

**Day and Date: Monday, 16.01.2023**

**Time: 2.00 pm to 12.00 pm**

**Max. Marks- 50**

**Instructions:**

- Question No. 1 & 2 is compulsory.
- Figure to the right indicate full marks.
- Give suitable general Instructions
- Any other Course Specific Instructions.

BT	CO's	Q. No.					Marks	Weightage													
		Q.1	All Questions are compulsory				20	40%													
L3	201.1	a	Solve $(D^2 - 2D + 1)y = e^x \sin x$				6														
L3	201.2	b	If $\phi = x^3 + y^3 + z^3 - 3xyz$ then Find Divergence of $\vec{f}$ & Curl of $\vec{f}$ at (1,1,1) where $\vec{f} = \nabla\phi$				7														
L3	201.3	c	Find both equations of line of regression of x on y and y on x from the following data. Also find r. <table border="1"><tr><td>x</td><td>10</td><td>14</td><td>18</td><td>22</td><td>26</td><td>30</td></tr><tr><td>y</td><td>18</td><td>12</td><td>24</td><td>6</td><td>30</td><td>36</td></tr></table>				x		10	14	18	22	26	30	y	18	12	24	6	30	36
x	10	14	18	22	26	30															
y	18	12	24	6	30	36															
		Q.2	All Questions are compulsory.				10	60%													
L3	201.4  OR  201.4	a	In a lot of 500 transistors 25 are defective. How many packets would you expect to have (i) no defective (iii) at least one is defective in a consignment of 10000 packets if each contain 20 transistors.  OR  A firm has two cars which it hires out day by day. The number of demand for car on each day is distributed as a Poisson variate with mean 1.5. Calculate probability that number of days in a year on which (i) Neither car is demand (ii) Demand is cancelled				5														
	201.4	b	The size of hats is normally distributed if the mean 18.5cm and standard deviation 2.5cm.How many hats in a total of 2000 will have sizes between (i) 18 cm and 20 cm (ii) Above 20 cm.( Given for S.N.V. z, area between z=0 and z=0.6 is 0.2257 and that between z=0 and z=0.2 is 0.0793)				5														
		Q.3	All Questions are compulsory.				10	60%													

<b>L3</b>	<b>201.5</b>	<b>a</b>	$L\{te^{3t} \sin 2t\}$	<b>5</b>	
<b>L3</b>	<b>201.5</b> <b>OR</b> <b>201.5</b>	<b>b</b>	Find $L^{-1}\left\{\frac{s^2}{(s^2+4)^2}\right\}$ by Convolution theorem.  <b>OR</b> Solve by Laplace transform $3\frac{dy}{dx} + 2y = e^{3t}$ , $y=1$ at $t=0$	<b>5</b>	
		<b>Q.4</b>	<b>All Questions are compulsory.</b>	<b>10</b>	
<b>L3</b>	<b>201.6</b>	<b>a</b>	Find Fourier series expansion of the function $f(x) = x^2$ in $(0, 2\pi)$ <b>OR</b> Find Fourier series expansion of the function $f(x) = 4 - x^2$ in $(0, 2)$	<b>6</b>	
<b>L3</b>		<b>b</b>	Find half range cosine series expansion of the function $f(x) = e^{-x}$ in $(0, \pi)$	<b>4</b>	

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