 2y) dy$$

▶ True

▶ False



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

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

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

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

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

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

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

Which of the following is correct?

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

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

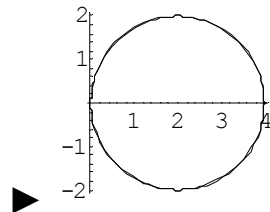
▶ $\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{3}{8}$

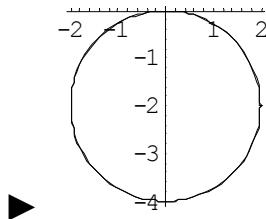
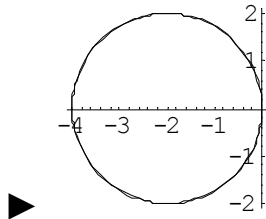
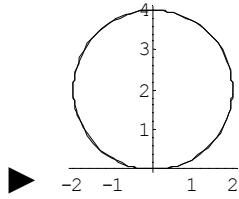
▶ $\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{2\pi}{3}$



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

Match the following equation in polar co-ordinates with its graph.
 $r = 4 \sin \theta$





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Question No: 16 (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**
- Pole

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

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

?

▶ $\frac{\pi}{2}$

▶ π

▶ $\frac{3\pi}{2}$

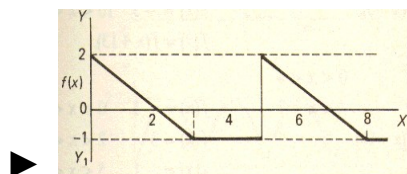
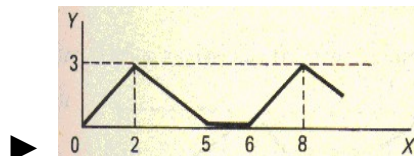
▶ 4π

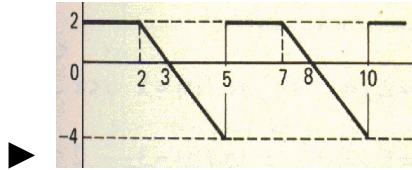
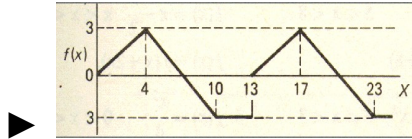


Question No: 18 (Marks: 1) - Please choose one

Match the following periodic function with its graph.

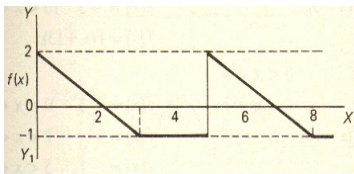
$$f(x) = \begin{cases} \frac{3}{4}x & 0 < x < 4 \\ 7-x & 4 < x < 10 \\ -3 & 10 < x < 13 \end{cases}$$





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

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



▶ 2

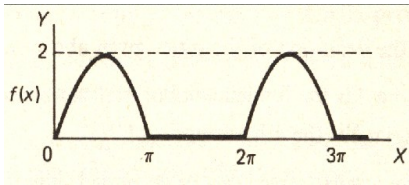
▶ 3

▶ 4

▶ 5

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

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



- ▶ 0
- ▶ 2
- ▶ π
- ▶ 2π not sure



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

Polar co-ordinates of a point are $\left(-2, \frac{-3\pi}{2}\right)$. Which of the following is another possible polar co-ordinates representation of this point?

- ▶ $\left(2, \frac{-\pi}{4}\right)$
- ▶ $\left(2, \frac{-\pi}{2}\right)$
- ▶ $\left(2, \frac{-\pi}{3}\right)$
- ▶ $\left(2, \frac{3\pi}{4}\right)$

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

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

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

- ▶ x-axis
- ▶ **y-axis**
- ▶ origin

page 208

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)
- ▶ (-2, 15)

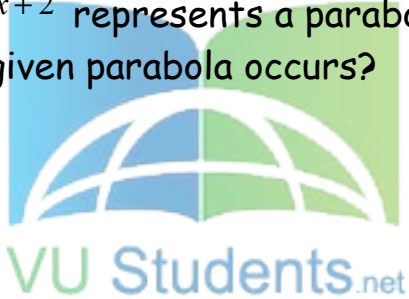
▶ (1, 0)

page 08

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)
- ▶ (-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

▶ $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ **does not exist**

▶ $f(0, 0)$ is defined and $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ 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.**
- ▶ 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)

▶ $\int_0^s e^{-st} F(t) dt$

▶ $\int_0^{\infty} e^{st} F(t) dt$

▶ $\int_{-\infty}^{\infty} e^{-st} F(t) dt$

▶ $\int_0^{\infty} e^{-st} F(t) dt$

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

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

▶ $L\{e^{5t}\} = \frac{1}{s-5}$

▶ $L\{e^{5t}\} = \frac{s}{s^2+25}$

▶ $L\{e^{5t}\} = \frac{5}{s^2+25}$

▶ $L\{e^{5t}\} = \frac{5!}{s^6}$



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

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

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

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

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

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

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

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

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

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

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

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

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

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

▶ $L\{-6\} = \frac{1}{s+6}$

▶ $L\{-6\} = \frac{-6}{s}$

▶ $L\{-6\} = \frac{s}{s^2+36}$

▶ $L\{-6\} = \frac{-6}{s^2+36}$



Question No: 33 (Marks: 1) - Please choose one

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

▶ 6

▶ -6

▶ 0

▶ Do not exist

Question No: 34 (Marks: 1) - Please choose one

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

▶ -4

▶ -2

▶ 0

▶ 2



Question No: 35 (Marks: 1) - Please choose one

Plane is an example of -----

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▶ Curve

▶ **Surface**

▶ Sphere

▶ Cone

Question No: 36 (Marks: 1) - Please choose one

If $R = \{(x, y) / 0 \leq x \leq 2 \text{ and } -1 \leq y \leq 1\}$, then

$$\iint_R (x + 2y^2) dA =$$

▶ $\int_{-1}^1 \int_0^2 (x + 2y^2) dy dx$

▶ $\int_0^2 \int_1^{-1} (x + 2y^2) dx dy$

▶ $\int_{-1}^1 \int_0^2 (x + 2y^2) dx dy$

▶ $\int_1^2 \int_{-1}^0 (x + 2y^2) dx dy$



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

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

▶ $dr = dx\hat{i} + dy\hat{j}$

▶ $dr = dx\hat{i} + dy\hat{j} + dz\hat{k}$

▶ $dr = dx + dy + dz$

▶ $dr = dx + dy$

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

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

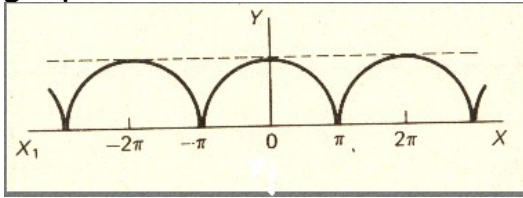
$r = a$

where a is an arbitrary constant.

The image contains four coordinate graphs and a logo. The first graph shows a vertical line at $x = a$ with a point $(a, 0)$ marked on the x-axis. The second graph shows a horizontal line at $y = a$ with a point $(0, a)$ marked on the y-axis. The third graph shows a circle centered at the origin with points $(0, a)$ and $(a, 0)$ marked on the y and x axes respectively. The fourth graph shows a circle centered at $(a, 0)$ on the x-axis. A logo for 'VU Students.net' is also present.

Question No: 39 (Marks: 1) - Please choose one

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

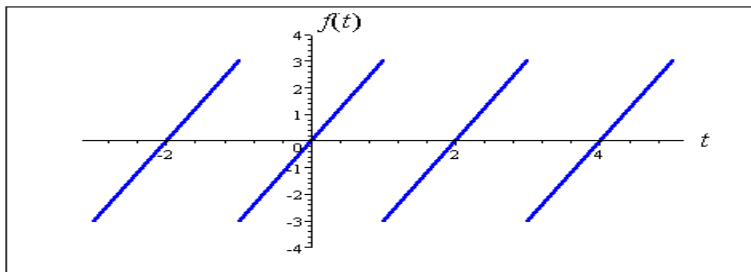


- ▶ **Even function**
- ▶ Odd function
- ▶ Neither even nor odd function



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

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

- ▶ An odd function

▶ An even function

▶ Neither even nor odd not sure

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

Laplace transform of 't' is

▶ $\frac{1}{s}$

▶ $\frac{1}{s^2}$

▶ e^{-s}

▶ s

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

Symmetric equation for the line through (1,3,5) and (2,-2,3) is

▶ $x-2 = -\frac{y+2}{3} = -\frac{z-3}{5}$

▶ $x+2 = -\frac{y+3}{5} = -\frac{z+5}{2}$

▶ $x-1 = -\frac{y-3}{5} = -\frac{z-5}{2}$

▶ $x+1 = \frac{y+3}{5} = \frac{z-5}{5}$

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

The level curves of $f(x, y) = y \csc x$ are parabolas.

▶ True.

▶ False.

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

The equation $z = r$ is written in

▶ Rectangular coordinates

▶ Cylindrical coordinates

▶ Spherical coordinates

▶ None of the above

FINAL TERM EXAMINATION
Spring 2010
MTH301 - Calculus II (Session - 4)

Ref No: Time: 90 min
 Marks: 60

Student Info	
StudentID:	
Center:	OPKST
ExamDate:	07 Aug 2010

For Teacher's Use Only									
Q No.	1	2	3	4	5	6	7	8	Total
Marks									
Q No.	9	10	11	12	13	14	15	16	
Marks									
Q No.	17	18	19	20	21	22	23	24	
Marks									
Q No.	25	26	27	28	29	30	31	32	
Marks									
Q No.	33	34	35	36	37	38	39		
Marks									

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

There is one-to-one correspondence between the set of points on co-ordinate line and -----

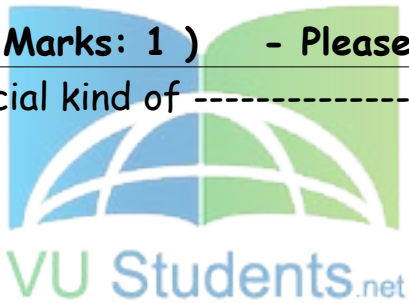
▶ **Set of real numbers**

- ▶ Set of integers
- ▶ Set of natural numbers
- ▶ Set of rational numbers

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

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

- ▶ Surface
- ▶ **Curve**
- ▶ Plane
- ▶ Parabola



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

$$\lim_{(x,y) \rightarrow (0,0)} \frac{xy^2}{x^2 + y^2} =$$

- ▶ **∞**
- ▶ 0
- ▶ 1
- ▶ 0.5

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

If $f(x, y) = x^2y - y^3 + \ln x$

then $\frac{\partial^2 f}{\partial x^2} =$

▶ $2xy + \frac{1}{x^2}$

▶ $2y + \frac{1}{x^2}$

▶ $2xy - \frac{1}{x^2}$

▶ $2y - \frac{1}{x^2}$

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

Suppose $f(x, y) = xy - 2y^2$ where $x = 3t + 1$ and $y = 2t$. Which one of the following is true?

$\frac{df}{dt} = -4t + 2$

$\frac{df}{dt} = -16t - t$

$\frac{df}{dt} = 18t + 2$

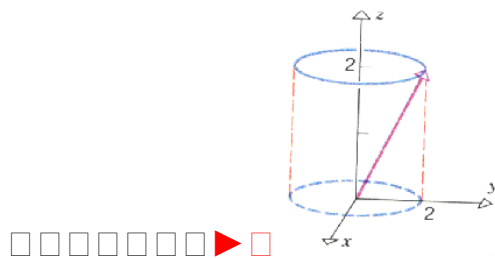
$\frac{df}{dt} = -10t^2 + 8t + 1$

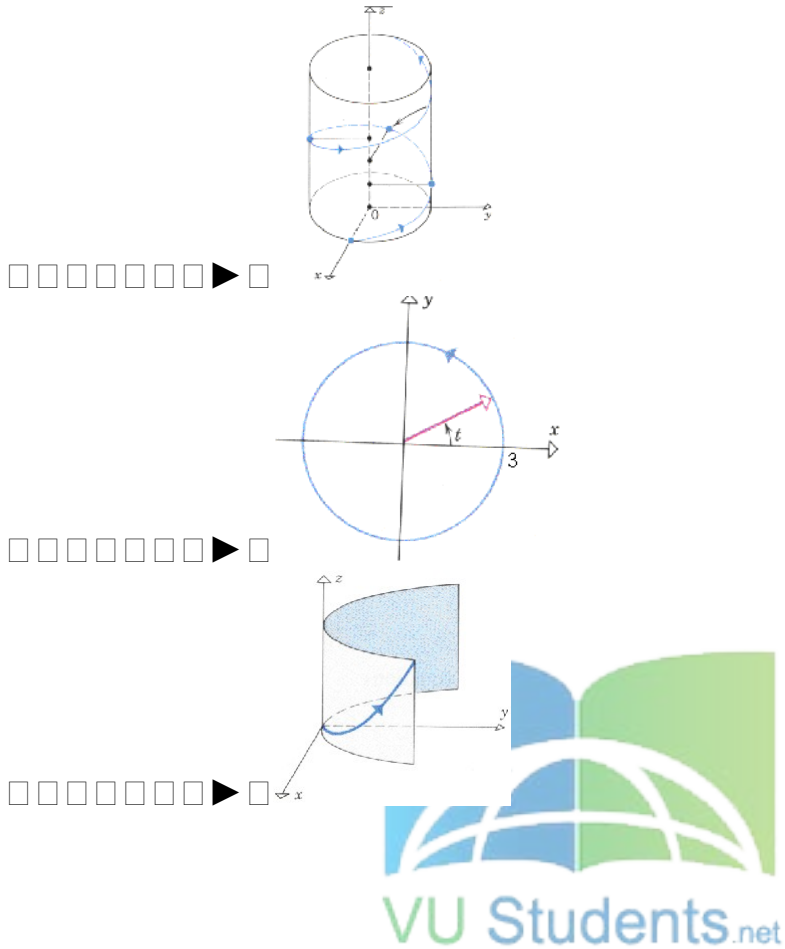


Question No: 6 (Marks: 1) - Please choose one

Match the following vector-valued function with its graph.

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





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

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

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

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

- ▶ One
- ▶ Infinite

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

What is laplace transform of the function $F(t)$ if $F(t) = \cos 2t$?

▶ $L\{\cos 2t\} = \frac{2}{s^2 + 4}$

▶ $L\{\cos 2t\} = \frac{1}{s - 2}$

▶ $L\{\cos 2t\} = \frac{s}{s^2 + 4}$

▶ $L\{\cos 2t\} = \frac{2!}{s^3}$

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

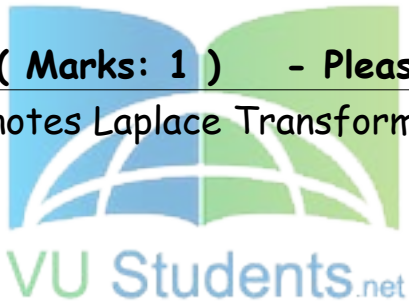
What is $L\{-6\}$ if L denotes Laplace Transform?

▶ $L\{-6\} = \frac{1}{s + 6}$

▶ $L\{-6\} = \frac{-6}{s}$

▶ $L\{-6\} = \frac{s}{s^2 + 36}$

▶ $L\{-6\} = \frac{-6}{s^2 + 36}$



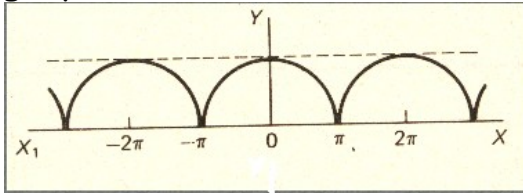
Question No: 28 (Marks: 1) - Please choose one

Curl of vector function is always a -----

- ▶ Scalar
- ▶ **Vector**

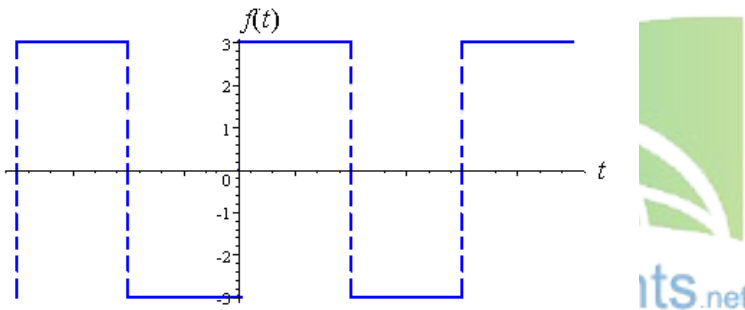
Question No: 29 (Marks: 1) - Please choose one

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



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

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



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

- ▶ **An odd function**
- ▶ An even function
- ▶ Neither even nor odd

Question No: 31 (Marks: 2)

Evaluate the line integral $\int_C 2x \, dx$ where C is the line segment from $(0, 2)$ to $(2, 6)$

Question No: 32 (Marks: 2)

Use Wallis sine formula to evaluate $\int_0^{\frac{\pi}{2}} \sin^5 x \, dx$

Question No: 33 (Marks: 2)

Find Laplace Transform of the function $F(t)$ if $F(t) = \sin 2t$.

Question No: 34 (Marks: 3)

Find $\text{div } \vec{F}$, if $\vec{F} = (3x + y)\hat{i} + xy^2z\hat{j} + (xz^2)\hat{k}$

Question No: 35 (Marks: 3)

Determine whether the following differential is exact or not.

$$dz = (4x^3y + 2xy^3) \, dx + (x^4 + 3x^2y^2) \, dy$$

Question No: 36 (Marks: 3)

Prove whether the following function is even, odd or neither.
 $f(x) = x^3 e^x$

Question No: 37 (Marks: 5)

Evaluate the following line integral which is independent of path.

$$\int_{(2,-2)}^{(-1,0)} (2xy^3) \, dx + (3y^2x^2) \, dy$$

Question No: 38 (Marks: 5)

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

$$f(x) = x^2 \quad 0 < x < 2\pi$$

Question No: 39 (Marks: 5)

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

$$\vec{F}(x, y, z) = (3x + y)\hat{i} + xy^2z\hat{j} + xz^2\hat{k}$$

ASSALAM O ALAIKUM

All Dearz fellows

ALL IN ONE MTH301

Final term PAPERS &

MCQz

Created BY Farhan & Ali

BS (cs) 2nd sem

Hackers Group

From Mandi Bahaiddin

Remember us in your prayers

Mindhacker124@gmail.com

Hearthacker124@gmail.com