Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 725202 **Date: 09/07/2012**

Subject Name: Embedded Systems Hardware Design

Time: 10:30 am – 13:00 pm **Total Marks: 70**

Instructions:

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

Q.1	(a)	What is BOM and why is it so important to the design of an embedded system?	**07**
	(b)	What is the most important factor in component selection of an embedded system? Why?	**07**
Q.2	(a)	Explain the evolution of PCBs with its need and advantages?.	**07**
	(b)	Explain the fabrication process flow of PCBs? List out the materials used in PCB fabrication with their usage?	**07**
		OR	
	(b)	You are asked to design a control system for a washing machine. Will you choose an 8 bit micro-controller or a 16 bit micro-controller? Justify your answer.	**07**
Q.3	(a)	Write short notes on: a. Concept to Gerber b. Environmental concerns w.r.t PCB industry c. Drilling operations in PCB	**07**
	(b)	What are the design considerations of an embedded system inside an auto-rickshaw meter? List all the major design attributes whether they are electronic or not.	**07**
		OR	
Q.3	(a)	Should the firmware of an embedded system sit in ROM, EPROM or EEPROM? Justify your answer.	**07**
	(b)	The PSOC boards can respond to touch. What is the principle used to detect touch? Illustrate how the mechanism works with a picture.	**07**
Q.4	(a)	You have to make a choice between designing your own board for an application or using a ready made board from Xilinx/Altera etc. Analyze the factors that influence your decision	**07**
	(b)	A PCB contains multiple power supplies – 1.2V, 3V, 5V. A buffer on board between two 5V components is connected to 1.2V accidentally. How can this be detected?	**07**
		OR	
Q.4	(a)	What is decoupling capacitance and what are its applications in embedded systems design	**07**
	(b)	If you had to choose between two micro-controllers for a solar energy based surveillance camera system, what factors would you consider?	**07**
Q.5	(a)	Draw the sample layout of a CMOS buffer abutting a CMOS NAND gate.	**07**
	(b)	Describe the pros and cons of using lumped RC values for trace level parasitic vs. using distributed parasitics.	**07**
		OR	
Q.5	(a)	How does the di-electric constant of the PCB material influence the behavior of the system?	**07**
	(b)	A real-time clock chip generates 32KHz. Design a clock that outputs seconds, minutes, hours in 12 or 24 hour format. Show your design in either schematic diagram or Verilog HDL pseudo code. Have one output bus for each of seconds, minutes, and hours.	**07**

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