

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL  
UNIVERSITY,  
LONERE - RAIGAD - 402 103  
Winter Semester Examination - Dec -2019**

**Branch: M. Tech. (Electronics Engineering)**  
**Subject :- Computational Methods (MTEEC101)**  
**Date :- 10/12/2019**

**Semester : I**  
**Marks : 60**  
**Time : 3 Hrs.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

**(Marks)**

**Q.1. Answer the following (12)**

- a) Explain the types of error with suitable examples.
- b) Find the relative error if the number  $X=0.0012397$  is i) truncated to three decimal digits, ii) rounded off to three decimal digits

**Q.2. Answer the following (12)**

- a) Show that  $f(x) = x^3 + 4x^2 - 10 = 0$  has a root in  $[1, 2]$  and use the regula-falsi method to determine an approximation to the root that is accurate to 5 iteration.
- b) Using Newton Raphson method, find a real root of the equation,  $\cos(x) = xe^x$ , correct to four decimal places.

**Q.3. Answer the following (12)**

- a) Find the positive root of  $x^4 - x = 10$  correct to three decimal places, using Bisection Method method with suitable lower and upper guess.
- b) Use least square regression to fit straight line using following data

x	1	2	3	4	5	6	7
y	0.5	2.4	2.8	4.1	3.5	6.1	5.5

Compute the standard deviation of data points, standard error of the estimate, and correlation coefficient

**Q.4. Answer the following (12)**

- a) Find the value of  $\sin(1.76)$  from the following table

x	1.7	1.74	1.78	1.82	1.86
Sin(x)	0.9916	0.9857	0.9781	0.9691	0.9584

- b) Evaluate the integral  $\int_0^1 \frac{x^2}{1+x^3} dx$  using Simpson's  $1/3^{\text{rd}}$  rule. Compare the error with the exact value.

**Q.5. Answer the following (12)**

- a) Apply Runge-Kutta method to find approximate value of  $y$  for  $x=0.2$ , in steps of  $0.1$ , if  $dy/dx=2x+3y^2$ , given that  $y=1$  where  $x=0$ .

- b) For the equation  $y'(x)=2y/x$ , with  $y(1)=2.5$ . estimate  $y(2)$  by Euler's method using  $h=0.25$  and compare the results with exact answer.

**Q.6. Answer the following**

**(12)**

- a) Using shooting method, solve the equation  $\frac{d^2 y}{dx^2} = 36x$   $y(1)=2$ ,  $y(2)=9$  in the interval  $(1,2)$ .
- b) For  $\frac{d^2 y}{dx^2} = e^{x^2}$  with  $y(0)=0, y(1)=0.5$  estimate the  $y(x)$  at  $x=0.25, 0.5, 0.75$  using finite difference method.

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**Paper End**

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**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,**  
**LONERE – RAIGAD – 402 103**  
**Winter Semester Examination – December – 2018**

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<b>Branch: M.Tech. (Electronics and Telecommunication Engineering)</b>	<b>Sem.: I</b>
<b>Subject:- Microelectronics (MTEEC102/MTETE125E)</b>	<b>Marks: 60</b>
<b>Date:- 12/12/2019</b>	<b>Time: 3 Hrs.</b>

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**Instructions to the Students**

1. Each question carries 12 marks.
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	(Marks)
<b>Q.1.</b> a) Draw and explain the MOS diffusion capacitance model.	(06)
b) Explain the operation of a tri state inverter.	(06)
<b>Q.2.</b> a) Explain photolithography process in CMOS fabrication.	(06)
b) Explain Gate and Source/Drain in formation in CMOS.	(06)
<b>Q.3.</b> a) What is layout design? What are its approaches? Explain.	(06)
b) Discuss CMOS process enhancements.	(06)
<b>Q.4.</b> a) What is design margin? Explain.	(06)
b) Explain RC delay model.	(06)
<b>Q.5.</b> a) Explain CMOS multiplexers.	(06)
b) Discuss static CMOS family.	(06)
<b>Q.6.</b> a) Explain BiCMOS circuits.	(06)
b) Explain CMOS inverter as an amplifier.	(06)

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Paper End

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**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –  
RAIGAD -402 103**

**Winter End Semester Examination – December - 2019**

**Branch: Electronics and Telecommunication Engineering**

**Sem.:- II**

**Subject:- Information Theory and Coding (MTETC202/MTDCC202) Marks: 60**

**Date:- 13/12/2019**

**Time:- 3 Hr.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Q.1 Write notes on

**(Marks)  
(12)**

- a) Stationary and non-stationary processes
- b) Markov processes.
- c) Central Limit Theorem

Q.2 A) A continuous RV has a pdf  $f(x) = 3x^2$ ,  $0 \leq x \leq 1$ . Find  $a$  and  $b$  (06)  
such that

- i.  $P(X \leq a) = P(X > a)$
- ii.  $P(X > b) = 0.05$

B) The joint *pdf* of a two dimensional Random Variable (X, Y) is (06)  
given by

$$f(x,y) = xy^2 + \frac{x^2}{8}, \quad 0 \leq x \leq 2, \quad 0 \leq y \leq 1.$$

Compute:

- i.  $P(X > 1)$
- ii.  $P(Y < 1/2)$
- iii.  $P(X > 1 / Y < \frac{1}{2})$
- iv.  $P(Y < \frac{1}{2} / X > 1)$
- v.  $P(X < Y)$

Q.3 A) Explain the Resistor noise with the help of an equivalent diagram and power density spectrum. (06)

B) A parallel resonating circuit is tuned at 200 MHz with a Q of 10 and capacitance of 10 pF. The temperature of the circuit is 17° C. what noise voltage will be observed across the circuit by a wide band oscillator? Assume the values of constant terms as usual. (06)

Q.4 A) For the convolutional encoder of Fig.1, determine the following (06)

- Dimension of the code
- Code rate
- Constraint length
- Generating sequences
- Output sequence for message sequence of  $m = \{ 1 \ 1 \ 0 \ 1 \ 1 \}$

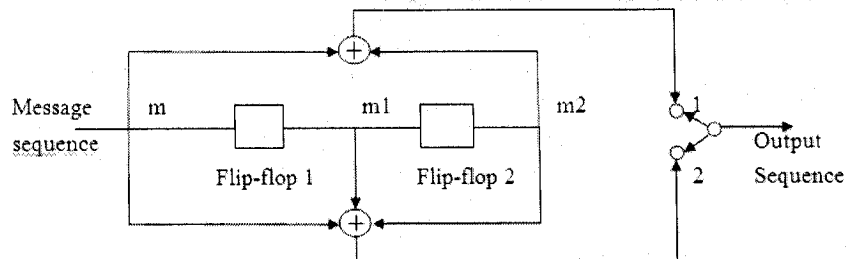


Fig. 1

B) A discrete source transmits messages  $x_1$ ,  $x_2$  and  $x_3$  with the probabilities 0.3, 0.4 and 0.3. The source is connected to the channel given in fig. 2. Calculate all entropies. (06)

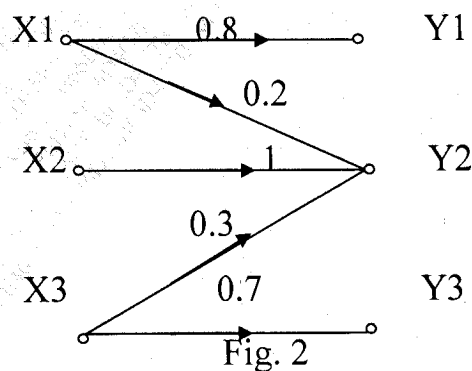


Fig. 2

Q.5 A) Write a note on Syndrome decoding. What happens if double (06)  
error occurs in received code word when the minimum  
distance criterion is 3?

B) The parity check matrix of a (7, 4) Hamming code is given as (06)  
follows

$$H = \left( \begin{array}{cccc|cccc} 1 & 1 & 1 & 0 & 1 & 0 & 0 & \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 & \\ 1 & 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{array} \right)_{3 \times 7}$$

- i. Find the generator matrix.
- ii. List all the code vectors.
- iii. What is the minimum distance between the code vectors?
- iv. How many errors can be detected? How many errors can be corrected?

Q.6 A) Write a note on sub-band coding. (06)

B) Discuss any three types of vocoders in brief. (06)

**Paper End**





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**Winter Semester Examination – December – 2019**

**Branch: M.Tech. (Electronics Engineering)**  
**Subject:-NANO ELECTRONICS (MTEEC202)**  
**Date:-13/12/2019**

**Sem.: II**  
**Marks: 60**  
**Time:3 Hrs.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

**(Marks)**

- Q.1.** a) What is Etching? Explain in detail Wet and Dry etching method. (06)  
b) Explain different chemical deposition methods. (06)
- Q.2** a)What is carbon Nanotubes? Explain electrical, mechanical and vibrational properties of Carbon nano tube. (06)  
b) What is optical lithography? Explain. (06)
- Q.3.** a) Illustrate the design structure for Ferro electric FET. (06)  
b) Write short note Super Conductor integrated circuit technology. (06)
- Q.4.** a) Describe the read and writing schemes for a ferro electric memory cell. (06)  
b) What is the basic operation of DRAM cell? What are the challenges for Gb DRAM capacitors? (06)
- Q.5.** a) How does a Hard Disk drive works? (06)  
b) Explain the principle of magneto-optical data storage and its material properties. (06)

**Q.6. Write short notes on any Two of the following.**

**(12)**

- a) Pre requisites of organic LED.
- b) Basic elements of a photonic network and their structure.
- c) Ball grid array and multichip module.

Paper End

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**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –  
RAIGAD -402 103**

**END-SEM EXAMINATION Winter Examination – December 2019**

**Branch: M.Tech. (Electronics Engineering)**

**Sem.:- I**

**Subject with Subject Code:- VLSI System Design (MTEEC103)**

**Marks: 60**

**Date:- 17/12/2019**

**Time:- 3 Hr.**

**Instructions:-** i) Assume suitable data  
ii) Attempt any five questions  
iii) Each question carries twelve marks

- Q.No.1** a) Draw dynamic latch circuit and explain it. Also draw stick diagram of a dynamic latch using transmission gate. (6)  
b) What is function of re-circulating quasi static latch? Explain with diagram. (6)
- Q.No.2** a) What is mean by Pseudo NMOS Logic? Why use a Pseudo-NMOS Logic? (6)  
b) What is mean by Domino Logic? Illustrate a Domino OR Gate. (6)
- Q.No.3** a) Design layout of CMOS Inverter and explain the layout design rule. (6)  
b) Define Noise margin. Explain low noise and high noise margin with Transfer characteristics of CMOS Inverter. (6)
- Q.No.4** a) Design the static Complementary pull up and pull down network for the following Function: (6)  
i)  $F1 = \overline{(A+B+C)}$   
ii)  $F2 = \overline{(A+B+C)}.D$   
b) How to reduce power consumption in CMOS logic ? Explain in detail (6)
- Q.No.5** a) What is mean by Block Placement and Channel definition in Floor planning ? Elaborate in detail with diagram (6)  
b) Draw a generic Integrated Circuit Design flow? Explain all steps in detail. (6)
- Q.No.6** a) Define Logical effort. How to measure logical effort. Calculate the logical effort for Inverter, Two input NAND gate and two input NOR gate. (6)  
b) What are the one phase clocking rules for Flip flops and two phase clocking disciplines for latches? (6)

**Paper End**



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Winter Semester Examination – December – 2019**

**Branch: M.Tech. (Electronics Engineering)**  
**Subject:- Medical Electronics (MTEEE114B)**  
**Date:- 19/12/2019**

**Semester: I**  
**Marks: 60**  
**Time: 3 Hrs.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

- |  | <b>(Marks)</b> |
|--|----------------|
| <b>Q.1</b> a) Explain the classification of Medical Equipments   | <b>(6)</b>     |
| b) Describe operation of X-ray Machine with Block Diagram  | <b>(6)</b>     |
| <b>Q.2</b> a) What is mean by resting and action potential? Explain action potential waveform          | <b>(6)</b>     |
| b) Explain different Electrodes used for ECG Measurement   | <b>(6)</b>     |
| <b>Q.3</b> a) Explain Performance characteristics of Transducers used for biomedical application       | <b>(6)</b>     |
| b).List two diagnostic, two therapeutic and two clinical laboratory equipments with their applications | <b>(6)</b>     |
| <b>Q.4</b> a) Explain with the help of block diagram major building blocks of EEG Machine              | <b>(6)</b>     |

b) Explain the operation of Pacemaker and why it is needed? (6)

**Q.5** a) What is the need of a Cardiac defibrillator? Explain with the help of block diagram (6)

b) Describe the different technique used to calculate Heart rate (6)

**Q.6** a) What are special design consideration for medical equipments from safety point of view (6)

b) Distinguish between Gross shock and Micro current shock, Explain the effect of electric current on the human body (6)

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Winter Semester Examination – Dec – 2019**

Branch: M.Tech Electronics and Telecommunication

Semester: I

Subject: - Research Methodology (MTETE255D)

Marks: 60

Date: - 20/12/2019

Time: 3 Hrs.

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

- (Marks)
- Q.1.** Briefly describe the different steps involved in a research process? (12)
- Q.2.** How would you differentiate between simple random sampling and complex random sampling designs? Explain clearly giving examples. (12)
- Q.3.** How will you differentiate between descriptive and inferential statistics? Describe the important measures used to summarise the data. (12)
- Q.4.** Write a short note on sampling error and central limit theorem. (12)
- Q.5.** Explain the meaning of analysis of variance. Describe briefly the technique of analysis of variance for one way and two way classification. (12)
- Q.6.** What do you mean by multivariate analysis? Explain how it differ from bivariate analysis. (12)

Paper End





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Winter Semester Examination – Dec. – 2019**

**Branch: M.Tech. (Electronics Engineering)**  
**Subject: - Embedded System Design MTEEE125A**  
**Date: -21/12/2019**

**Semester: I**  
**Marks: 60**  
**Time: 03 Hrs.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

**(Marks)**

- Q.1. a) what is the difference between big – endian and little - endian data representation? Explain the difference between Harvard and Von- Neuman architecture. (06)**
- b) Implement Peek ( ) and Poke ( ) in assembly language for ARM. (06)**
- Q.2. a) what is Bus Protocols? Explain a typical microprocessor bus. (06)**
- b) Give hardware architecture of a typical PC. (06)**
- Q.3. a) what is assembly and linking in compilation process? Explain with example.(06)**
- b) How you can control power consumption in embedded system? What are the factors that contribute to the energy consumption of the program. (06)**
- Q.4. a) what is Context Switching? Explain Cooperative Context Switching for the ARM. (06)**
- b) Explain the interprocessor communication mechanism provided by the operating system. (06)**
- Q.5. a) what is performance analysis? Explain single threaded versus multithreaded Control of an accelerator. (06)**
- b) What are the different types of interconnection networks for implementation of distributed embedded systems, explain it. (06)**

**Q.6. a) Explain successive refinement design methodology for embedded systems. (06)**

**b) What is systems – on – silicon? Explain with the help of example. (06)**

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