Total Number of Pages: 2 $2^{\text{nd}} \text{ Semester Regular Examination 2015-16}$ MATHEMATICS - II BRANCH: AlI Time: 3 Hours Max Marks: 100 $Q.\text{CODE: W275}$ $\text{Answer Part-A which is compulsory and any four from Part-B.}$ $\text{The figures in the right hand margin indicate marks.}$ $\text{Part - A (Answer all the questions)}$ $\text{Answer the following questions: multiple type or dash fill up type}$ (2 x 10) $\text{The inverse Laplace transform of } \frac{6s}{(s^2+9)^2} \text{ is } \underline{}}$ $\text{Discourse The smallest positive period of } \frac{3}{s^2+6s+18} \text{ is } \underline{}}$ $\text{Discourse The smallest positive period of } \frac{3}{s^2+6s+18} \text{ is } \underline{}}$ $\text{Discourse The smallest positive period of } \frac{3}{s^2+6s+18} \text{ is } \underline{}}$ $\text{Discourse The following questions: } \frac{dF(t)}{dt} = \underline{}}$ $Discourse The following following the following following the following following the following the following the following following the following following the following following the following the following the following the f$	Regis	tration No:			
MATHEMATICS - II BRANCH: All Time: 3 Hours Max Marks: 100 Q.CODE: W275 Answer Part-A which is compulsory and any four from Part-B. The figures in the right hand margin indicate marks. Part - A (Answer all the questions) Answer the following questions: multiple type or dash fill up type a) The inverse Laplace transform of $\frac{6s}{(s^2+9)^3}$ is b) The Laplace transform of $\frac{3}{s^2+6s+18}$ is c) The inverse Laplace transform of $\frac{3}{s^2+6s+18}$ is d) The Fourier series of $\sin^2 x$ is e) The smallest positive period of $\sin \pi x$ is f) If $\vec{F}(t) = t\vec{i} + \sin t \vec{j} + t^2 \vec{k}$ then $\frac{d\vec{F}(t)}{dt}$ = g) If $f(x,y,z) = xyz$ then $\vec{\nabla}f =$ h) For a scalar field f , Curl(gradf) = j) The surface $\vec{F}(u,v) = [a\cos v, a\sin v, u]$ represents a Q2 Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\vec{i} + y\vec{j} + z\vec{k})$. c) Evaluate the curl of $\sin y\vec{i} + \cos z\vec{j} + \vec{k}$ d) Find the surface normal to the surface $\vec{F}(u,v) = [u\cos v, u\sin v, cu]$ e) Find the limits of the double integration $\iint f(x,y)dydx$ over the triangle with vertices $(0,0)$, $(1,0)$, and $(1,1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$	15BS1104				
Time: 3 Hours Max Marks: 100 Q.CODE: W275 Answer Part-A which is compulsory and any four from Part-B. The figures in the right hand margin indicate marks. Part – A (Answer all the questions) Answer the following questions: multiple type or dash fill up type a) The inverse Laplace transform of $\frac{6s}{(s^2+9)^2}$ is		_			
Max Marks: 100 Q.CODE: W275 Answer Part-A which is compulsory and any four from Part-B. The figures in the right hand margin indicate marks. Part – A (Answer all the questions) Q1 Answer the following questions: multiple type or dash fill up type (2 x 10) a) The inverse Laplace transform of $\frac{6s}{(s^2+9)^2}$ is $\frac{1}{s^2}$. b) The Laplace transform of $\frac{3}{s^2+6s+18}$ is $\frac{1}{s^2}$. c) The inverse Laplace transform of $\frac{3}{s^2+6s+18}$ is $\frac{1}{s^2}$. d) The Fourier series of $\sin^2 x$ is $\frac{1}{s^2}$. e) The smallest positive period of $\sin \pi x$ is $\frac{1}{s^2}$. f) If $\vec{F}(t) = t\vec{i} + \sin t \vec{j} + t^2 \hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{1}{s^2}$. g) If $f(x, y, z) = xyz$ then $\nabla f = \frac{1}{s^2}$. h) For a scalar field f, Curl(gradf) = $\frac{1}{s^2}$. j) The surface $\vec{F}(u, v) = [a\cos v, a\sin v, u]$ represents a Q2 Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{t} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y\hat{t} + \cos z\hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{F}(u, v) = [u\cos v, u\sin v, cu]$ e) Find the limits of the double integration $\iint f(x, y) dydx$ over the triangle with vertices (0 0), (1,0), and (1,1). g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$					
Q.CODE: W275 Answer Part-A which is compulsory and any four from Part-B. The figures in the right hand margin indicate marks. $\frac{\text{Part} - \text{A (Answer all the questions)}}{\text{Cand the part of the limits of the double integration}}$ Q1 Answer the following questions: $\frac{6s}{(s^2 + 9)^2}$ is Q2 Answer the following of $\frac{6s}{(s^2 + 9)^2}$ is C3 The inverse Laplace transform of $\frac{6s}{(s^2 + 9)^2}$ is C4 The inverse Laplace transform of $\frac{3}{s^2 + 6s + 18}$ is C5 The inverse Laplace transform of $\frac{3}{s^2 + 6s + 18}$ is C6 The smallest positive period of $\frac{3}{s^2 + 6s + 18}$ is C7 The smallest positive period of $\frac{3}{s^2 + 6s + 18}$ is C8 The smallest positive period of $\frac{3}{s^2 + 6s + 18}$ is C9 If $f(x, y, z) = xyz$ then $\frac{\sqrt{f}}{dt} = \frac{d\tilde{F}(t)}{dt} = d\tilde$					
Answer Part-A which is compulsory and any four from Part-B. The figures in the right hand margin indicate marks. Part – A (Answer all the questions) Q1 Answer the following questions: multiple type or dash fill up type (2 x 10) a) The inverse Laplace transform of $\frac{6s}{(s^2+9)^2}$ is b) The Laplace transform of $\sin t \times u(t-2\pi)$ is c) The inverse Laplace transform of $\frac{3}{s^2+6s+18}$ is d) The Fourier series of $\sin t \times u(t-2\pi)$ is e) The smallest positive period of $\sin t \times u(t-2\pi)$ is f) If $\vec{F}(t) = t\vec{i} + \sin t \vec{j} + t^2 \hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ = g) If $f(x, y, z) = xyz$ then $\nabla f = \frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ = h) For a scalar field f , Curl(gradf) = i) The value of $\beta(2, 3) = \frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ = Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y\hat{i} + \cos z\hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{F}(u,v) = [u\cos v, u\sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2+y^2}$ at $(0,1,2)$. f) Find the limits of the double integration $\iint f(x,y) dy dx$ over the triangle with vertices $(0,0)$, $(1,0)$, and $(1,1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$	210	210 210 210 210 210	210	210	
The figures in the right hand margin indicate marks. $\frac{Part - A}{Part - A} \text{ (Answer all the questions)}$ Q1 Answer the following questions: $multiple type \ or \ dash \ fill \ up \ type$ a) The inverse Laplace transform of $\frac{6s}{(s^2 + 9)^3}$ is		*	D		
Answer the following questions: multiple type or dash fill up type a) The inverse Laplace transform of $\frac{6s}{(s^2+9)^2}$ is	·				
Answer the following questions: multiple type or dash fill up type a) The inverse Laplace transform of $\frac{6s}{(s^2+9)^2}$ is b) The Laplace transform of $\sin t \times u(t-2\pi)$ is c) The inverse Laplace transform of $\frac{3}{s^2+6s+18}$ is d) The Fourier series of $\sin^2 x$ is e) The smallest positive period of $\sin \pi x$ is f) If $\vec{F}(t) = t\hat{i} + \sin t\hat{j} + t^2\hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ g) If $f(x, y, z) = xyz$ then $\vec{\nabla}f = \frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ i) The value of $\beta(2, 3) = \frac{d\vec{F}(t)}{dt}$ a) Represent the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{t} + y\hat{j} + z\hat{k})$. c) Evaluate the divergence of $xyz(x\hat{t} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y\hat{t} + \cos z\hat{j} + \hat{k}$ d) Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at $(0, 1, 2)$. f) Find the limits of the double integration $\iint f(x, y)dydx$ over the triangle with vertices $(0, 0)$, $(1, 0)$, and $(1, 1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$ will converge at $x = 2\pi$					
b) The Laplace transform of $\sin t \times u(t-2\pi)$ is c) The inverse Laplace transform of $\frac{3}{s^2+6s+18}$ is d) The Fourier series of $\sin^2 x$ is e) The smallest positive period of $\sin \pi x$ is If $\vec{F}(t) = t\hat{i} + \sin t\hat{j} + t^2\hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{1}{200}$ 9) If $f(x, y, z) = xyz$ then $\vec{\nabla}f = \frac{1}{200}$ h) For a scalar field f, Curl(gradf) = j) The value of $\beta(2, 3) = \frac{1}{200}$ Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y\hat{i} + \cos z\hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{r}(u,v) = [u\cos v, u\sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2+y^2}$ at $(0,1,2)$. f) Find the limits of the double integration $\iint f(x,y)dydx$ over the triangle with vertices $(0,0)$, $(1,0)$, and $(1,1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$.	Q1	Answer the following questions: multiple type or dash fill up type	(2 x 10)		
The inverse Laplace transform of $\frac{3}{s^2+6s+18}$ is d) The Fourier series of $\sin^2 x$ is e) The smallest positive period of $\sin \pi x$ is If $\vec{F}(t) = t\hat{i} + \sin t \hat{j} + t^2 \hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{210}{210}$ g) If $f(x, y, z) = xyz$ then $\nabla f = \frac{1}{200}$ h) For a scalar field f, Curl(gradf) = j) The value of $\beta(2, 3) = \frac{1}{200}$ Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y \hat{i} + \cos z \hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{F}(u, v) = [u \cos v, u \sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at $(0, 1, 2)$. f) Find the limits of the double integration $\iint f(x, y) dy dx$ over the triangle with vertices $(0, 0)$, $(1, 0)$, and $(1, 1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$.		The inverse Laplace transform of $\frac{6s}{(s^2+9)^2}$ is	210	210	
The inverse Laplace transform of $\frac{x^2+6s+18}{s^2+6s+18}$ is d) The Fourier series of $\sin^2 x$ is The smallest positive period of $\sin \pi x$ is If $\vec{F}(t) = t\hat{i} + \sin t \hat{j} + t^2 \hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{200}{t}$	k	The Laplace transform of $\sin t \times u(t-2\pi)$ is			
The smallest positive period of $\sin \pi x$ is If $\vec{F}(t) = t\hat{i} + \sin t \hat{j} + t^2 \hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ 9) If $f(x, y, z) = xyz$ then $\vec{\nabla} f = \frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ 1) The value of $\beta(2, 3) = \frac{d\vec{F}(t)}{dt} = \frac{d\vec{F}(t)}{dt}$ 210 Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y\hat{i} + \cos z\hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{F}(u,v) = [u\cos v, u\sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at $(0, 1, 2)$. 1) Find the limits of the double integration $\iint f(x, y) dy dx$ over the triangle with vertices $(0, 0)$, $(1, 0)$, and $(1, 1)$. 9) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$	(The inverse Laplace transform of $\frac{3}{s^2 + 6s + 18}$ is			
e) The smallest positive period of $\sin \pi x$ is If $\vec{F}(t) = t\hat{i} + \sin t \hat{j} + t^2 \hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{210}{210}$ 9) If $f(x, y, z) = xyz$ then $\vec{\nabla}f = \frac{d\vec{F}(t)}{dt}$ 1) The value of $\beta(2, 3) = \frac{d\vec{F}(t)}{dt}$ 1) The surface $\vec{F}(u, v) = [a\cos v, a\sin v, u]$ represents a 20 Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y \hat{i} + \cos z \hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{F}(u, v) = [u\cos v, u\sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2 + \frac{yv}{y^2}}$ at $(0, 1, 2)$. 1) Find the limits of the double integration $\iint f(x, y) dy dx$ over the triangle with vertices $(0, 0)$, $(1, 0)$, and $(1, 1)$. 9) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$	(The Fourier series of $\sin^2 x$ is			
If $F(t) = ti + \sin t j + t^2 k$ then $\frac{\sin t y}{dt} = \frac{\sin t y}{dt} = \frac{\sin t y}{dt}$ 9) If $f(x, y, z) = xyz$ then $\nabla f = \frac{\sin t y}{dt}$ h) For a scalar field f , $Curl(gradf) = \frac{\sin t y}{dt}$ i) The value of $\beta(2, 3) = \frac{\sin t y}{dt}$ j) The surface $\vec{r}(u, v) = [a\cos v, a\sin v, u]$ represents a		The smallest positive period of $\sin \pi x$ is			
h) For a scalar field f, Curl(gradf) =	210	If $\vec{F}(t) = t \hat{i} + \sin t \hat{j} + t^2 \hat{k}$ then $\frac{d\vec{F}(t)}{dt} = \frac{210}{100}$	210	210	
The value of $\beta(2,3) = \underline{\hspace{1cm}}$ The surface $\overline{r}(u,v) = [a\cos v,\ a\sin v,\ u]$ represents a Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y\hat{i} + \cos z\hat{j} + \hat{k}$ d) Find the surface normal to the surface $\overline{r}(u,v) = [u\cos v,\ u\sin v,\ cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at $(0, 1, 2)$. f) Find the limits of the double integration $\iint f(x,y)dydx$ over the triangle with vertices $(0\ 0)$, $(1,0)$, and $(1,1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$	Ç	I) If $f(x, y, z) = xyz$ then $\nabla f = $			
Q2° Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y \hat{i} + \cos z \hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{r}(u,v) = [u\cos v, u\sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at $(0, 1, 2)$. f) Find the limits of the double integration $\iint f(x,y) dy dx$ over the triangle with vertices $(0,0)$, $(1,0)$, and $(1,1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$					
Answer the following questions: Short answer type a) Represent the curve $x^2 + y^2 = 1$, $y = z$ parametrically. b) Evaluate the divergence of $xyz(x\hat{i} + y\hat{j} + z\hat{k})$. c) Evaluate the curl of $\sin y \hat{i} + \cos z \hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{r}(u,v) = [u\cos v, u\sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at $(0, 1, 2)$. f) Find the limits of the double integration $\iint f(x,y) dy dx$ over the triangle with vertices $(0,0)$, $(1,0)$, and $(1,1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$		The value of $\beta(2,3) = $ The surface $\vec{r}(y,y) = [a\cos y, a\sin y, y]$ represents a			
 a) Represent the curve x² + y² = 1, y = z parametrically. b) Evaluate the divergence of xyz(xî + yĵ + zk̂). c) Evaluate the curl of sin yî + cos zĵ + k̂ d) Find the surface normal to the surface r̄(u, v) = [u cos v, u sin v, cu] e) Find the direction of maximum increase of the function z/(x² + y²)² at (0, 1, 2). f) Find the limits of the double integration ∫∫ f(x, y)dydx over the triangle with vertices (0 0), (1,0), and (1,1). g) Find the Laplace transform of the function f(t) = t², 0 < t < 1, 0 otherwise. h) Evaluate the convolution e¹ * e⁻¹ by integration i) Find the value to which the Fourier series of the function f(x) = x, 0 < x < 2π will converge at x = 2π 	•	The surface $T(u, v) = [u\cos v, u\sin v, u]$ represents a			
b) Evaluate the divergence of $xyz(x\hat{i}+y\hat{j}+z\hat{k})$. c) Evaluate the curl of $\siny\hat{i}+\cosz\hat{j}+\hat{k}$ d) Find the surface normal to the surface $\vec{r}(u,v)=[u\cos v,u\sin v,cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2+y^2}$ at $(0,1,2)$. f) Find the limits of the double integration $\iint f(x,y)dydx$ over the triangle with vertices $(00),(1,0),$ and $(1,1).$ g) Find the Laplace transform of the function $f(t)=t^2,0< t<1,0$ otherwise. h) Evaluate the convolution e^t*e^{-t} by integration i) Find the value to which the Fourier series of the function $f(x)=x,0< x<2\pi$ will converge at $x=2\pi$	$\mathbf{Q}\mathbf{\hat{2}}^{\circ}$	Answer the following questions. Short answer type	(2 x 10)	210	
c) Evaluate the curl of $\sin y \hat{i} + \cos z \hat{j} + \hat{k}$ d) Find the surface normal to the surface $\vec{r}(u,v) = [u\cos v, u\sin v, cu]$ e) Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at $(0, 1, 2)$. f) Find the limits of the double integration $\iint f(x,y) dy dx$ over the triangle with vertices $(0,0)$, $(1,0)$, and $(1,1)$. g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$					
Find the surface normal to the surface $\vec{r}(u,v) = [u\cos v,u\sin v,cu]$ Find the direction of maximum increase of the function $\frac{z}{x^2+y^2}$ at $(0,1,2)$. Find the limits of the double integration $\iint f(x,y) dy dx$ over the triangle with vertices (00) , $(1,0)$, and $(1,1)$. Given: By Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$.	k	Evaluate the divergence of $xyz(x \hat{i} + y \hat{j} + z \hat{k})$.			
 Find the direction of maximum increase of the function ^z/_{x²+y²} at (0, 1, 2). 210 Find the limits of the double integration ∫ f(x, y)dydx over the triangle with vertices (0 0), (1,0), and (1,1). Find the Laplace transform of the function f(t) = t², 0 < t < 1, 0 otherwise. Evaluate the convolution e^t * e^{-t} by integration Find the value to which the Fourier series of the function f(x) = x, 0 < x < 2π will converge at x = 2π 	(Evaluate the curl of $\sin y \hat{i} + \cos z \hat{j} + \hat{k}$			
 f) Find the limits of the double integration ∫∫ f(x, y)dydx over the triangle with vertices (0 0), (1,0), and (1,1). g) Find the Laplace transform of the function f(t) = t², 0 < t < 1, 0 otherwise. h) Evaluate the convolution e^t * e^{-t} by integration i) Find the value to which the Fourier series of the function f(x) = x, 0 < x < 2π will converge at x = 2π 					
vertices (0 0), (1,0), and (1,1). 9) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$		Find the direction of maximum increase of the function $\frac{z}{x^2 + y^2}$ at (0, 1, 2).	210	210	
vertices (0 0), (1,0), and (1,1). g) Find the Laplace transform of the function $f(t) = t^2$, $0 < t < 1$, 0 otherwise. h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$	1	Find the limits of the double integration $\iint f(x, y) dy dx$ over the triangle with			
h) Evaluate the convolution $e^t * e^{-t}$ by integration i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$		••			
i) Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 2\pi$ will converge at $x = 2\pi$					
will converge at $x = 2\pi$		- Evaluate the convolutions is by integration			
will converge at $x = 2\pi$		Find the value to which the Fourier series of the function $f(x) = x$, $0 < x < 0$	2π	210	
j) Compute $\Gamma(-3.5)$		•		7	

Part - B (Answer any four questions)

- Q3 a) Use Laplace transform to solve $y'' + 6y' + 8y = e^{-3t} e^{-5t}$, y(0) = 0, y'(0) = 0. (10) Provide the details of your work.
 - b) Provide the inverse Laplace transform of $\ln\left(\frac{s+1}{s-1}\right)$ with details of all steps. (5)
- Q4 a) Provide the details of the solution of the given equation. (10) y'' + 3y' + 2y = r(t), r(t) = 1 if 0 < t < 1, 0 if t > 1, y(0) = 0, y'(0) = 0
 - Solve the integral equation $y(t) = 1 \int_{0}^{t} (t \tau_{0}) y(\tau) d\tau$. (5)
- Q5 a) Using Green's theorem evaluate $\iint_C \vec{F}(r) \Box d\vec{r}$ counter clockwise where C is the boundary of the triangle with vertices (0,0), (2,0) and (2,1). $\vec{F}(r) = [-e^y, e^x]$.
 - Show that the integral $\int_{(0,0,0)}^{(4,1,2)} (3ydx + 3xdy + 2zdz)$ is independent of path hence evaluate it.
- **Q6** a) Using divergence theorem evaluate $\iint_S \vec{F} \cdot \vec{n} dA$ where $\vec{F} = [\cos y, \sin x, \cos z]$, S (10) is the surface of $x^2 + y^2 \le 4$, $|z| \le 2$. Provide the details of your work.
 - **b)** Find the area enclosed by the cardioid $r = a(1 \cos\theta)$, $0 \le \theta \le 2\pi$. (5)
- **Q7 a)** Work out in detail to find the Fourier series for the function f(x) = 0, -2 < x < 0, f(x) = 2, 0 < x < 2, period = 4
 - **b)** Work out in detail to find the Fourier sine series for the function f(x) = x, 0 < x < L.
- Q8 a) Work out in detail to find the Fourier integral of the function 210 (10) $f(x) = 0, x < 0, \ f(0) = \pi/2, \& f(x) = \pi e^{-x}, \ x > 0$
 - **b)** Work out in detail to find the Fourier transform of the function f(x) where f(x) = 1, 0 < x < 1, & f(x) = 0 otherwise.
- Q9 a)
 Show that $\int_{0}^{1} \left(\frac{x}{1-x^{3}}\right)^{1/2} dx = \frac{\sqrt{\pi} \Gamma\left(\frac{5}{6}\right)}{\Gamma\left(\frac{1}{3}\right)}$. Provide the details of your work.
 - Find the scalar field f for which the vector field $grad\ f = \left[\frac{y}{z}, \frac{x}{z}, -\frac{xy}{z^2}\right]$. (5)