



Symbol of Secularism
& National Integration

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL
School of Engineering & Technology

DEPARTMENT OF MECHANICAL ENGINEERING

CLASS:- TEME-1

SEM:- V

SUBJECT:- H.T

DATE:- 26 / 09 / 2016

DURATION:- 60 min.

MARKS:- 20

CLASS TEST 02

Q.01 Attempt any two: (08 Marks)

	Marks	CO
a) Significance of dimensionless numbers used in heat transfer by convection.	04	CO5
b) Classify heat exchanger on various arrangements?	04	CO4
c) What is Fouling in heat Exchanger?	04	CO4

Q.02 Attempt any two: (12 Marks)

a) Using dimensional analysis, derive an expression for Forced convection:- $Nu = \text{constant } (Re)^m (Pr)^n$	06	CO5
b) A copper bar 25mm diameter is cooled by air at 30 ⁰ c which is flowing near the bar with velocity of 2.5m/s. If surface temperature of bar is not to exceed 85 ⁰ c and resistivity of copper is $0.0175 \times 10^{-6} \Omega \text{ m}$. Calculate i) Heat transfer coefficient from surface to air ii) Permissible current intensity for bar. Following relation must be used For $10 < Re < 10^3$ Use $Nu = 0.44 (Re)^{0.5}$ AND For $10^3 < Re < 2 \times 10^5$ Use $Nu = 0.22(Re)^{0.6}$ The thermo physical properties of air at 30 ⁰ c are given as $K = 0.2673 \text{ W/m}^0\text{c}$, $\nu = 16 \times 10^{-6} \text{ m}^2/\text{s}$.	06	CO5
c) 16.5 kg/s of the product at 650 ⁰ c ($C_p = 3.55 \text{ kJ/kgk}$) in a chemical plant, are to be used to heat 20.5kg/s of the incoming fluid from 100 ⁰ c ($C_p = 4.2 \text{ kJ/kgk}$). If the overall heat transfer coefficient is $0.95 \text{ kw/m}^2\text{k}$ and the installed heat transfer surface is 44 m^2 , calculate the fluid outlet temperature for the counter flow and parallel flow arrangement.	06	CO4