Code No: 5621AH

R19

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech I Semester Examinations, January - 2020

NANO FLUIDS

(Thermal Engineering)

Time: 3hrs **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) Explain nanostructure materials role in nano fluids. [5]
b) Discuss about Brownian motion on enhancing the thermal conductivity. [5]
c) What is the effect of Graetz number effect in the entry region? [5]
d) Define LMTD and pumping power for nano fluids. [5]
e) Give a note on Application to automobile radiators. [5]

PART - B

5 × 10 Marks = 50

2. Give a note on:
a) Theoretical equations and new empirical correlations to determine the density of different nano fluids.
b) Explain Thermo physical properties of Nano fluids. [5+5]

OR

3.a) What are the principles of measurement and apparatus in Viscocity?
b) Give an Introduction about Introduction to nano fluids, dispersion, sonication and stable suspension. [5+5]

4. Discuss about the Effect of volumetric concentration and temperature in
a) Thermal Conductivity b) Specific Heat. [5+5]

OR

5. Determine the thermal conductivity of differentnanofluids by
a) Theoretical equations b) New empirical correlations. [5+5]

6.a) What are the Combined effects of thermo physical properties of nano fluids on the thermal diffusivity.
b) Explain in detail about Prandtlnumber, the Reynolds number and the Nusselt number. [5+5]

OR

7. Explain broadly the Significance of:
a) Entry length and fully developed friction factor in Convective heat transfer:
b) Single-phase fluid equations, laminar flow heat transfer coefficient in Convective heat transfer. [5+5]

8. Detailly Discuss about Heating capacity, mass flow, heat exchanger surface area, for nano fluids versus conventional heat transfer fluids. [10]

OR

9. Elaborate about
   a) Effect of particle Pecletnumber.
   b) Application of nano fluids to various types of industrial heat exchangers. [5+5]

10. Explain about Application to building heating and cooling Comparison of nano fluids performance with glycol solution in hydronic coils. [10]

OR

11. Write a note on Introduction to electronic cooling in micro channels with nano fluids. [10]

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