ADAMAS UNIVERSITY

END-SEMESTER EXAMINATION : JANUARY 2021

(Academic Session: 2020 – 21)

Name of the Program:	B.Tech. in CE/ME	**Semester:**	III
Paper Title :	Engineering Mathematics IIIA	**Paper Code:**	SMA42113
Maximum Marks :	40	**Time duration:**	3 hrs.
Total No of questions:	12	**Total No of Pages:**	1
(Any other information for the student may be mentioned here)			

Instructions:

Attempt all questions from **Section A** (each carrying 1 marks); any **Three Questions** from **Section B** (each carrying 5 marks)**.** any **Two Questions** from **Section C** (carrying 10 marks)**.**

	Section A (Answer all**)** $5 \times 1 = 5$	
1	**Define sectional continuity of a function.**	**(1)**
2	**What is the order and degree of the equation** $\frac{\partial^2 z}{\partial x^2} = \left(1 + \frac{\partial z}{\partial y}\right)^{\frac{3}{2}}$	**(1)**
3	**Explain complete integral of a partial differential equation of order one.**	**(1)**
4	**What is the probability of getting 9 cards of the same suit in one hand at a game of bridge?**	**(1)**
5	**Define simple random sampling with and without replacement.**	**(1)**
	Section B (Attempt **any Three)** $3 \times 5 = 15$	
6	**Show that** $L\{\sin(at)\} = \frac{a}{s^2+a^2}$ **and** $L\{\cos(at)\} = \frac{s}{s^2+a^2}$	**(5)**
7	**Evaluate** $L\left\{\int_0^t \frac{1-e^{-2u}}{u} du\right\}$	**(5)**
8	**Formulate partial differential equation from** $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	**(5)**
9	**From a vessel containing 3 white and 5 black balls, 4 balls are transferred to 2nd vessel and one ball is drawn from it found to be white. What is the probability that out of 4 balls transferred, 3 are white and 1 is black?**	**(5)**
	SECTION C (Attempt **any Two)** $2 \times 10 = 20$	
10	**Solve** $(D^2 + 9)y = \cos(2t)$ **if** $y(0) = 1$ **and** $y\left(\frac{\pi}{2}\right) = -1$	**(10)**
11	**i. Eliminate** φ **from** $\varphi(x^2 + y^2 + z^2, z^2 - 2xy) = 0$ **ii. Solve** $y^2 p - xyq = x(z - 2y)$	**(5+5)**
12	**i. Five balls are drawn from an urn containing 4 white and 6 black balls. Find the probability distribution of the number of white balls drawn without replacement.** **ii. The probability of a man hitting a target is** $\frac{1}{3}$**.** **(a) what is the probability of his hitting the target at least twice if he fires 5 times?** **(b) How many times must he fire so tat the probability of his hitting the target at least once is more than 90% ?**	**(5+5)**