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**PRESIDENCY  
UNIVERSITY**  
BENGALURU

**Department of Research & Development**  
**Mid - Term Examinations - SEPTEMBER 2024**

<b>Odd Semester:</b> Ph.D. Course Work	<b>Date:</b> 27/09/2024
<b>Course Code:</b> MAT 835	<b>Time:</b> 10:00am – 11:30am
<b>Course Name:</b> Heat and Mass Transfer of Nanofluids	<b>Max Marks:</b> 50
<b>Department:</b> Mathematics	<b>Weightage:</b> 25%

**Instructions:**

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

**Part A**

<b>Answer ALL the Questions. Each question carries 5 marks.</b>		<b>4Qx5M=20M</b>
<b>1</b>	Discuss the concept of free and mixed convection.	<b>5 Marks</b>
<b>2</b>	Define Stefan -Boltzmann law, radiative intensity.	<b>5 Marks</b>
<b>3</b>	What are the three modes of heat transfer? Discuss any one of them.	<b>5 Marks</b>
<b>4</b>	Why is the forced convection heat transfer coefficient greater than the coefficient of natural convection?	<b>5 Marks</b>

**Part B**

<b>Answer ALL Questions. Each question carries 15 marks.</b>		<b>2QX15M=30M</b>
<b>5</b>	Why is the forced convection heat transfer coefficient greater than the coefficient of natural convection and Derive an expression for heat transfer through rectangular fin?	<b>15 Marks</b>
<b>6</b>	Derive the general energy equation. Discuss heat transfer in freezing and melting	<b>15 Marks</b>