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QUESTION BANK

Title of the Subject: Engineering Mathematics I	
Title of the Unit: Linear Algebra-Matrices	Unit No:-1

Multiple Choice Questions

Question No.	Question Description	Expected Marks
1	The rank of Matrix $A=\begin{bmatrix}1&2&3\\0&1&1\\0&1&2\end{bmatrix}$ is A) 0 B) 1 C) 2 D) 3	1
2	The sum of the Eigen values of a Matrix is equal to A) Sum of diagonal elements B) sum of the principal diagonal elements C) sum of the non diagonal elements D) $\lvert A\rvert$	1
3	The normal form of matrix $A=\begin{bmatrix}1&2&3\\1&2&3\\0&1&0\end{bmatrix}$ *is* $A)\ [I_3]$ $B)\ \begin{bmatrix}I_2&0\\0&0\end{bmatrix}$ $C)\ [I_2]$ $D)\ [I_2\quad 0]$	1
4	If the rank of matrix A is 3 ,then the rank of A^T is A) 0 B) 4 C) 1 D) 3	1
5	For given matrix A, i) if all minors of order (r+1) is zero , ii) at least one minor of order 'r' is non zero, then the rank of matrix is ---- A) 0 B) r C) r+1 D) None	1
6	For the given system of non-homogenous linear simultaneous equations [A] [X] = [D],there exists unique solution if --------- $A)\ \rho\,(A)\neq\ \rho(A,D)\quad B)\ \rho\,(A)=\ \rho(A,D) < number\ of\ unkowns$ $C\ )\rho\,(A)=\ \rho(A,D)=number\ of\ unkowns\quad D)\ None$	1
7	$If\ A=\begin{bmatrix}1&2\\3&4\end{bmatrix}, then\ its\ characteristic\ equation\ is\ ---$ $A)\ \lambda^2+5\,\lambda-2=0\quad B)\ \lambda^2-\ 5\lambda-2=0\quad C)\ \lambda^2+5\,\lambda+2=0\quad D\ )\ \lambda^2-4\,\lambda-2=0$	1
8	$If\ \lambda^3-6\,\lambda^2+\ 11\,\lambda-6=0\ is\ the\ characteristic\ equation, then\ Eigen\ values\ are\ ---$ A) 0 , 1 , 2 B) 0 , 1 , 3 C) 1 , 2 , 3 D) -1 , 2, 3	1
9	Cayley - Hamilton theorem states that every square matrix satisfies -------- A) Its determinant B) Its simultaneous equation C)Its own characteristic equation D) None	1
10	Characteristic equation of the square matrix A is given by $A)\ \lvert A-\lambda\,I\rvert=0\quad B)\ \lvert A\rvert=0\quad C)\ [A-\lambda\,I]=0\quad D)\ \lvert A\rvert-\lvert\lambda\,I\rvert=0$	1

Short Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	**Define Rank of Matrix.**	2
2	**Define Normal form of Matrix.**	2
3	**Discuss the conditions for consistency for Non homogeneous equations.**	2
4	**Discuss the conditions for consistency for homogeneous equations**	2
5	**Define Characteristic equation of Matrix.**	2
6	**Define Cayley- Hamilton theorem.**	2
7	**Find the Rank of Matrix A=** $\begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 1 \\ 2 & 1 & 1 \end{bmatrix}$	2
8	**Find the Eigen values of the Matrix** **A=** $\begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix}$	2
9	**Verify Cayley Hamilton theorem for** **A=** $\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$	2
10	**Find** A^{-1} **,using Cayley Hamilton theorem** **A=** $\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$	2

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	**Find inverse by Gauss Jordon Method** $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 2 & 1 & -2 \end{bmatrix}$	**5**
2	**Find Rank of Matrix A=** $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$	**5**
3	**Find normal form of A =** $\begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & -3 & -1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$	**5**
4	**Discuss the consistency and solve** $x + y + z = 6;\ x - y + 2z = 5;\ 3x + y + z = 8;\ 2x - 2y + 3z = 7.$	**5**
5	**Discuss the consistency and solve** $x + y + 3z = 6;\ 2x + 3y + z = 8;\ 4x + 5y + 7z = 20;\ x + 8z = 10.$	**5**
6	**Solve** $2x - y + 3z = 0;\ 3x + 2y + 2z = 0;\ x - 4y + 5z = 0.$	**5**
7	**Solve** $3x - y - z = 0\ ;\ x + y + 2z = 0\ ;\ 5x + y + 3z = 0$	**5**
8	**Find Eigen values & Eigen vectors for the Matrix** **A=** $\begin{bmatrix} 1 & 0 & 4 \\ 0 & 5 & 4 \\ -4 & 4 & 3 \end{bmatrix}$	**5**
9	**Verify Cayley -Hamilton theorem for the Matrix** **A=** $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$	**5**
10	**Using Cayley Hamilton theorem find** A^{-1} **A=** $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$	**5**

QUESTION BANK

Title of the Subject: Engineering Mathematics I	
Title of the Unit: Partial differentiation	**Unit No:-2**

Multiple Choice Questions

Question No.	Question Description	Expected Marks
1	$If\ u = e^{y/x}\ then\ \frac{\partial u}{\partial x} = ---$ $A)\ e^{y/x}\quad B)\ e^{y/x}\left(-\frac{y}{x^2}\right)\quad C)\ e^{y/x}\left(-\frac{1}{x^2}\right)\quad D)\ e^{y/x}\left(\frac{1}{x}\right)$	1
2	$If\ u = x^y, then\ \frac{\partial u}{\partial x} = ---$ A) $x^y \log x$ B) x^{y-1} C) $y x^y$ D) $y x^{y-1}$	1
3	If f(x, y) = c is an implicit function then $\frac{dy}{dx} = ------.$ $A)\ -\frac{f_x}{f_y}\quad B)\ \frac{f_x}{f_y}\quad C)\ -\frac{f_x}{f}\quad D)\ -\frac{f_y}{f_x}$	1
4	u = $(x^3 + y^3)/(x-y)$ is a homogeneous function of degree n=........ A) 0 B) 2 C) 1 D) 3	1
5	$If\ u = \log(x^2 + y^2 + xy)\ then\ x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = ----$ A) 0 B) 1 C) 2u D) 2	1
6	$If\ u = x^y, then\ \frac{\partial u}{\partial y} = ---$ A) $x^y \log x$ B) x^{y-1} C) $y x^y$ D) $y x^{y-1}$	1
7	$If\ u = tan^{-1}\left(\frac{x^2+y^2}{x+y}\right) then\ by\ Euler's\ theorem\ x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = ----$ $A) \sin 2u\quad B)\ \frac{1}{2}\sin 2u\quad C)\ \tan u\quad D)\ 0$	1
8	$If u = x^n F\left(\frac{y}{x}\right) as homogenous\ function\ in\ x\ \&\ y\ with\ degree\ n\ then\ by$	1

	Euler's theorem we have A) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y} = 0$ B) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y} = n(n-1)$ C) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y} = n\,u$ D) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y} = u$	
9	$If\ \frac{\partial z}{\partial u}=\frac{\partial z}{\partial x}+\frac{\partial z}{\partial y}\ then\ \frac{\partial}{\partial u} = ---$ A) $\frac{\partial z}{\partial y}+\frac{\partial}{\partial y}$ B) $\frac{\partial}{\partial x}+\frac{\partial}{\partial y}$ C) $\frac{\partial}{\partial x}-\frac{\partial}{\partial y}$ D) $\frac{\partial}{\partial x}+\frac{\partial z}{\partial y}$	1
10	$If\ z=f(x,y) and\ x=u+v, y=u\,v\ then\ \frac{\partial z}{\partial u} = ---$ A) $\frac{\partial z}{\partial y}+\frac{\partial z}{\partial y}$ B) $\frac{\partial z}{\partial x}+v\frac{\partial z}{\partial y}$ C) $u\frac{\partial z}{\partial x}+v\frac{\partial z}{\partial v}$ D) $v\frac{\partial z}{\partial x}+\frac{\partial z}{\partial y}$	1

Short Answer Question

Question No.	Question Description	Expected Marks
1	If $u = x.log(xy)$ where $x^3+y^3+3xy=1$. Find $\frac{du}{dx}$	2
2	If $x = rcos\theta\ , y = rsin\theta$ .Find $(\partial x/\partial r)_\theta$, $(\partial\theta/\partial x)_y$	2
3	State Euler's theorem for a function u of two variables.	2
4	If u = $e^{x^2+y^2}$ find the value of x $\frac{\partial u}{\partial x}$ + y $\frac{\partial u}{\partial y}$	2
5	If u = f(r, s, t) , r = x- y , s = y –z , t = z- x then find the value of $\frac{\partial u}{\partial x}$	2
6	If $\theta = t^n e^{-r^2/4t}$, find $\frac{\partial\theta}{\partial t}$	2
7	If u = $\tan^{-1}(\frac{x^3+y^3}{x-y})$ then prove that x $\frac{\partial u}{\partial x}$ + y $\frac{\partial u}{\partial y}$ = sin 2u	2
8	If z= f(x, y), x= u + v, y = u v then find the value of $\frac{\partial z}{\partial u}$	2
9	**If z = e^{ax+by} f(ax-by) find** $\frac{\partial z}{\partial y}$	2
10	**If u = x^y find** $\frac{\partial u}{\partial x}$, $\frac{\partial u}{\partial y}$	2

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	If $u = \log(tanx + tany + tanz)$ then prove that, $sin2x\frac{\partial u}{\partial x} + sin2y\frac{\partial u}{\partial y} + sin2z\frac{\partial u}{\partial z} = 2.$	5
2	If $z(x+y) = x^2 + y^2$ then show that, $\{\frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\}^2 = 4\left[1 - \frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right].$	5
3	If $u = lx + my$, $v = mx - ly$ .Then show that, $(\frac{\partial u}{\partial x})_y \cdot (\frac{\partial x}{\partial u})_v = \frac{l^2}{l^2+m^2}$	5
4	If $u = \tan^{-1}\left(\frac{y^2}{x}\right)$. Find $Find\ x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x \partial y} + y^2\frac{\partial^2 u}{\partial y^2}$	5
5	If $\boldsymbol{u = tan^{-1}(\frac{x^3+y^3}{x-y})}$ prove that $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x\, \partial y} + y^2\frac{\partial^2 u}{\partial y^2} = \sin 2u\,(1 - 4\sin^2 u)$	5
6	If $Z = f(x,y)$, $x = e^u + e^{-v}$, $y = e^{-u} - e^v$, Prove that, $\frac{\partial z}{\partial u} - \frac{\partial z}{\partial v} = x\frac{\partial z}{\partial x} - y\frac{\partial z}{\partial y}$	5
7	If $u = \sin^{-1}\left(\frac{x^2+y^2}{x+y}\right)$ Prove that, $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x \partial y} + y^2\frac{\partial^2 u}{\partial y^2} = tan^3 u$	5
8	If $z = f(x, y)$, $x = u + v$, $y = u - v$, Prove that $\frac{\partial^2 z}{\partial u\, \partial v} = \frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial y^2}$	5
9	If $r^2 = x^2 + y^2 + z^2$ and $v = r^m$, prove that $v_{xx} + v_{yy} + v_{zz} = m(m+1)\, r^{m-2}$	5
10	If $v = f(x, y)$ and $x = e^{\theta + i\varphi}$, $y = e^{\theta - i\varphi}$,Show that $\frac{\partial^2 v}{\partial \theta^2} + \frac{\partial^2 v}{\partial \phi^2} = 4xy\frac{\partial^2 v}{\partial x\, \partial y}$	5

QUESTION BANK

Title of the Subject: Engineering Mathematics I	
Title of the Unit: Applications of Partial differentiation	**Unit No:-3**

Multiple Choice Questions

Question No.	Question Description	Expected Marks
1	$If\ x = u\,v\,, y = \frac{u}{v}\ then\ J = ---$ $A) -\frac{2u}{v}\quad B)\frac{2u}{v}\quad C)\ \frac{u}{v}\quad D)\ 0$	1
2	$If\ x = r\cos\theta\,, y = r\sin\theta\ then$ Jacobian of the given transformation is ----- A) J = 2 r B) J = r C) J= 1/r D) 0	1
3	If u = x^2 -2y , v = x + y , then J= ---- A) 2 x + 2 B) 3 x + 2 C) 2 x - 2 D) 2 x + 1	1
4	The necessary condition for maxima, minima of f(x ,y) is $A)\, r\,t - s^2 > 0\quad B)\ \frac{\partial u}{\partial x} = 0, \frac{\partial u}{\partial y} = 0\quad C)\ \frac{\partial u}{\partial x} = 0\quad D)\, r\,t - s^2 < 0$	1
5	$For\ the\ function\ u = f(x,y), under\ the\ condition$ $r\,t - s^2 > 0\ and\ r > 0, the\ function\ f(x,y) is ---$ A) Maximum B) No max, No minimum C) minimum D) both max & minimum	1
6	$The\ function\ u = f(x,y) is\ maximum\ under\ the\ condition$ $A)\, r\,t - s^2 = 0\ \ B)\ r\,t - s^2 < 0\ \ C)\, r\,t - s^2 > 0\ \&\, r < 0\ \ D)\, r\,t - s^2 > 0\ \&\, r > 0$	1
7	$If\ J = \frac{\partial(x,y)}{\partial(u,v)}\ \ and\ J' = \frac{\partial(u,v)}{\partial(x,y)}\ \ then\ J\ J' = ---$ A) 0 B) -1 C) 1 D) None	1
8	Function u = x^2 +y^2 + 6 x +12 has stationary value at the point (x ,y) = ---- A) (0,0) B) (0,3) C) (-3,3) D) (-3,0)	1
9	If x= a(u + v) , y = b (u – v)then the Jacobian J= ----- A) ab B) - 2 a b C) 0 D) – 4 a b	1
10	I f x = u cos v , y = u sin v then J = ----- A) u B) v C) 0 D) uv	1

Short Answer Question		
Question No.	Question Description	Expected Marks
1	$If\ x = r\cos\theta\ , y = r\sin\theta\ \ , find\ \frac{\partial(x,y)}{\partial(r,\theta)}$	2
2	If u = $x^2 - 2y$, v = x + y + z , w = x- 2y +3z then find the Jacobian of the given transformation.	2
3	$If\ x = u\,v\,, y = \frac{u}{v}\ \ then\ find\ J$	2
4	$If\ x = e^{v}\sec u\,,\ \ y = \ e^{v}\tan u\,, then\ find\ J$	2
5	If x = u(1-v) , y = u v then find J.	2
6	Discuss the necessary condition for Maxima, minima.	2
7	Discuss the sufficient condition for Maxima, minima.	2
8	Define Jacobian.	2
9	Define Taylor's theorem for function of two variables.	2
10	$If\ x = \ e^{\theta + i\emptyset}\ , y = e^{\theta - i\emptyset}\ then\ find\ J$	2

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	$If\ \ x = r\sin\theta\cos\emptyset\ , y = r\sin\theta\sin\emptyset\ \ , z = r\cos\theta$ $then\ find\ \ \frac{\partial(x,y,z)}{\partial(r,\theta,\emptyset)}$	5
2	$If\ y_1 = \frac{x_2 x_3}{x_1}\ , y_2 = \frac{x_3 x_1}{x_2}\ , y_3 = \frac{x_1 x_2}{x_3}\ \ then\ find\ \ \frac{\partial(y_1,y_2,y_3)}{\partial(x_1,x_2,x_3)}$	5
3	If $x = e^{\theta}\cos\emptyset\ , y = e^{\theta}\sin\emptyset$, Prove that $J\,J'$ = 1	5
4	If X = $v^2 + w^2\ , y = w^2 + u^2\ , z = u^2 + v^2$, Prove that $J\,J'$ = 1	5
5	$x = \sqrt{v\,w}\ \ , y = \sqrt{u\,w}\ \ , z = \sqrt{u\,v}$, Prove that $J\,J'$ = 1	5
6	Discuss the stationary values of $x^3 y^2$ (1- x - y)	5
7	Find Maxima, minima of $x\,y + \frac{a^3}{x} + \frac{a^3}{y}\ , a > 0$	5
8	Divide 24 into three parts that the continued product of first, square of the second and cube of the third may be maximum.	5
9	A rectangular box open at the top is to have volume of 256 cubic feet. Determine the dimensions of the box requiring least material for the construction of the box. (Use Lagrange's method of multipliers	5
10	Expand in to Taylor's theorem for f(x , y) = e^x cos y in the powers of (x-1) & $(y - \frac{\pi}{4})$	5

QUESTION BANK

Title of the Subject: Engineering Mathematics I	
Title of the Unit: Reduction formulae & Curve Tracing	**Unit No:-4**

Multiple Choice Questions		
Question No.	**Question Description**	**Expected Marks**
1	The equation of the tangents at the origin for the curve $y^2(a-x) = x^3$ is a) x=0 , b) y = 0 ,c) y = 0 , y = 0, d) x = a	**1**
2	What are the point of intersections with X axis for the curve $xy^2 = 4a^2 (2a- x)$? a) (0,0) , b) (a,0) , c) (-2a, 0) , d) (2a, 0)	**1**
3	For the curve $a^2 x^2 = y^3(2a-y)$ at the origin there is ----- a)Node point , b) Singular point, c) Cusp point , d) Nothing	**1**
4	The equation of the asymptote to the curve $x^2 y^2 = a^2(y^2- x^2)$ is ----. a) X = a , b) x = ± a , c) y = ± a , d) x= 0	**1**
5	The equation of the tangent at the origin for the curve $y^2(x^2-1) = x$ is - a) Y axis , b) x axis , c) y = ± x , d) none	**1**
6	For the curve $x^{1/2} + y^{1/2} = a^{1/2}$, the equation of the tangent at (0,a)is -----. a) X=0 , b) y= 0 , c) y= x , d) y = -x	**1**
7	Curve x=a $\cos^3\Theta$, y=a $\sin^3\Theta$ is symmetrical about ------------ . a) Y axis , b) X axis , c) x =a ,d) y = x	**1**
8	Find $\frac{dy}{dx}$ at Θ=0. For the curve x=a (Θ+ sin Θ), y=a (1- cos Θ). a) 1 ,b) -1 c) 0 ,d) ∞	**1**
9	For the curve r= a cos 2Θ , the equation of the tangents at the pole is -----. $\theta = \pm\frac{\pi}{4}$ b) $\theta = \pm\frac{\pi}{2}$,c) θ = 0 d) $\theta = \pm\frac{\pi}{3}$	**1**
10	Curve r = a (1- cos Θ) is symmetrical about ------------. a) Initial line , b) pole ,c) θ = π , d) θ = π/2	**1**

Short Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	$Evaluate \int_0^{\frac{\pi}{2}} sin^5\theta \, d\theta$	2
2	$Evaluate \int_0^{\frac{\pi}{2}} cos^4\theta \, d\theta$	2
3	$Evaluate \int_0^{\pi} cos^6\theta \, d\theta$	2
4	Evaluate $\int_0^{\frac{\pi}{2}} sin^3\theta \; cos^4\theta \, d\theta$	2
5	Evaluate $\int_0^{\frac{\pi}{2}} sin^6\theta \; cos^8\theta \, d\theta$	2
6	Evaluate $\int_0^1 x^3\sqrt{2-x}\, dx$	2
7	$Evaluate \int_0^{\pi} sin^5\theta \, d\theta$	2
8	$Evaluate \int_0^{\frac{\pi}{2}} sin^5\theta \, cos^3\theta \, d\theta$	2
9	Define Asymptote.	2
10	Define Node point & Cusp point.	2

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	Trace the curve with full justification $y^2(a-x) = x^3$.	**5**
2	Trace the curve with full justification $x(x^2+y^2) = a(x^2 - y^2)$.	**5**
3	Trace the curve with full justification $y^2(x^2-1)=x$.	**5**
4	Trace the curve with full justification $x=a\cos^3\Theta$, $y=a\sin^3\Theta$.	**5**
5	Trace the curve with full justification $x=a(\Theta-\sin\Theta)$, $y=a(1+\cos\Theta)$.	**5**
6	Trace the curve with full justification $x=t^2$, $y=t(1-t^2/3)$.	**5**
7	Trace the curve with full justification $r=a\cos 2\Theta$.	**5**
8	Trace the curve with full justification $r = a(1-\cos\Theta)$.	**5**
9	Trace the curve with full justification $r = a(1+\cos\Theta)$.	**5**
10	Trace the curve with full justification $r^2=a^2\cos 2\Theta$.	**5**

QUESTION BANK

Title of the Subject: Engineering Mathematics I	
Title of the Unit: Multiple Integral	**Unit No:-5**

Multiple Choice Questions		
Question No.	**Question Description**	**Expected Marks**
1	Evaluate $\int_0^1 \int_1^2 dx\, dy$ A) 0 , B) 1, C) 2, D) – 1	1
2	$\int_0^1 \int_x^{2x} x\, dx\, dy = ----$ A) 2/3 B) 0 C) 1/3 D) 1	1
3	$\int_1^2 \int_0^{\sqrt{x}} y\, dx\, dy = ---$ A) 1 B) 3/4 C) 1/4 D) 4/3	1
4	$\int_0^{\frac{\pi}{2}} \int_0^{\sin\theta} dr\, d\theta$ A) -1 B)1 C) 0 D) 1/2	1
5	Evaluate $\int_0^1 \int_0^1 (x+y)\, dx\, dy$ A) 1 B) 2 C) 0 D) 1/3	1
6	In double integration, if the elementary strip is drawn parallel to X axis then first integration is performed w.r.t. A) y B) x C) both D) none of this	1
7	For $\int_0^1 \int_x^{2x} dx\, dy$ The region of integration is A) circle B) triangle C) square D) parabola	1

8	Area of the closed region bounded by two Polar curves is given by $A)\ Area = \int\int dr\, d\theta \quad B)\ \int\int r\, d\theta \quad C) \int\int r\, dr\, d\theta \quad D)\ \int\int r\, dr$	1
9	To convert Cartesian equation to polar form ,we use the substitutions as ---- $A)\ x = \cos\theta\ ,\ \ y = \sin\theta \quad B)\ \ x = \mathrm{r}\cos\theta\ ,\ \ y = r\ \sin\theta \quad C)\ x = \mathrm{r}\sin\ \theta\ ,\ \ y = r\cos\theta$ $D)\ x = \sin\theta\ ,y = \cos\theta$	1
10	The surface area of the solid of revolution about x-axis is given by $A)\ \int y\, ds \quad B)\ 2\pi \int y\, ds \quad C)\ \pi \int y\, dx \quad D)\ 2\pi \int y\, dx$	1

Short Answer Question

Question No.	**Question Description**	Expected Marks
1	Change the order of integration by showing the region $\int_0^1 \int_{lx}^{mx} \boldsymbol{f(x,y)dx\,dy}$	2
2	Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \boldsymbol{y^2\, dx\, dy}$	2
3	Evaluate $\int_0^2 \int_0^{\frac{x^2}{4}} \boldsymbol{x\, y\, dx\, dy}$	2
4	Evaluate $\int_0^{\infty} \int_0^{y} \frac{e^{-y}}{y}\, \boldsymbol{dx\, dy}$	2
5	Change the order of integration: $\int_0^a \int_x^{\frac{1}{x}} f(x,y)dx\, dy$	2
6	*Evaluate* $\int_0^{\pi/2} \int_0^2 r\cos\theta\, dr\, d\theta$	2
7	*Evaluate* $\int_0^1 \int_0^1 \int_0^1 dx\, dy\, dz$	2
8	*Evaluate* $\int_0^1 \int_0^1 \int_0^1 e^{x+y+z} dx\, dy\, dz$	2
9	*Evaluate* $\int_0^{\pi} \int_0^{a\sin\theta} r\, dr\, d\theta$	2
10	*Evaluate* $\int_0^{\frac{\pi}{2}} \int_0^{\cos\theta} dr\, d\theta$	2

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	Evaluate $\iint x\, y\, dx\, dy$ over the area bounded by x axis, the ordinate at x = 2a, $x^2 = 4ay$	5
2	Change the order of integration and evaluate $\int_0^1 \int_y^{\sqrt{y}} x\, y\, dx\, dy$	5
3	Evaluate $\iint r \sin\theta\, dr\, d\theta$ over the curve r = a (1 – cos θ) above the initial line.	5
4	Change to Polar and evaluate $\iint x^3 dx\, dy$ over the interior of the circle $x^2 + y^2 - 2ax = 0$	5
5	Evaluate $\int\int r^2\, dr\, d\theta$ between the circles: $r = 2\sin\theta$ & $r = 4\sin\theta$	5
6	Evaluate $\int\int (x^2 - y^2) dx\, dy$ over the area of the triangle whose vertices are at the points $(0,1)$, $(1,1)$& $(1,2)$.	5
7	Change the order of integration and evaluate $\int_0^a \int_0^{2\sqrt{x\,a}} x^2\, dx\, dy$	5
8	Find by double integration the area of the loop of the curve $x = t^2$, $y = t - \frac{t^3}{3}$	5
9	Find by double integration the area included between the Cardioids $r = a(1 + \cos\theta\,)\ and\ r = a\,(\,1 - \cos\theta\,)$.	5
10	Find the surface area of the solid generated by the revolution of the curve $x = a\cos^3\theta$, $y = a\sin^3\theta$ about x axis.	5