

Reg. No.

MANIPAL ACADEMY OF HIGHER EDUCATION
SCHOOL OF INFORMATION SCIENCES

THIRD SEMESTER M.Sc. Tech (EMBEDDED SYSTEMS & INSTRUMENTATION)
DEGREE EXAMINATION – NOVEMBER 2018

SUBJECT: ESI 605 – EMBEDDED SYSTEMS DESIGN

Monday, November 19, 2018

Time: 10.00 – 13.00 Hrs.

Max. Marks: 100

Answer ALL the questions

All questions carries 10 marks.

1. List and define three main characteristics of embedded systems that distinguish such systems from other computing systems.
(10 Marks)
2. Explain five important design challenges in an embedded system.
(10 Marks)
3. The design of a healthcare product has an NRE cost of Rs. 5 lakh, and a unit cost of Rs. 25. How much will we have to add to the cost of each product to cover our NRE cost, assuming we sell (a) 1000 units and (b) 10,000 units? What are per product costs for each? What are your observations?
(5+5 = 10 Marks)
4. For a product, you determine the NRE cost and unit cost to be the following for three listed IC technologies:

Technology	NRE Cost in Rs	Unit Cost in Rs
FPGA	5,000	25
ASIC	50,000	10
VLSI	300,000	5

- o Determine the precise volumes for which each technology yields the lowest total cost.

(10 Marks)

5. With functionality block diagram explain three processor technologies, the pros and cons of each technology.

(10 Marks)

6. Given an analog input signal whose voltage ranges from -5 to $+5$ V, and an 8-bit digital encoding, calculate the correct encoding 2.1 V, and then trace the successive-approximation approach to find the correct encoding.

(10 Marks)

7. Write the block diagram of a Data Acquisition System & explain the importance of each block.

(10 Marks)

8. With suitable diagram explain Paging System in a memory management unit.

(10 Marks)

9. Assume a main memory has 3-page frames and initially all page frames are empty. Consider the following stream of references

1,2,3,4,5,1,2,3,1,2,3,4,3,6,5. Calculate the hit ratio if the replacement policy used is LRU (b) FIFO

(5+5 = 10 Marks)

10. Write a note on the different Wireless communication protocols that are in use.

(10 Marks)
