Model Question Paper-I with effect from 2022 (CBCS Scheme)

USN | | | | | | | | | | |

First Semester B.E Degree Examination

Mathematics-I for Mechanical Engineering Stream (BMATM101)

TIME: 03 Hours **Max. Marks: 100**

Note:

1. Answer any **FIVE** full questions, choosing atleast **ONE** question from each **MODULE**
2. VTU Formula Hand Book is Permitted
3. M: Marks, L: RBT levels, C: Course outcomes.

		Module - 1	M	L	C
Q.1	a	Find the angle of intersection of the curves $r=\sin\theta+\cos\theta$, $r=2\sin\theta$.	6	L2	CO1
	b	Find the pedal equation of the curve $r^2=a^2\sec 2\theta$.	7	L2	CO1
	c	Find the radius of curvature of the curve $x^4+y^4=2$ at (1, 1).	7	L2	CO1
		OR			
Q.2	a	Derive the radius of curvature for polar curve $r=f(\theta)$ in the form $\rho=\dfrac{\left(r^2+r_1^2\right)^{3/2}}{\left(r^2+2r_1^2-r r_2\right)}$.	7	L2	CO1
	b	Find the angle between the radius vector and the tangent and also find the slope of the tangent $r=a(1+\cos\theta)$ at $\theta=\dfrac{\pi}{3}$.	8	L2	CO1
	c	Using modern mathematical tool write a program/code to plot the sine and cosine curve.	5	L3	CO5
		Module – 2			
Q.3	a	Expand $\log(\cos x)$ by Maclaurin's series up to the term containing x^6	6	L2	CO2
	b	If $z=\dfrac{x^2+y^2}{x+y}$, show that $\left(\dfrac{\partial z}{\partial x}-\dfrac{\partial z}{\partial y}\right)^2=4\left(1-\dfrac{\partial z}{\partial x}-\dfrac{\partial z}{\partial y}\right)$.	7	L2	CO2
	c	If $x+y+z=u, y+z=uv, z=uvw$ find $\dfrac{\partial(x,y,z)}{\partial(u,v,w)}$.	7	L3	CO2
		OR			
Q.4	a	If $u=f(ax-by, by-cz, cz-ax)$ Prove that $\dfrac{1}{a}\dfrac{\partial u}{\partial x}+\dfrac{1}{b}\dfrac{\partial u}{\partial y}+\dfrac{1}{c}\dfrac{\partial u}{\partial z}=0$.	7	L2	CO2

	b	Find the extreme values of $f(x, y) = x^3 + 3x^2 + 4xy + y^2$.	8	L3	CO2
	c	Using modern mathematical tool write a program/code to evaluate $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$.	5	L3	CO5
Module – 3					
Q.5	a	Solve $\frac{dy}{dx} - y\tan x = y^2 \sec x$.	6	L2	CO3
	b	Water at temperature $10°C$ takes 5 minutes to warm up to $20°C$ at room temperature of 40°. Find the temperature of the water after 20 minutes. .	7	L3	CO3
	c	Solve $\frac{dy}{dx} - \frac{dx}{dy} = \frac{x}{y} - \frac{y}{x}$.	7	L2	CO3
OR					
Q.6	a	Solve $(y\log y)dx + (x - \log y)dy = 0$	6	L2	CO3
	b	Find the orthogonal trajectories of the family curve $r = 2a(\cos\theta + \sin\theta)$	7	L3	CO3
	c	Find the general and singular solutions of $xp^2 + xp - yp + 1 - y = 0$.	7	L2	CO3
Module – 4					
Q.7	a	Solve $(D^3 - 6D^2 + 11D - 6)y = e^{2x}$	6	L2	CO3
	b	Solve $(D^2 - 4)y = \cos 2x$.	7	L2	CO3
	c	Solve by variation of parameters $(D^2 + 1)y = \sec x$.	7	L2	CO3
OR					
Q.8	a	Solve $(D^2 + D + 1)y = x^2 + 1$.	6	L2	CO3
	b	Solve by variation of parameters $(D-2)^2 y = 8(x^2 + \sin 2x + e^{2x})$.	7	L2	CO3
	c	Solve $x^2\frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 2y = \log x$.	7	L2	CO3
Module – 5					
Q.9	a	Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 1 \\ 2 & 1 & -1 & 0 \\ 3 & 3 & 2 & 1 \\ 2 & 4 & 6 & 2 \end{bmatrix}$.	6	L2	CO4
	b	Solve the system of equations by Gauss-Elimination method $3x + y + 2z = 3,\ 2x - 3y - z = -3,\ x + 2y + z = 4$.	7	L3	CO4
	c	Using the Gauss-Seidel iteration method, solve the equations	7	L3	CO4

		$27x+6y-z=85,$ $6x+15y+2z=72,$ $x+y+54z=110$ Carryout four iterations starting with the initial approximations (0, 0, 0).			
OR					
Q.10	**a**	Using Rayleigh's power method find the dominant eigenvalue and the corresponding eigenvector of $\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ by taking $[1\ 0\ 0]^T$ as the initial eigenvector [carry out 6 iterations].	**8**	**L3**	**CO4**
	b	Using Gauss-Jordan method, solve $x+y+z=11, 3x-y+2z=12, 2x+y-z=3.$	**7**	**L3**	**CO4**
	c	Using modern mathematical tool write a program/code to test the consistency of the equations, x+2y-z=1, 2x+y+4z=2, 3x+3y+4z=1.	**5**	**L3**	**CO5**

Model Question Paper-II with effect from 2022 (CBCS Scheme)

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First Semester B.E Degree Examination

Mathematics-I for Mechanical Engineering Stream (BMATM101)

TIME: 03 Hours **Max. Marks: 100**

Note:

1. Answer any **FIVE** full questions, choosing atleast **ONE** question from each **MODULE**
2. VTU Formula Hand Book is Permitted
3. M: Marks, L: RBT levels, C: Course outcomes.

		Module – 1	M	L	C
Q.1	a	Find the angle of intersection of the curves $r=\sin\theta+\cos\theta,\ r=2\sin\theta$.	6	L2	CO1
	b	With usual notations prove that for the curve $r=f(\theta),\quad \frac{1}{p^2}=\frac{1}{r^2}+\frac{1}{r^4}\left(\frac{dr}{d\theta}\right)^2$	7	L2	CO1
	c	Find the radius of curvature for the curve $y=ax^2+bx+c\ at\ x=\frac{1}{2a}\left(\sqrt{a^2-1}-b\right)$.	7	L3	CO1
		OR			
Q.2	a	Show that the pedal equation for the curve $r^m=a^m\cos m\theta\ is\ pa^m=r^{m+1}$.	8	L2	CO1
	b	Derive the radius of curvature in Cartesian form.	7	L2	CO1
	c	Using modern mathematical tool write a program/code to plot the curve $r=2\lvert cos2\theta\rvert$.	5	L3	CO5
		Module – 2			
Q.3	a	Expand $e^{\cos x}$ by Maclaurin's series up to the term containing x^6.	6	L2	CO2
	b	If $u=f(x-y,y-z,z-x)$, show that $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=0$.	7	L2	CO2
	c	Examine the function $f(x,y)=x^3+3xy^2+15x^2-15y^2+72x$ for extreme values.	7	L3	CO2
		OR			
Q.4	a	Evaluate $\lim_{x\to 0}\left(\frac{a^x+b^x+c^x+d^x}{4}\right)^{\frac{1}{x}}$.	7	L2	CO2
	b	$If\ u=x^2+y^2+z^2,\ v=xy+yz+zx,\ w=x+y+z\ find\ \frac{\partial(u,v,w)}{\partial(x,y,z)}$.	8	L3	CO2
	c	Using modern mathematical tool write a program/code to show that $u_{xx}+u_{yy}=0\ given\ u=e^x(x\,cosy-y\,siny)$.	5	L3	CO5

Module – 3					
Q.5	**a**	Solve $\frac{dy}{dx} + x\sin 2y = x^2\cos^2 y$.	**6**	**L2**	**CO3**
	b	Solve $\left(x^3 + y^3 + 6x\right)dx + \left(xy^2\right)dy = 0$.	**7**	**L2**	**CO3**
	c	Find the orthogonal trajectories of cardioid $r = a\left(1 - \cos\theta\right)$.	**7**	**L3**	**CO3**
OR					
Q.6	**a**	Solve $\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0$	**6**	**L2**	**CO3**
	b	A body is heated to 110° C and placed in air at $10°C$. After an hour its temperature becomes $60°c$. How much additional time is required for it to cool 30^0 C.	**7**	**L3**	**CO3**
	c	Find the general and singular solution of the equation $x^2\left(y - px\right) = p^2 y$ reducing into Clairaut's form, using the substitution $X = x^2, Y = y^2$..	**7**	**L2**	**CO3**
Module – 4					
Q.7	**a**	Solve $\left(D^4 - 4D^3 + 8D^2 - 8D + 4\right)y = 0$	**6**	**L2**	**CO3**
	b	Solve $\left(D^2 - 6D + 9\right)y = 6e^{3x} + 7e^{-2x} - \log 2$.	**7**	**L3**	**CO3**
	c	Solve by variation of parameters $\left(D^2 - 1\right)y = \frac{2}{1 + e^x}$	**7**	**L2**	**CO3**
OR					
Q.8	**a**	Solve $\left(D^3 - 3D^2 + 3D - 1\right)y = 0$.	**6**	**L2**	**CO3**
	b	Solve $\left(D^3 + 2D^2 + D\right)y = \sin 2x$.	**7**	**L2**	**CO3**
	c	Solve $\left(2x+3\right)^2 \frac{d^2y}{dx^2} - \left(2x+3\right)\frac{dy}{dx} - 12y = 6x$.	**7**	**L2**	**CO3**
Module – 5					
Q.9	**a**	Find the rank of the matrix $\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$.	**6**	**L2**	**CO4**
	b	Solve the system of equations by Gauss-Jordan method $x + y + z = 8, -x - y + 2z = -4, 3x + 5y - 7z = 14$.	**7**	**L3**	**CO4**
	c	Solve the system of equations using Gauss-Seidel method by taking (0, 0, 0) as an initial approximate root $5x + 2y + z = 12,\ x + 4y + 2z = 15,\ x + 2y + 5z = 20$	**7**	**L3**	**CO4**

OR					
Q.10	a	Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 4 & 3 \\ 2 & 4 & 6 & 8 \\ 4 & 8 & 12 & 16 \\ 1 & 2 & 3 & 4 \end{bmatrix}$.	7	L2	CO4
	b	For what values λ and μ the system of equations $2x + 3y + 5z = 9$, $7x + 3y - 2z = 8$, $2x + 3y + \lambda z = \mu$, has (i) no solution (ii) a unique solution and (iii)infinite number of solutions.	8	L2	CO4
	c	Using modern mathematical tool write a program/code to find the largest eigen value of $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ by power method.	5	L3	CO5

Model Question Paper-I with effect from2022(CBCS Scheme)

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First Semester B.E Degree Examination

Mathematics-I for Mechanical Engineering stream (22MATM11)

TIME: 03 Hours **Max. Marks: 100**

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each module.

		Module -1		**Marks**
Q.01	a	Find the angle of intersection of the curves $r = \sin\theta + \cos\theta$ and $r = 2\sin\theta$		**06**
	b	Find the pedal equation of the curve $r^2 = a^2 sec2\theta$.		**07**
	c	Find the radius of curvature of the curve $x^4 + y^4 = 2$ $at\ the\ point$ $(1, 1)$		**07**
		OR		
Q.02	a	Derive the radius of curvature for polar curve $r = f(\theta)$ in the form $\rho = \frac{(r^2+r_1{}^2)^{3/2}}{r^2+2r_1{}^2-rr_2}$		**06**
	b	Find the angle between the radius vector and the tangent and also find the slope of the tangent $r = a(1 + cos\theta)$ $at\ \theta = \pi/3$.		**07**
	c	Find that the radius of curvature of $a^2y = x^3 - a^3$ at the point where the curves cut the X-axis.		**07**
		Module-2		
Q. 03	a	Expand $\log cosx$ by Maclaurin's series up to the term containing x^6		**06**
	b	If $z = \frac{x^2+y^2}{x+y}$, show that $\left(\frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)^2 = 4\left(1 - \frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)$		**07**
	c	If $u = x + y + z,\ uv = y + z\ ,\ uvw = z,$ evaluate $\frac{\partial(x,y,z)}{\partial(u,v,w)}$		**07**
		OR		
Q.04	a	Evaluate (i) $\lim_{x\to 0}\left(\frac{\sin x}{x}\right)^{1/x^2}$ (ii) $\lim_{x\to 0}(\tan x)^{\tan x}$		**6**
	b	If $u = f(ax - by, by - cz, cz - ax)$, show that $\frac{1}{a}\frac{\partial u}{\partial x} + \frac{1}{b}\frac{\partial u}{\partial y} + \frac{1}{c}\frac{\partial u}{\partial z} = 0$		**07**
	c	Find the extreme values of $f(x, y) = x^3 + 3x^2 + 4xy + y^2$		**07**
		Module-3		
Q. 05	a	Solve $\frac{dy}{dx} - ytanx = y^2secx$		**06**
	b	Water at temperature$10°C$ takes 5 minutes to warm up to $20°C$ at room temperature of 40°. Find the temperature of the water after 20 minutes.		**07**
	c	Solve $\frac{dy}{dx} - \frac{dx}{dy} = \frac{x}{y} - \frac{y}{x}$		**07**
		OR		

Q. 06	a	Solve$(y\ logy)dx +\ (x - logy)dy = 0$	**06**
	b	Find the orthogonal trajectories of the family curve $r = 2a(cos\theta + sin\theta)$.	**07**
	c	Find the general and singular solutions of $xp^2 + xp - yp + 1 - y = 0$	**07**
Module-4			
Q. 07	a	Solve $(D^3 - 6D^2 + 11D - 6)y = e^{2x}$	**06**
	b	Solve $\frac{d^2y}{dx^2} - 4y = cos2x$	**07**
	c	Solve by variation of parameters method $(D^2 + 1)y = secx$	**07**
OR			
Q. 08	a	Solve $(D^2 + D + 1)y = x^2 + 1$	**06**
	b	Solve $(D - 2)^2 y = 8(x^2 + sin2x + e^{2x})$	**07**
	c	Solve $x^2 \frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 2y = logx$	**07**
Module-5			
Q. 09	a	Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 1 \\ 2 & 1 & -1 & 0 \\ 3 & 3 & 2 & 1 \\ 2 & 4 & 6 & 2 \end{bmatrix}$	**06**
	b	Solve the system of equations by using the Gauss elimination method $3x + y + 2z = 3,$ $2x - 3y - z = -3,$ $x + 2y + z = 4.$	**07**
	c	Using the Gauss-Seidel iteration method, solve the equations $27x + 6y - z = 85,$ $6x + 15y + 2z = 72,$ $x + y + 54z = 110.$ Carryout four iterations starting with the initial approximations (0, 0, 0)	**07**
OR			
Q. 10	a	Test for consistency and solve $5x + 3y + 7z = 4, \quad 3x + 26y + 2z = 9, \quad 7x + 2y + 10z = 5$	06
	b	Using Gauss-Jordan method, solve $x + y + z = 11, \quad 3x - y + 2z = 12, \quad 2x + y - z = 3$	**07**
	c	Find the largest eigenvalue and the corresponding eigenvector of $\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ with the initial approximate eigenvector $[1\ 0\ 0]^T$. Carry out 4 iterations.	**07**

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome				
Question		**Bloom's Taxonomy Level attached**	**Course Outcome**	**Program Outcome**
Q.1	(a)	L1	CO 01	PO 01
	(b)	L2	CO 01	PO 01
	(c)	L3	CO 01	PO 02
Q.2	(a)	L1	CO 01	PO 01
	(b)	L2	CO 01	PO 01
	(c)	L3	CO 01	PO 02
Q.3	(a)	L2	CO 02	PO 01
	(b)	L2	CO 02	PO 01
	(c)	L3	CO 02	PO 02
Q.4	(a)	L2	CO 02	PO 01
	(b)	L2	CO 02	PO 01
	(c)	L3	CO 02	PO 03
Q.5	(a)	L2	CO 03	PO 02
	(b)	L3	CO 03	PO 03
	(c)	L2	CO 03	PO 01
Q.6	(a)	L2	CO 03	PO 02
	(b)	L3	CO 03	PO 03
	(c)	L2	CO 03	PO 01
Q.7	(a)	L2	CO 04	PO 02
	(b)	L2	CO 04	PO 02
	(c)	L2	CO 04	PO 02
Q.8	(a)	L2	CO 04	PO 02
	(b)	L2	CO 04	PO 02
	(c)	L2	CO 04	PO 02
Q.9	(a)	L2	CO 05	PO 01
	(b)	L3	CO 05	PO 01
	(c)	L3	CO 05	PO 02
Q.10	(a)	L2	CO 05	PO 01
	(b)	L3	CO 05	PO 01
	(c)	L3	CO 05	PO 02

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering (Knowledge): L_1	Understanding (Comprehension): L_2	Applying (Application): L_3
	Higher-order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6

Model Question Paper-2 with effect from 2022 (CBCS Scheme)

USN | | | | | | | | | | |

First Semester B.E Degree Examination

Mathematics-I for Mechanical Engineering Stream (22MATM11)

TIME: 03 Hours **Max. Marks: 100**

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE.**

		Module -1	Marks
Q.01	a	Find the angle between the polar curves $r = a(1+\cos\theta)$ and $r^2 = a^2\cos 2\theta$	**06**
	b	Prove with usual notations $\frac{1}{p^2} = \frac{1}{r^2} + \frac{1}{r^4}\left(\frac{dr}{d\theta}\right)^2$	**07**
	c	Find the radius of curvature for the curve $y = ax^2 + bx + c$ at $x = \frac{1}{2a}\left(\sqrt{a^2-1} - b\right)$.	**07**
		OR	
Q.02	a	Show that the pedal equation for the curve $r^m = a^m \cos m\theta$ is $p\,a^m = r^{m+1}$	**06**
	b	Derive the radius of curvature in Cartesian form.	**07**
	c	Show that for the curve $r = a(1 - cos\theta)$ is $\frac{\rho^2}{r}$ = constant.	**07**
		Module-2	
Q. 03	a	Expand e^{cosx} up to the terms containing fourth degree using Maclaurin's series.	**06**
	b	If $u = f(x-y, y-z, z-x)$ show that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$	**07**
	c	Find the extreme values of the function $f(x,y) = x^3 + 3xy^2 + 15x^2 - 15y^2 + 72x$	**07**
		OR	
Q.04	a	Evaluate $\underset{x\to 0}{lit}\left(\frac{a^x + b^x + c^x + d^x}{4}\right)^{1/x}$	**06**
	b	Find the total derivative $\frac{du}{dx}$ for $u = xy^2 + x^2y$; $x = at$; $y = 2at$	**07**
	c	If $u = x^2 + y^2 + z^2$, $v = xy + yz + zx$, $w = x + y + z$ find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$	**07**
		Module-3	
Q. 05	a	Solve $\frac{dy}{dx} + x\sin 2y = x^3\cos^2 y$	**06**

	b	Solve $\left(x^3+y^3+6x\right)dx+\left(xy^2\right)dy=0$	**07**
	c	Find the orthogonal trajectories of cardioid $r=a\left(1-\cos\theta\right)$	**07**
		OR	
Q. 06	a	Solve $\frac{dy}{dx}+\frac{ycosx+siny+y}{sinx+xcosy+x}=0$	**06**
	b	A body is heated to 110°C and placed in air at 10°C. After an hour its temperature becomes 60°C. How much additional time is required for it to cool to 30°C.	**07**
	c	Find the general solution of $x^2\left(y-px\right)=p^2y$ by reducing it to Clairaut's form using the substitution $X=x^2, Y=y^2$.	**07**
		Module-4	
Q. 07	a	Solve $[D^4-4D^3+8D^2-8D+4]y=0$.	**06**
	b	Solve $[D^2-6D+9]y=6e^{3x}+7e^{-2x}-log2$	**07**
	c	Solve by the method of variation of parameter $\frac{d^2y}{dx^2}-y=\frac{2}{1+e^x}$	**07**
		OR	
Q. 08	a	Solve $(D^3-3D^2+3D-1)y=0$	**06**
	b	Solve $[D^3+2D^2+D]y=sin2x$	**07**
	c	Solve $(2x+3)^2\frac{d^2y}{dx^2}-(2x+3)\frac{dy}{dx}-12y=6x$	**07**
		Module-5	
Q. 09	a	Find the rank of the matrix $A=\begin{bmatrix}0 & 1 & -3 & -1\\ 1 & 0 & 1 & 1\\ 3 & 1 & 0 & 2\\ 1 & 1 & -2 & 0\end{bmatrix}$	**06**
	b	Solve the system of equations by Gauss-Jordan method $x+y+z=8$; $-x-y+2z=-4$; $3x+5y+-7=14$	**07**
	c	Using Rayleigh's power method find the dominant eigenvalue and the corresponding eigenvector of $A=\begin{bmatrix}25 & 1 & 2\\ 1 & 3 & 0\\ 2 & 0 & -4\end{bmatrix}$ by taking $\left(1,0,0\right)^T$ as initial eigenvector by carrying out 6 iterations.	**07**
		OR	

Q. 10	a	Find the rank of the matrix $A=\begin{bmatrix} 1 & 2 & 4 & 3 \\ 2 & 4 & 6 & 8 \\ 4 & 8 & 12 & 16 \\ 1 & 2 & 3 & 4 \end{bmatrix}$	06
	b	Investigate the value of λ and μ so that the equations $2x+3y+5z=9$, $7x+3y-2z=8$, $2x+3y+\lambda z=\mu$ may have i) unique solution ii) many solution iii) no solution.	**07**
	c	Solve the system of equations using Gauss-Seidel method by taking (0, 0, 0) as an initial approximate root. $5x+2y+z=12$ $x+4y+2z=15$ $x+2y+5z=20$	**07**

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome

Question		**Bloom's Taxonomy Level attached**	**Course Outcome**	**Program Outcome**
Q.1	(a)	L1	CO 01	PO 01
	(b)	L2	CO 01	PO 01
	(c)	L3	CO 01	PO 02
Q.2	(a)	L1	CO 01	PO 01
	(b)	L2	CO 01	PO 01
	(c)	L3	CO 01	PO 02
Q.3	(a)	L2	CO 02	PO 01
	(b)	L2	CO 02	PO 01
	(c)	L3	CO 02	PO 02
Q.4	(a)	L2	CO 02	PO 01
	(b)	L2	CO 02	PO 01
	(c)	L3	CO 02	PO 03
Q.5	(a)	L2	CO 03	PO 01
	(b)	L3	CO 03	PO 02
	(c)	L2	CO 03	PO 01
Q.6	(a)	L2	CO 03	PO 01
	(b)	L3	CO 03	PO 02
	(c)	L2	CO 03	PO 01
Q.7	(a)	L2	CO 04	PO 01
	(b)	L2	CO 04	PO 01
	(c)	L2	CO 04	PO 02
Q.8	(a)	L2	CO 04	PO 01
	(b)	L2	CO 04	PO 01
	(c)	L2	CO 04	PO 02
Q.9	(a)	L2	CO 05	PO 01
	(b)	L3	CO 05	PO 01
	(c)	L3	CO 05	PO 02

Q.10	(a)	L2	CO 05	PO 01
	(b)	L3	CO 05	PO 01
	(c)	L3	CO 05	PO 02

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering (knowledge):L_1	Understanding (Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis):L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6