Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2142810 **Date: 06/06/2017**

Subject Name: Process Calculations in Textile Wet Processing

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1		**Attempt the following objective questions.**	**14**
	1	To prepare normal solutions, it is required to know_____ Weight of substance.	
	2	Differentiate between Molarity and molality.	
	3	Give the units of work and power.	
	4	Give the formula for % add on.	
	5	Give the formula for conversion between ^{0}k and ^{0}C.	
	6	Unit ppm is equivalent to unit gpl, true or false? correct If false.	
	7	Define % shade.	
	8	Name a dyeing machine which works on principle of Counter current flow of liquid and material.	
	9	What is saturated steam?	
	10	Super heated steam attains higher temperature than Saturated steam, true or false?	
	11	Name a textile processing machine where superheated Steam is used.	
	12	Define M:LR.	
	13	On which principle hydro extractor is working?	
	14	Name any two flow meters for liquid.	
Q.2	**(a)**	A solution of sodium chloride in water contains 20% NaCl (by mass) at 333K (60^0 C). The density of the solution is 1.127 kg/L. Find the Normality, molarity and molality of the solution.	**03**
	(b)	Convert: 2 lit/sec to ft^3/day and 400 in^3/day to Cm^3/min	**04**
	(c)	Explain the material balance of evaporator.	**07**
		OR	
	(c)	Discuss the terms specific gravity and density with its significance and the formulas.	**07**
Q.3	**(a)**	Give the three major relationships used for expressing weights and volumes of liquids, fibres and fabrics.	**03**
	(b)	Give Classification of physical quantities. Write unit of following quantity with dimension: Area, Volume,, Mass flow rate.	**04**
	(c)	Solve the following.	**07**
		i) Find out the density of solution resulting from adding 21.65 gm NaCl to 100ml water. Addition of salt causes an increase in volume by 10ml. (Density of NaCl is 2.165)	**02**
		ii) A cotton fabric is to be treated with 5% owf of chemical finish in a wet on wet pad application with entry wet pick	**05**

up 75%, exit wet pick up of 90% and interchange factor of 0.7. What are the effective wet pick up and necessary pad concentration? (Density of solution is 1.05g/ml)

OR

Q.3	**(a)**	How much gallons of water must be used for treatment of 1500 lbs of fabric with bath ratio 20:1.	**03**
	(b)	Discuss Reynold's experiment.	**04**
	(c)	Elaborately explain batch and continuous processes in textile wet processing industry with suitable examples, merits and demerits.	**07**
Q.4	**(a)**	Write a brief note on Pitot tube.	**03**
	(b)	Discuss the terms: NPSH and viscosity,	**04**
	(c)	i) Explain the terms: Wet on Dry Pick up and Wet on Wet Pick up with the methods to determine them. Give the formulas for calculating dry on wet pick up and wet on wet pick up.	**07**

OR

Q.4	**(a)**	Define with units: i) Specific heat capacity ii) Specific Latent Heat	**03**
	(b)	Discuss the terms: Thermal Conductivity and Thermal Diffusivity	**04**
	(c)	Discuss two properties of fluid like surface tension and vapour pressure with their significance and role in deciding behaviour of fluid.	**07**
Q.5	**(a)**	Name the three modes of heat transfer with at least one example of textile processing machine for each.	**03**
	(b)	Explain the terms: Wet on Dry Pick up and Wet on Wet Pick up with the methods to determine them.	**04**
	(c)	Differentiate between Newtonian and non-Newtonian fluids with diagrams and examples.	**07**

OR

Q.5	**(a)**	Define: yield and conversion..	**03**
	(b)	Define and discuss limiting reactant and excess reactant.	**04**
	(c)	What are the necessary feed solution concentration and flow rate for fabric finish in wet on wet pad application with following datas. Pad concentration: 77.8 g/l WPU_0 = 90%, WPU_i= 75%, f = 0.7	**07**

****