

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Winter Semester Examination – December – 2017**

Branch: M.Tech (Electronics Engineering)

Semester: I

**Subject with Subject Code: Computational Methods
(MTEEC101)**

Marks: 60

Date: 12 /12 / 2017

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.

Q. 1 Answer the followings:

(12M)

- a. Explain the concept of the instability of the numerical process with neat sketch.
- b. If $P = 4xy^2/z^3$ and errors in x, y, z be 0.001, show that the maximum relative error at $x = y = z = 1$ is 0.006.

Q. 2 Answer the followings:

(12M)

- a. Use the factorization to solve the system:
 $x_1 + x_2 + 3x_4 = 8, 2x_1 + x_2 - x_3 + x_4 = 7,$
 $3x_1 - x_2 - x_3 + 2x_4 = 14, -x_1 + 2x_2 + 3x_3 - x_4 = -7$
- b. Using regula-falsi method, find a real root of the equation, $f(x) = e^{-x} + 2^{-x} + 2\cos(x) - 6$, for $1 \leq x \leq 2$.

Q. 3 Answer the followings:

(12M)

- a. Use least square regression to fit straight line using following data:

| | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|
| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| y | 0.5 | 2.5 | 2.0 | 4.0 | 3.5 | 6.0 | 5.5 |

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

- b. For the following data set, find the cubic splines and evaluate $y(1.5)$ and $y'(3)$

| | | | | |
|---|---|---|---|----|
| x | 1 | 2 | 3 | 4 |
| y | 1 | 2 | 5 | 11 |

Q. 4 Answer the followings: (12M)

a. Let $f(x) = \cosh(x)$ and $a = 2$, Let $h = 0.01$ and approximate $f'(a)$ using forward, backward and central differences. Work to 8 decimal places and compare your answers with the exact result, which is $\sinh(2)$.

b. Use the multiple-segment trapezoidal rule to find the area under the curve $f(x) = \frac{300x}{1+e^x}$ from $x = 0$ to $x = 10$.

Q. 5 Answer the followings: (12M)

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

b. Solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2, 0.4$, using Runge-Kutta method of fourth order.

Q. 6 Answer the followings: (12M)

a. Given that $2dy/dx = (1+x)y$ and $y(0) = 1$, $y(0.1) = 1.06$, $y(0.2) = 1.12$, $y(0.3) = 1.21$, evaluate $y(0.4)$ by Milens predictor corrector method.

b. For $\frac{d^2y}{dx^2} = e^{x^2}$ with $y(0) = 0, y(1) = 0$ estimate the $y(x)$ at $x = 0.25, 0.5, 0.75$ using finite difference method.

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Winter Semester Examination - December - 2017**

Branch: M.Tech. (Electronics Engineering)

Semester: I

Subject with Subject Code: Microelectronics
(MTEEC102)

Marks: 60

Date: 14 / 12 / 2017

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) Draw and explain MOS diffusion capacitance model. | (6M) |
| b) Discuss the non-ideal I/V effects observed in MOS. | (6M) |
| Q.2. a) Explain photolithographic process in detail. | (6M) |
| b) Explain Gate and source/Drain formation in a CMOS. | (6M) |
| Q.3. a) Give and explain CMOS design rules. | (6M) |
| b) Explain CMOS process enhancement with respect to interconnect, circuit element etc. | (6M) |
| Q.4. a) Explain how optimum number of stages are chosen in a multistage logic network. | (6M) |
| b) What is static and dynamic power dissipation? Explain. | (6M) |
| Q.5. a) Explain static CMOS gates. | (6M) |
| b) Discuss ratioed circuits. | (6M) |

Q.6. a) Give the detailed comparison amongst various circuit families. (6M)

b) Explain the CMOS inverter as an amplifier. (6M)

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Winter Semester Examination - December - 2017**

Branch: M.Tech. (Electronics Engineering)

Semester: I

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

Marks: 60

Date: 16 /12 / 2017

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 are the types of Design Layout rule? Design and Explain CMOS Inverter layout. (6)
- b) Illustrate the term:
i) stick diagram
ii) wire parasitics (6)
- Q.2. Why we called static complementary Gates? Design the static complementary pull up and pull down network for the following (12)
- i) NAND Gate
ii) $A+B+C$
iii) $(A+B)C$
- Q.3. Describe following terms in detail (12)
- a) Domino logic
b) Delay through an RC Transmission line
- Q.4. a) Give test for stuck at 0 and stuck at 1 faults for the following CMOS gate (6)
- $F = A(B+C)$
- b) Explain the timing analysis and optimization in Chip design. (6)
- Q.5. a) What is function of recirculating Quasi static latch? Explain with diagram (6)
- b) What are the one phase clocking rules for Flip flops and two phase clocking disciplines for latches? (6)

Q.6. a) What is mean by Block Placement and Channel definition in Floor planning? (6)
Elaborate in detail with diagram.

b) How to improve clock distribution for chip layout in Floor planning? (6)

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Winter Semester Examination – December – 2017

Branch: M.Tech. (Electronics Engineering)

Semester: I

Subject with Subject Code: Medical Electronics
[MTEEE114]

Marks: 60

Date: 18 /12 / 2017

Time: 3 Hrs.

Instructions to the Students:

1. Figures to the right indicate the full 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 Attempt any TWO of the following:

(12M)

- a) What is meant by diagnostic equipment? Explain any one diagnostic equipment.
- b) With neat sketch, explain block diagram of the X –ray machine.
- c) How the medical electronic equipment are classified? Explain any therapeutic equipment in detail?

Q.2 Attempt any TWO of the following:

(12M)

- a) Draw equivalent circuit of microelectrodes. Distinguish between metallic and nonmetallic microelectrodes.
- b) Explain the different electrodes used for ECG measurement?
- c) What are the voltage range, frequency range used for ECG, EMG, and EEG signals.

Q.3 Answer the following:

(12M)

- a) What are different selection factors for transducers used for biomedical applications?
- b) Draw and explain how photoelectric transducers is suitable for pulse rate measurement in patient monitoring system.

Q.4 Answer the following:

(12M)

- a) Draw and explain block diagram of ECG machine used for recording ECG signals?
- b) Draw and explain block diagram of EEG machine used for recording and plotting the EEG signals?

Q.5 Answer the following:

(12M)

- a) Draw and explain ECG signal in detail.
- b) Explain the operating principle of ultrasonic blood flow measurement along with neat diagram. Specify the transducer and operating frequency of measuring signal.

Q.6. Answer the following:

(12M)

- a) Comment on Macroshock and Microshock hazards.
- b) What are the parameters on which electrical hazards depends? Discuss in detail.

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Winter Semester Examination – December – 2017**

Branch: M.Tech. (Electronics Engineering)

Semester: I

**Subject with Subject Code: Embedded System Design
[MTEEE125]**

Marks: 60

Date: 20 / 12 / 2017

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.

- Q.1. a) What is the difference between big – endian and little-endian data representation? Explain the difference between Harvard and Von Neuman architecture. (06M)**
- b) Write ARM based assembly language program to implement the equation. (06M)**
 $3X+4Y+9Z$
- Q.2. a) What is peak and poke function? How it can be implemented using high level language. (06M)**
- b) What is switch bouncing? How you can eliminate this? (06M)**
- Q.3. a) Explain how you will construct Control/Data Flow Graph. (06M)**
- b) How you can control power consumption in embedded system? What are the factors that contribute to the energy consumption of the program. (06M)**
- Q.4. a) What is the concept of context switching? Explain Co-operative Context switching for the ARM. (06M)**
- b) Explain the interprocessor communication mechanism provided by the operating system. (06M)**
- Q.5. a) What is distributed embedded architecture? What are the advantages of this system. (06M)**
- b) What are the different types of interconnection networks for implementation of distributed embedded systems, explain it. (06M)**

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

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

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