FINALTERM EXAMINATION

Fall 2009

MTH301- Calculus II

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?

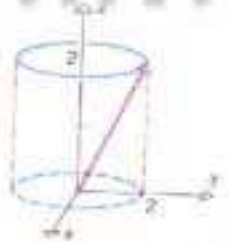
$f(x, y) = 4xy + \sin 3x^2y$

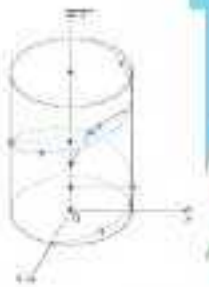
- $f(x, y)$ is continuous at origin
- $f(0, 0)$ is not defined
- $f(0, 0)$ is defined but $\lim_{(x,y)\to(0,0)} f(x, y)$ does not exist
- $f(0, 0)$ is defined and $\lim_{(x,y)\to(0,0)} f(x, y)$ exists but these two numbers are not equal.

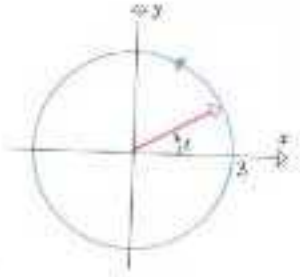
Question No: 6 (Marks: 1) - Please choose one

Match the following vector-valued function with its graph.

$r(t) = 3\cos t\, i + 3\sin t\, j$ And $0 \le t \le 2\pi$



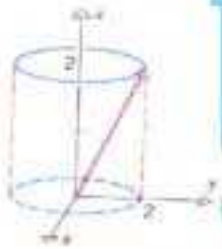


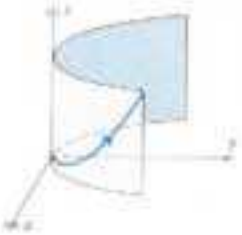


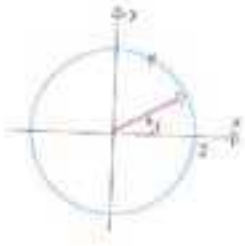
Question No: 7 (Marks: 1) - Please choose one

Match the following vector-valued function with its graph.

$r(t)=t\,i+t^2\,j+t^3\,k$ and $t\geq 0$







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

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

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

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

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 $\lim_{t \to 0} \vec{r}(t)$ 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: 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 $n \geq 3$?

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

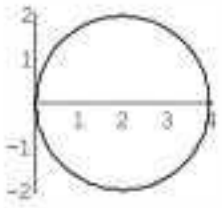
Question No: 14 (Marks: 1) - Please choose one

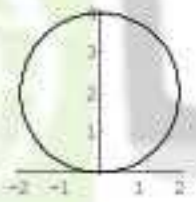
Which of the following is correct?

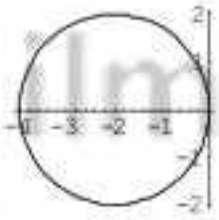
- $\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{3}{16}$
- $\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{3\pi}{16}$
- $\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{3}{8}$
- $\int_0^{\frac{\pi}{2}} \sin^4 x \, dx = \frac{2\pi}{3}$

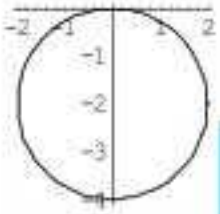
Question No: 15 (Marks: 1) - Please choose one

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

- 

▶ 

▶ 

▶ 

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

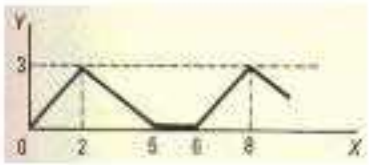
What is the period of a periodic function defined by $f(x)=\sin\frac{x}{2}$?

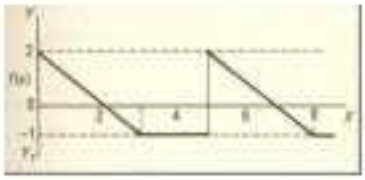
- $\frac{\pi}{2}$
- π
- $\frac{3\pi}{2}$
- 4π

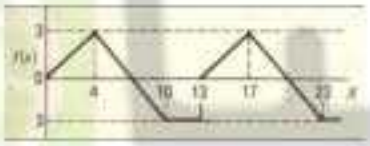
Question No: 18 (Marks: 1) - Please choose one

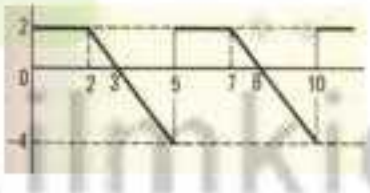
Match the following periodic function with its graph.

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

- 

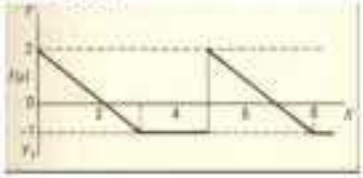
- 

▶ 

▶ 

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

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



▶ 2

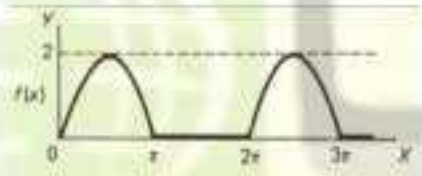
▶ 3

▶ 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

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

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

- x-axis
- y-axis page 208
- 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)
- (−2, 15)
- (1, 0)

pge 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

► $\lim_{(x,y)\to(0,0)} f(x,y)$ 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: 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)

► $\int_0^\infty e^{-st} F(t)\,dt$

► $\int_0^\infty e^{st} F(t)\,dt$

- $\int_{-\infty}^{\infty} e^{-st} F(t)\,dt$
- $\int_{0}^{\infty} e^{-st} F(t)\,dt$

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 ----------

- Curve
- **Surface**
- Sphere
- Cone

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

If $R = \{(x,y)/0 \le x \le 2 and -1 \le y \le 1\}$, then
$\iint_R (x+2y^2)dA =$

- $\int_{-1}^{1}\int_{0}^{2}(x+2y^2)dydx$
- $\int_{0}^{2}\int_{1}^{-1}(x+2y^2)dxdy$
- $\int_{-1}^{1}\int_{0}^{2}(x+2y^2)dxdy$
- $\int_{1}^{2}\int_{-1}^{0}(x+2y^2)dxdy$

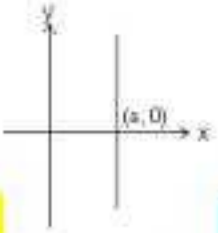
Question No: 37 (Marks: 1) - Please choose one

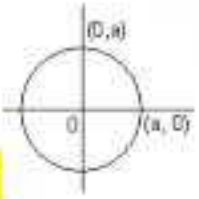
To evaluate the line integral, the integrand is expressed in terms of x, y, z with

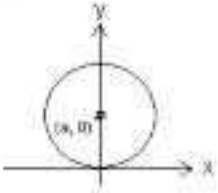
- $dr = dx\vec{i} + dy\vec{j}$
- $dr = dx\vec{i} + dy\vec{j} + dy\vec{k}$
- $dr = dx + dy + dz$
- $dr = dx + dy$

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.

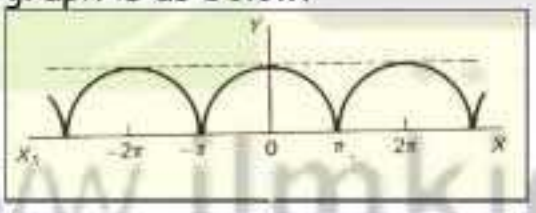






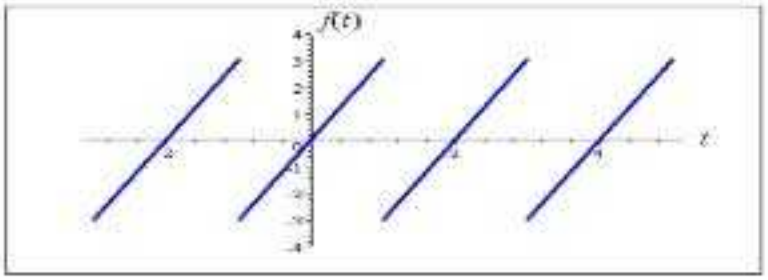
Question No: 39 (Marks: 1) - Please choose one

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



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

- An odd function