Name of Subject: - Mathematics – II

DEPT: - Department of Engineering Sciences & Humanities (ES&H)

Year (FE/SE/TE/BE): - Year: F. E. / F. T. SEM-II

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Subject Code: -BSC2102 / BSC2202

Sr No.	Questions	CO	RBT	Marks	Type (N/T)	PI
1	Check given differential equation is Exact or Non-Exact $\left(2y^2-4x+5\right)dx=\left(y-2y^2-4xy\right)dy$	**CO1**	R	2	N	1.1.1
2	Check given differential equation is Exact or Non-Exact $(1+log\,x\,y)dx+\left(1+\frac{x}{y}\right)dy=0$	**CO1**	R	2	N	1.1.1
3	Check given differential equation is Exact or Non-Exact $(e^y+1)\cos x\,dx+e^y\sin x\,dy=0$	**CO1**	R	2	N	1.1.1
4	Given an amount of a radioactive substance say 0.5gm. Find the amount present at any later time t.	**CO1**	R	2	N	1.1.1
5	Half-life of cobalt-60 is 5.3 years. If an old sample of 10 grams has now decayed to 1 gram, how much time has passed?	**CO1**	R	2	N	1.1.1
6	In a single closed circuit, the current 'i' at any time 't' is given by $Ri+L\frac{di}{dt}=E$, find the current i at any time t , given that t = 0 , i = 0 and L , R ,E are constant.	**CO1**	U	2	N	1.1.2
7	Half-life of uranium-232 is 68.9 years. How much of a 100-gram sample is present after 250 years?	**CO1**	U	2	N	1.1.2
8	A medicine decays by 15% every 12 hours. How much of the medicine is left after 3 days?	**CO1**	U	2	N	1.1.2
9	If a material's half-life is 7 years, how much of a 1000 mg sample will remain after 14 years?	**CO1**	U	2	N	1.1.2
10	Find integrating factor for the equation $x^2y\,dx + (y^2 + 2x)\,dy = 0$	**CO1**	R	2	N	1.1.1
11	Find integrating factor for the equation $(x^4 + y^4)\,dx - xy^3\,dy = 0$	**CO1**	R	2	N	1.1.1
12	Find integrating factor for the equation $\left(x^2+y^2\right)dx-(x^2+xy)dy=0$	**CO1**	R	2	N	1.1.1
13	Solve $\frac{dy}{dx}+y=y^2(\cos x-\sin x)$	**CO1**	A	5	N	1.3.1
14	Solve $xy(1+xy^2)\frac{dy}{dx}=1$	**CO1**	A	5	N	1.3.1
15	Solve $y\frac{dx}{dy}=x-yx^2\sin y$	**CO1**	A	5	N	1.3.1
16	Solve $y(2xy+e^x)dx-e^xdy=0$	**CO1**	A	5	N	1.3.1
17	Solve $y^4dx=\left(x^{-\frac{3}{4}}-y^3x\right)dy$	**CO1**	A	5	N	1.3.1
18	The brewing pot temperature of coffee is 180º F and the room temperature is 76º F. After 5 minutes, the temperature of the coffee is 168º F. Find the exponential equation for this situation. How long will it take for the coffee to reach a serving temperature of 155º F?	**CO1**	U	5	N	2.1.3

19	A cup of coffee at $190^{\circ} F$ is left in room of $70^{\circ} F$. at time t=0, the coffee is cooling at $15^{\circ} F$ per minute find the function that models the cooling of the coffee and solve it. How much time will it takes the temperature to reach $143^{\circ} F$?	**CO1**	U	5	N	2.1.3
20	The air temperature is 50C. Water cools from 1000C to 750C in 5 minutes. How long will it take for the water to cool to 100C?	**CO1**	U	5	N	2.1.3
21	The C.S.I. team arrived at the scene of a murder at 9.30 pm. At that time, the dead body's temperature was 77.9^0F. At 10.30 pm, the dead body's temperature was recorded again, and it was 75.6^0F. Given the room temperature was 72^0F, when was the person murdered? (A normal human body temperature is 98.6^0F)	**CO1**	U	5	N	2.1.3
22	*Solve* $\left(xy^2 - e^{1/x^3}\right)dx - x^2 y\,dy = 0.$	**CO1**	A	5	N	1.3.1
23	*Solve* $\left(x\sqrt{x^2+y^2} - y\right)dx + \left(y\sqrt{x^2+y^2} - x\right)dy = 0$	**CO1**	A	5	N	1.3.1
24	*Solve* $\left(xy^3 + y\right)dx + 2\left(x^2y^2 + x + y^4\right)dy = 0$	**CO1**	A	5	N	1.3.1
25	Solve $\left(x\sec^2 y - x^2\cos y\right)dy = \left(\tan y - 3x^4\right)dx$	**CO1**	A	5	N	1.3.1
26	Solve $\frac{dy}{dx}\cosh x = 2\cosh^2 x \sinh x - y\sinh x$	**CO1**	A	5	N	1.3.1
27	Solve $\frac{dy}{dx} = \frac{y^3}{e^{3x} + y^2}$	**CO1**	A	5	N	1.3.1
28	Solve $(x^4 + y^4)dx - xy^3dy = 0$	**CO1**	A	10	N	1.3.1
29	Solve $y\,dx + x(1 - 3x^2y^2)\,dy = 0$	**CO1**	A	10	N	1.3.1
30	Solve $(xy\sin x\,y + \cos x\,y)ydx + (xy\sin x\,y - \cos x\,y)xdy = 0$	**CO1**	A	10	N	2.1.3
31	Solve $(2xy^4e^y + 2xy^3 + y)dx + (x^2y^4e^y - x^2y^2 - 3x)dy = 0$	**CO1**	A	10	N	1.3.1
32	Solve $(xy^2 + 2x^2y^3)dx + (x^2y - x^3y^2)dy = 0$	**CO1**	A	10	N	2.1.3
33	Solve $y(x^2y + e^x)dx - e^xdy = 0$	**CO1**	A	10	N	2.1.3
34	Solve $(x^2y - 2xy^2)dx - (x^3 - 3x^2y)dy = 0$	**CO1**	A	10	N	2.1.3
35	Find Complementary Function (C.F.) $(D^3 - 5D^2 + 7D - 3)y = 0$	**CO2**	R	2	N	1.1.1
36	Find Complementary Function (C.F.) $(D^3 + 1)y = 0$	**CO2**	R	2	N	1.1.1
37	Find Complementary Function (C.F.) $\left(D^2 + 6D + 9\right)y = 3^x$	**CO2**	U	2	N	1.1.1
38	Find Complementary Function (C.F.) $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = e^{-x}$	**CO2**	R	2	N	1.1.1
39	Find particular Integral (P.I.) for $\left(D^2 + 2D + 1\right)y = e^{-x}\log x$	**CO2**	U	2	N	1.1.2
40	Find particular Integral (P.I.) for $\left(D^2 - 4D + 4\right)y = 8\,x^2$	**CO2**	U	2	N	1.1.2
41	Find Complementary Function (C.F.) $(D-1)(D^2+1)\,y = 0$	**CO2**	U	2	N	1.1.2

42	Find Particular Integral (P.I.) for $\left(D^2+4\right)y=\cos 2x$	**CO2**	U	2	N	1.1.2
43	Find Particular Integral (P.I.) for $\left(D^2-2D+1\right)y=\sin x$	**CO2**	R	2	N	1.1.2
44	Find Particular Integral (P.I.) for $\left(D^2+1\right)y=\sin x\sin 2x$	**CO2**	U	2	N	1.1.2
45	Find Particular Integral (P.I.) for $\left(D^2+6D+9\right)y=\frac{e^{-3x}}{x^2}$	**CO2**	U	2	N	1.1.2
46	Find Particular Integral (P.I.) for $\frac{d^2y}{dx^2}+5y=1+e^{3x}$	**CO2**	U	2	N	1.1.2
47	Solve $\left(D^2+2D+1\right)y=e^{-x}\log x$	**CO2**	U	5	N	1.3.1
8	Solve $\frac{d^2y}{dx^2}+2y=x^2e^{3x}+e^x-cos\,2x$	**CO2**	U	5	N	1.3.1
49	Solve $(D^2-7D+6)\,y=e^{2x}+x$	**CO2**	U	5	N	1.3.1
50	Solve by the method of variation of parameters. $\frac{d^2y}{dx^2}-y=e^{-x}\sin\left(e^{-x}\right)+\cos\left(e^{-x}\right)$	**CO2**	A	5	N	2.4.1
51	Solve by the method of variation of parameters. $\frac{d^2y}{dx^2}-y=\frac{2}{1+e^x}$	**CO2**	A	5	N	2.4.1
52	Solve by the method of variation of parameters. $(D^2+a^2)y=\cos ec\,ax$	**CO2**	A	5	N	2.4.1
53	Solve by the method of variation of parameters. $\frac{d^2y}{dx^2}+4y=\tan 2x$	**CO2**	A	5	N	2.4.1
54	Solve by the method of variation of parameters. $(D^2+a^2)y=\sec ax$	**CO2**	A	5	N	2.4.1
55	Solve by the method of variation of parameters. $\frac{d^2y}{dx^2}-y=2(1-e^{-2x})^{-=\frac{1}{2}}$	**CO2**	A	5	N	2.4.1
56	Solve $\frac{d^2y}{dx^2}+2y=x^2e^{3x}$	**CO2**	U	5	N	1.3.1
57	Solve $\left(D^2+D+1\right)y=(1+\sin x)^2$	**CO2**	U	5	N	1.3.1
58	Solve $(D^2+3D+2)\,y=\cos h\,2x\sin h\,3x$	**CO2**	U	5	N	1.3.1
59	Solve $\frac{d^2y}{dx^2}+2y=e^{-2x}-\cos 2x$	**CO2**	U	5	N	1.3.1
60	Solve $(D^2+3D+2)\,y=e^x\cos 2x$	**CO2**	U	5	N	1.3.1
61	Solve $\left(D^2+2D+1\right)y=e^{-x}\log x$	**CO2**	U	5	N	1.3.1

62	Solve $3x\frac{d^2y}{dx^2}+\frac{dy}{dx}=x^2\log x$	**CO2**	A	10	N	2.4.1
63	Solve $(2x+1)^2\frac{d^2y}{dx^2}-2(2x+1)\frac{dy}{dx}-12y=6x$	**CO2**	A	10	N	2.4.1
64	Solve $x^2\frac{d^2y}{dx^2}-3x\frac{dy}{dx}+5y=x^2\sin\log x$	**CO2**	A	10	N	2.4.1
65	Solve $x^2\frac{d^2y}{dx^2}+5x\frac{dy}{dx}+3y=\frac{\log x}{x^2}$	**CO2**	A	10	N	2.4.1
66	Solve $(1+x)^2\frac{d^2y}{dx^2}+(1+x)\frac{dy}{dx}+y=4\cos\log(x+1)$	**CO2**	A	10	N	2.4.1
67	Solve $x^2\frac{d^2y}{dx^2}-x\frac{dy}{dx}+4y=cos(\log x)+x\sin(\log x)$	**CO2**	A	10	N	2.4.1
68	Solve $(3x+2)^2\frac{d^2y}{dx^2}+3(3x+2)\frac{dy}{dx}-36y=3x^2+4x+1.$	**CO2**	A	10	N	2.4.1
69	Find the Eigen values of the Matrix $A=\begin{bmatrix}2&-1&1\\1&2&-1\\1&-1&2\end{bmatrix}$	**CO3**	R	2	N	1.1.1
70	Find the sum of the Eigen values of the matrix $\begin{bmatrix}1&1&1\\1&1&1\\1&1&1\end{bmatrix}$	**CO3**	R	2	N	1.1.1
71	Find the product of the Eigen values of the matrix $\begin{bmatrix}2&2&1\\1&3&1\\1&2&2\end{bmatrix}$	**CO3**	R	2	N	1.1.1
72	Find the Eigen values of A^3+2I, where $A=\begin{bmatrix}1&2&-3\\0&3&2\\0&0&-2\end{bmatrix}$	**CO3**	U	2	N	1.1.1
73	Find the Eigen values of adjoint of the matrix $A=\begin{bmatrix}-2&5&4\\5&7&5\\4&5&-2\end{bmatrix}$	**CO3**	R	2	N	1.1.1
74	Find the Eigen values of A^3 where $A=\begin{bmatrix}1&1&3\\1&5&1\\3&1&1\end{bmatrix}$	**CO3**	U	2	N	1.1.1
75	Find Eigen values of A^2-4I where $A=\begin{bmatrix}0&1&1\\1&0&1\\1&1&0\end{bmatrix}$	**CO3**	U	2	N	1.1.1
76	If $A=\begin{bmatrix}1&0\\2&4\end{bmatrix}$ then find the Eigen values of $4A^{-1}+3A+2I$	**CO3**	R	2	N	1.1.1
77	If $A=\begin{bmatrix}1&2&-3\\0&3&2\\0&0&-2\end{bmatrix}$ then find the Eigen values of $3A^3+5A^2-6A+2I$	**CO3**	R	2	N	1.1.1

78	Find the Eigen values of the matrix $\begin{bmatrix}1 & 1 & 1\\1 & 1 & 1\\1 & 1 & 1\end{bmatrix}$	**CO3**	R	2	N	1.1.1
79	The minimum and maximum Eigen values of the matrix $\begin{bmatrix}1 & 1 & 3\\1 & 5 & 1\\3 & 1 & 1\end{bmatrix}$ are -2 and 6 respectively. What is the other Eigen value?	**CO3**	U	2	N	1.1.1
80	The sum and the product of Eigen values of the matrix $\begin{bmatrix}1 & 1 & 3\\1 & 5 & 1\\3 & 1 & 1\end{bmatrix}$	**CO3**	U	2	N	1.1.1
81	Verify Cayley-Hamilton theorem for the matrix A = $\begin{bmatrix}1 & 0 & 2\\0 & 2 & 1\\2 & 0 & 3\end{bmatrix}$	**CO3**	A	5	N	2.1.3
82	Verify Cayley-Hamilton theorem for the matrix A = $\begin{bmatrix}1 & 2 & 3\\2 & -1 & 4\\3 & -1 & -1\end{bmatrix}$	**CO3**	U	5	N	2.1.3
83	Use the Gram–Schmidt process to transform the basis vectors u = (1, 0, 0), v = (3, 7, –2), 4 = (0, 4, 1) into an orthonormal basis.	**CO3**	A	5	N	2.1.3
84	Use the Gram–Schmidt process to transform the basis vectors u = (1, 0, 3), v = (2, 2, 0), w = (3, 1, 2) into an orthonormal basis	**CO3**	A	5	N	2.1.3
85	Use the Gram -Schmidt Process to transform the basis vectors u = (1, 1, 1), v = (1, –1, 1), w = (1, 1, 0) into an orthogonal basis.	**CO3**	A	5	N	2.1.3
86	Verify Cayley-Hamilton theorem for the matrix A = $\begin{bmatrix}1 & 2 & -2\\-1 & 3 & 0\\0 & -2 & 1\end{bmatrix}$	**CO3**	U	5	N	2.1.3
87	Verify Cayley-Hamilton theorem for the matrix A = $\begin{bmatrix}2 & 0 & -1\\0 & 2 & 0\\-1 & 0 & 2\end{bmatrix}$	**CO3**	U	5	N	2.1.3
88	Compute $A^9 - 6A^8 + 10A^7 - 3A^6 + A + I$ where $A = \begin{bmatrix}1 & 2 & 3\\-1 & 3 & 1\\1 & 0 & 2\end{bmatrix}$	**CO3**	A	5	N	2.1.3
89	Use Cayley – Hamilton theorem to find A^{-1} where $A = \begin{bmatrix}1 & 4\\2 & 3\end{bmatrix}$ and express $A^5 - 4A^4 - 7A^3 + 11A^2 - A - 10I$ as a linear polynomial in A	**CO3**	A	5	N	2.1.3
90	Find the characteristic equation of the matrix A = $\begin{bmatrix}2 & 1 & 1\\0 & 1 & 0\\1 & 1 & 2\end{bmatrix}$ and hence find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$	**CO3**	A	5	N	2.1.3
91	Verify Cayley-Hamilton theorem for the matrix A = $\begin{bmatrix}0 & 1 & 0\\0 & 0 & 1\\1 & -3 & 3\end{bmatrix}$	**CO3**	U	5	N	2.1.3

92	Use the Gram–Schmidt process to transform the basis vectors $u_1 = (1,1,1), u_2 = (1,-1,1), u_3 = (1,1,0)$into an orthonormal basis.	**CO3**	A	5	N	2.1.3
93	Use the Gram–Schmidt process to transform the basis vectors $u = (4,1,2), v = (0,3,8)$ and $w = (3,1,2)$into an orthonormal basis.	**CO3**	A	5	N	2.1.3
94	Use the Gram–Schmidt process to transform the basis vectors u = (1, 0, 0), v = (3, 0, 2), 4 = (0, 4, 2) into an orthonormal basis.	**CO3**	A	5	N	2.1.3
95	Find a vector orthogonal to both $u = (2,0,-1)$ and $v = (0,3,4)$.	**CO3**	A	5	N	2.1.3
96	Show that the matrix A is diagnosable. Find the diagonal form D and the diagonalizing matrix M where $A = \begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$	**CO3**	A	10	N	2.2.3
97	Find the Eigen values and Eigen vectors of the matrix. $A = \begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$	**CO3**	A	10	N	2.2.3
98	Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$	**CO3**	A	10	N	2.2.3
99	Find the Eigen values and Eigen vectors of the following matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 2 \\ 3 & 3 & 4 \end{bmatrix}$	**CO3**	A	10	N	2.2.3
100	Find the Eigen values and Eigen vectors of the following matrix $\begin{bmatrix} 2 & -2 & 2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$	**CO3**	A	10	N	2.2.3
101	Show that the matrix A is diagnosable. Find the diagonal form D and the diagonalizing matrix M where $\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$	**CO3**	A	10	N	2.2.3
102	Show that the matrix A is diagnosable. Find the diagonal form D and the	**CO3**	A	10	N	2.2.3

	diagonalizing matrix M where $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$					
103	*Evaluate* $\int_0^2 \int_0^x dy\, dx$	**CO4**	U	2	N	1.1.1
104	*Evaluate* $\int_0^2 \int_0^y dx\, dy$	**CO4**	U	2	N	1.1.1
105	*Evaluate* $\int_0^2 \int_0^5 x\, y\, dx\, dy$	**CO4**	U	2	N	1.1.1
106	*Evaluate* $\int_0^{\frac{\pi}{2}} \int_0^{\frac{\pi}{2}} \sin x \sin y\ dx\, dy$	**CO4**	U	2	N	1.1.1
107	*Evaluate* $\int_0^{\frac{\pi}{2}} \int_0^{\frac{\pi}{2}} \cos x \cos y\ dx\, dy$	**CO4**	U	2	N	1.1.1
108	*Evaluate* $\int_0^{\frac{\pi}{2}} \int_0^{\cos\theta}$ dr dθ	**CO4**	U	2	N	1.1.2
109	*Evaluate* $\int_1^2 \int_1^y dx\, dy$	**CO4**	U	2	N	1.1.2
110	*Evaluate* $\int_0^{\frac{\pi}{2}} \int_0^{cos\,\theta} r.dr\, d\theta$	**CO4**	U	2	N	1.1.1
111	*Evaluate* $\int_0^1 \int_0^2 e^{x-y}$	**CO4**	U	2	N	1.1.1
112	*Evaluate* $\int_0^1 \int_0^x (xy) dx\, dy$	**CO4**	U	2	N	1.1.1
113	Define Double Integral and convert it to polar form .	**CO4**	U	2	N	1.1.1
114	*Evaluate* $\int_1^2 \int_1^y (x+y)\, dx\, dy$	**CO4**	U	2	N	1.1.1
115	Find the area between parabola $y = x^2 - 6x + 3$ and the line $y = 2x - 9$	**CO4**	A	5	N	1.3.1
116	Find the area enclosed by the curve 9xy = 4 and the line 2x+y = 2.	**CO4**	A	5	N	1.3.1
117	Evaluate $\iint_R \frac{dx\ dy}{x^4 + y^2}$, *over* $y \geq x^2$, $x \geq 1$	**CO4**	R	5	N	1.3.1
118	Evaluate $\iint e^{2x-3y}\, dx\, dy$ over the triangle bounded by the lines $x = 0$, $y = 0$, and $x + y = 1$.	**CO4**	R	5	N	1.3.1
119	Evaluate $\iint (x^2 - y^2)\, dx\, dy$ over the triangle with vertices (0, 1), (1, 1), (1, 2).	**CO4**	A	5	N	1.3.1
120	Evaluate $\int \int\ xy\,(x-1)\, dx\, dy$ over the region bounded by xy = 4,	**CO4**	A	5	N	2.1.3

	y = 0, x = 1 and x = 4					
121	Find the area bounded by the lines y = 2 + x, y = 2 – x and x = 5	**CO4**	A	5	N	2.1.3
122	Determine the area of the region bounded by the lines x=0,x=2,y=0 , y=x	**CO4**	A	5	N	2.1.3
123	Change the order of integration $\int_0^4 \int_{\frac{y}{2}}^{9-y} f(x,y)dxdy$	**CO4**	A	5	N	2.1.3
124	Change to polar and evaluate $\int_0^1 \int_0^x (x+y)dydx$	**CO4**	A	5	N	2.1.3
125	Change to polar form $\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \frac{dxdy}{(a^2+x^2+y^2)^{\frac{3}{2}}}$	**CO4**	A	5	N	2.1.3
126	Find the area between curve x=0, y=o ,y=2 and the line 9xy = 4	**CO4**	A	5	N	2.1.3
127	Evaluate $\int_0^1 \int_0^x (x^2+y^2)\, xdydx$	**CO4**	A	5	N	2.1.3
128	Evaluate $\int_0^{\frac{\pi}{2}} \int_0^{a(1+\sin\theta)} r^2 \cos\theta \, d\theta dr$	**CO4**	A	5	N	2.1.3
129	Find the area common to the parabola $y = x^2$ and xy = 1	**CO4**	A	5	N	2.1.3
130	Change the order of integration of the following and evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \frac{e^y}{(e^y+1)\sqrt{1-x^2-y^2}}\, dx\, dy$	**CO4**	A	10	N	1.3.1
131	Change the order of integration and evaluate $\int_0^2 \int_{\sqrt{2y}}^2 \frac{x^2}{\sqrt{x^4-4y^2}} dx\, dy$	**CO4**	A	10	N	1.3.1
132	Change the order of integration of the following and evaluate $\int_0^{\pi} \int_0^x \frac{\sin y.dydx}{\sqrt{(\pi-x)(x-y)}}$	**CO4**	A	10	N	2.1.3
133	Change the order of integration of the following and evaluate $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{x^2+y^2}} dx\, dy.$	**CO4**	A	10	N	1.3.1
134	Change the order of integration of the following and evaluate $\int_0^1 \int_0^{\sqrt{1-y^2}} \frac{\cos^{-1} x}{\sqrt{1-x^2}\sqrt{1-x^2-y^2}}\, dx\, dy$	**CO4**	A	10	N	2.1.3
135	Change the order of integration of the following and evaluate. $\int_0^2 \int_{\sqrt{2x}}^2 \frac{y^2}{\sqrt{y^4-4x^2}}\, dx\, dy$	**CO4**	A	10	N	2.1.3

136	Change the order of integration of the following and evaluate. $\int_0^5 \int_{2-x}^{2+x} dy\ dx$	**CO4**	A	10	N	2.1.3
137	Identify the limits of cylindrical polar coordinates when the region is bounded by the paraboloid $x^2 + y^2 = 2z$ and the cylinder $x^2 + y^2 = 4$	**CO5**	U	2	N	1.1.1
138	Identify the limits of cylindrical polar coordinates when the region is bounded by the cone $x^2 + y^2 = z^2$ and z = 1 , z > 0	**CO5**	U	2	N	1.1.1
139	Identify the limits of cylindrical polar coordinates when the region is bounded by the planes z = 0, z = 4 and the cylinder $x^2 + y^2 = 4$	**CO5**	U	2	N	1.1.1
140	Identify the limits of cylindrical polar coordinates when the region is bounded by the paraboloid $x^2 + y^2 = z$ and the plane z = 1, z > 0	**CO5**	U	2	N	1.1.1
141	Identify the limit of spherical polar coordinates when the region is bounded by upper hemisphere $x^2 + y^2 + z^2 = 4$	**CO5**	U	2	N	1.1.2
142	Identify the limit of spherical polar coordinates when the region is bounded by two concentric spheres $x^2 + y^2 + z^2 = 1$ and $x^2 + y^2 + z^2 = 2$	**CO5**	U	2	N	1.1.2
143	Identify the limit of spherical polar coordinates when the region is bounded by upper ellipsoid $\frac{x^2}{1} + \frac{y^2}{4} + \frac{z^2}{9} = 1$	**CO5**	U	2	N	1.1.2
144	Evaluate $\int_0^1 \int_0^2 \int_1^2 (xz) dxdydz$	**CO5**	U	2	N	1.1.2
145	Evaluate $\int_0^1 \int_2^3 \int_0^1 (x^2yz) dxdydz$	**CO5**	U	2	N	1.1.2
146	Evaluate $\int_0^1 \int_0^1 \int_0^1 (xyz) dxdydz$	**CO5**	U	2	N	1.1.2
147	Evaluate $\int_0^1 \int_0^2 \int_0^2 (x + y + z) dxdydz$	**CO5**	U	2	N	1.1.2
148	Identify the limits of cylindrical polar coordinates when the region is bounded by the $x^2 + y^2$ = 4 and the planes z = 0 and z = 2.	**CO5**	U	2	N	1.1.2
149	*Evaluate* $\int\int\int x\,y\,z\,(x^2 + y^2 + z^2)\,dx\,dy\,dz$, *over the first octant of the sphere* $x^2 + y^2 + z^2 = a^2$	**CO5**	A	5	N	1.3.1
150	*Evaluate* $\int\int\int \frac{z^2 dx\,dy\,dz}{x^2 + y^2 + z^2}$ *over the volume of the sphere* $x^2 + y^2 + z^2 = 2$	**CO5**	A	5	N	1.3.1
151	*Evaluate* $\int\int\int \frac{dx\,dy\,dz}{(x^2 + y^2 + z^2)}$ *over the volume of the sphere* $x^2 + y^2 + z^2 = a^2$	**CO5**	A	5	N	1.3.1
152	Evaluate $\int\int\int x^2\ dx\ dy\ dz$ *over the ellipsoid* $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	**CO5**	A	5	N	2.4.1
153	*Evaluate* $\int\int\int \sqrt{x^2 + y^2}\,dxdydz$ *over the volume bounded by the right circular cone* $x^2 + y^2 = z^2, z > 0$ *and the planes* $z = 0$ *and* $z = 1$	**CO5**	R	5	N	2.4.1

154	$Evaluate \int\int\int (x^2+y^2)dxdydz, over\ the\ region\ bounded\ by\ the\ surface\ x^2+y^2=2z\ and\ the\ plane\ z=2.$	**CO5**	R	5	N	2.4.1
155	$Evaluate \int\int\int \frac{dxdydz}{(x^2+y^2+z^2)^{\frac{3}{2}}} over\ the\ volume\ bounded\ by\ the\ spheres\ x^2+y^2+z^2=a^2 and\ x^2+y^2+z^2=b^2, a>b>0$	**CO5**	R	5	N	2.4.1
156	Evaluate $\iiint$ x dx dy dz over the cone $x^2+y^2 \leq z^2$, $0 \leq z \leq 2$.	**CO5**	R	5	N	2.4.1
157	Evaluate $\iiint(x^2+y^2+z^2)$dxdydz over the region bounded by $x^2+y^2=9$, z = 0, z = 1.	**CO5**	R	5	N	2.4.1
158	Evaluate $\iiint(x^2+y^2+z^2)$ dxdydz over the sphere $x^2+y^2+z^2 \leq 4$.	**CO5**	R	5	N	2.4.1
159	Evaluate $\iiint_R (x+y+z)dx\,dy\,dz$ where R: $0 \leq x \leq 1, 1 \leq y \leq 2, 2 \leq z \leq 3$	**CO5**	R	5	N	2.4.1
160	Evaluate the integral $\iint(x^2+y^2)$dxdydz over the cylinder $x^2+y^2 \leq 4$, $0 \leq z \leq 1$ using cylindrical polar coordinates.	**CO5**	R	5	N	2.4.1
161	Identify the limits of integration in cylindrical polar coordinates for the region enclosed by the cylinder $x^2+y^2=36$ and the planes z=2x and z=0.	**CO5**	R	5	N	2.4.1
162	Find the limits of integration in cylindrical polar coordinates for the region enclosed by the paraboloid $z = 4 - (x^2+y^2)$ and the xy-plane.	**CO5**	R	5	N	2.4.1
163	Find the volume of the solid bounded by the cylinder $x^2+y^2=1$ and the planes z = 0 and z = 3 using cylindrical polar coordinates.	**CO5**	R	5	N	2.4.1
164	Evaluate $\iiint$ x dx dy dz over the cone $x^2+y^2 \leq z^2$, $0 \leq z \leq 2$.	**CO5**	R	5	N	2.4.1
165	Evaluate $\int_0^{\log 2}\int_0^{x}\int_0^{x+y} e^{x+y+z}\,dx\,dy\,dz$	**CO5**	A	10	N	2.4.1
166	Evaluate $\int_1^{e}\int_1^{\log y}\int_0^{e^x} \log z\,dz\,dx\,dy$	**CO5**	A	10	N	2.4.1
167	*Prove that* $\int_0^1\int_0^{1-x}\int_0^{1-x-y} \frac{1}{(x+y+z+1)^3}dx\,dy\,dz = -\frac{1}{2}\left(\frac{5}{8}-\log 2\right)$	**CO5**	A	10	N	2.4.1
168	Evaluate $\int_0^{a}\int_0^{\sqrt{a^2-x^2}}\int_0^{\sqrt{a^2-x^2-y^2}} x\,y\,z\;\,dx\,dy\,dz$	**CO5**	A	10	N	2.4.1
169	Evaluate $\int_0^{\pi}\int_0^{a(1+\cos\theta)}\int_0^{h} 2\left(1-\frac{r}{a(1+\cos\theta)}\right)r\;\,dr\,d\theta\,dz$	**CO5**	A	10	N	2.4.1
170	Find the volume of the tetrahedron bounded by the coordinate planes $x = 0$, $y = 0$, $z = 0$ and $\frac{x}{2}+\frac{y}{3}+\frac{z}{4}=1$.	**CO5**	A	10	N	2.4.1
171	Find the volume bounded by the cylinder $y^2 = x$ and $x^2 = y$ and the planes z = 0 and x + y + z = 2.	**CO5**	A	10	N	2.4.1

172	Check whether $f(z) = e^z$ satisfies C-R equation or not.	**CO6**	U	2	N	1.1.1
173	Check whether $x^2 + iy^3$ satisfies C-R equation or not.	**CO6**	U	2	N	1.1.1
174	Check whether $\frac{1}{x^2-y^2}$ satisfies C-R equation or not.	**CO6**	U	2	N	1.1.1
175	Check whether $e^{-y}cosx$ satisfies C-R equation or not.	**CO6**	U	2	N	1.1.1
176	Check whether $f(z) = 3x + y + i(3y - x)$ satisfies C-R equation or not.	**CO6**	U	2	N	1.1.1
177	Check whether $f(z) = e^{-y}(cosx + isinx)$ satisfies C-R equation or not.	**CO6**	U	2	N	1.1.1
178	Check whether $f(z) = sinx\ coshy + cosx\ sinhy$ satisfies C-R equation or not.	**CO6**	U	2	N	1.1.1
179	Verify the CR equation for $f(z) = (x^2 - y^2 - 2xy) + i(x^2 - y^2 + 2xy)$	**CO6**	U	2	N	1.1.1
180	Show that $f(z) = r^3(\cos 3\theta + i\sin 3\theta)$ satisfies the Cauchy-Riemann equations	**CO6**	U	2	N	1.1.1
181	If u(x,y) = $x^2 + y^2$ and v(x,y) = 2xy, prove that u(x,y) and v(x,y) satisfy the Cauchy-Riemann equations	**CO6**	U	2	N	1.1.1
182	Is Coshz satisfy C-R equation?	**CO6**	U	2	N	1.1.1
183	Is $e^{-y}cosx$ satisfies C-R equation?	**CO6**	U	2	N	1.1.1
184	Determine the constants a, b, c, d if f(z)= $x^2+2axy+by^2+i(cx^2+2dxy+y^2)$ is analytic.	**CO6**	R	5	N	2.1.3
185	Find p if f(z)= $r^2 \cos 2\theta + i\, r^2 \sin p\,\theta$ is analytic function.	**CO6**	R	5	N	2.1.3
186	Determine the constants a, b, c, d so that the function $f(z) = x^2 + axy + by^2 + i(cx^2 + dxy + y^2)$ is analytic.	**CO6**	R	5	N	2.1.3
187	Find the orthogonal trajectory of the family of curves $e^{-x}(x\sin y - y\cos y) = a$	**CO6**	A	5	N	2.1.3
188	Find the orthogonal trajectory of the family of curves $3x^2y+2x^2-y^3-2y^2=c$	**CO6**	A	5	N	2.1.3
189	Find the orthogonal trajectory of the family of curves $x^2-y^2-2xy+2x-3y=c$	**CO6**	A	5	N	2.1.3
190	Find the orthogonal trajectory of the family of curves $x^3y - xy^3 = c$	**CO6**	A	5	N	2.1.3
191	Show that the function f(z)=sin z is analytic & find their derivatives	**CO6**	A	5	N	2.1.3
192	Check whether that the function f(z)=tan z is analytic or not & find its derivatives	**CO6**	A	5	N	2.1.3
193	Check whether that the function is f(z)=(x3-3xy +2xy) + i (3xy-x2+y2 -y3)is analytic or not & find its derivatives	**CO6**	A	5	N	2.1.3
194	Check whether the function $f(z) = r^3(\cos 3\theta + i\sin 3\theta)$ is analytic or not	**CO6**	A	5	N	2.1.3

195	Find the harmonic conjugate of u(x,y) = ex+y and prove that the resulting function is an analytic function	**CO6**	A	5	N	2.1.3
196	The harmonic conjugate of u(x,y) = $e^x \cos(y)$	**CO6**	A	5	N	2.1.3
197	Show that u(x,y)=cosx sinh y is harmonic. Find its harmonic conjugate and corresponding analytic function"	**CO6**	A	5	N	2.1.3
198	Find the harmonic conjugate of whose real part is u = $x^3 - 3xy^2$	**CO6**	A	5	N	2.1.3
199	Show that the function $u = 3x^2y + 2x^2 - y^3 - 2y^2$ is harmonic. Find its harmonic conjugate and corresponding analytic function.	**CO6**	A	10	N	2.2.3
200	Show that the function $v = e^x(x\sin y + y\cos y)$ is harmonic. Find its harmonic conjugate and corresponding analytic function.	**CO6**	A	10	N	2.2.3
201	Show that the function e^x (x cos y-y sin y) = u is harmonic. Find its harmonic conjugate and corresponding analytic function.	**CO6**	A	10	N	2.2.3
202	Show that the function v= e^{-y} sin x is harmonic. Find its harmonic conjugate and corresponding analytic function.	**CO6**	A	10	N	2.2.3
203	Show that the function u = $\frac{1}{2}$ log (x^2+y^2) is harmonic. Find its harmonic conjugate and corresponding analytic function.	**CO6**	A	10	N	2.2.3
204	Show that the function $v = e^{2x}(y\cos 2y + x\sin 2y)$ is harmonic. Find its harmonic conjugate and corresponding analytic function.	**CO6**	A	10	N	2.2.3
205	Show that the function $u = e^{-x}(x\sin y - y\cos y)$ is harmonic. Find its harmonic conjugate and corresponding analytic function.	**CO6**	A	10	N	2.2.3