

H.T No:

R22

Course Code: A400006



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: **COMPUTER ORIENTED STATISTICAL METHODS**
(Common for IT & CSD)

Date: 05.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Explain about Condition Probability 1 M
2. Define product rule. 1 M
3. Explain about probability density function of continuous random variable. 1 M
4. If X and Y be two independent random variables, then $E(XY)=$ 1 M
5. When the distribution is said to be standard distribution. 1 M
6. Write any two characteristics of normal distribution. 1 M
7. What is confidence interval? 1 M
8. Explain about null hypothesis. 1 M
9. State the important aspects for a stochastic process. 1 M
10. Define absorbing state. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). A manufacturing firm employs three analytical plans for the design and development of a particular product. For cost reasons all three are used at varying times. In fact plans 1,2 and 3 are used for 30%, 20% & 50% of the products respectively. The defect rate is different for the three procedure as follows, 10M

$$P(D/P_1) = 0.01, P(D/P_2) = 0.03, P(D/P_3) = 0.02$$

Where $P(D/P_j)$ is the probability of a defective product, given plan j. If a random product was observed and found to be defective, which plan was most likely used and thus responsible?

OR

11. B). i) A Town has two fire engines operating independently. The probability that a specific engine is available when needed is 0.96. 5M

(a) What is the probability that neither is available when needed?

(b) What is the probability that a fire engine is available needed?

- ii) A pair of fair dice is tossed. Find the probability of getting 5M

(a) a total of 8 (b) at most a total of 5

12. A). The probability that a patient recovers from a rare blood disease is 0.4. If 15 people are known to have contracted this disease, what is the probability that 10M

(i) At least 10 survive

(ii) From 3 to 8 survive and

(iii) Exactly 5 survive

(P.T.O.)

OR

12. B). Out of 800 families with 5 children each, how many would you expect to have 10M
i) 3 boys ii) 5 girls iii) either 2 or 3 boys iv) atleast one boy.
Assume equal probabilities for boys and girls.

13. A). A company pays its employees on average wage of \$.15.90 an hour with a standard 10M
deviation \$.1.50. If the wages are approximately normally distributed and paid to the
nearest cent

(i) What is probability of the workers receive wages between \$13.75 and \$16.22 an hour
inclusive.

(ii) What is the probability of workers receive wages greater than \$ 17.

OR

13. B). i) Given a standard normal distribution, find the value of 'k' such that 5M

(a) $P(z > k) = 0.2946$

(b) $P(z < k) = 0.0427$

(c) $P(-0.93 < z < k) = 0.7235$

- ii) A pair of dice is rolled 180 times, what is the probability that a total of 7 occurs

5M

- a) Atleast 25 times
b) Between 33 and 41 times inclusive.
c) Exactly 30 times

14. A). A random sample of 100 recorded deaths in the united states during the past year showed 10M
an average life span of 71.8 years. Assuming a population standard deviation of 8.9 years,
does this seem to indicate that the mean life span today is greater than 70 years? Use a
0.05 level of significance.

OR

14. B). A survey of 1000 students found that 274 chose professional cricket team A as their 10M
favourite team. In a similar survey involving 760 students, 240 of them chose team A as
their favourite. Is there any significant difference between the proportions of students
favouring team A in the two surveys.

15. A). In a town only two brands of LED are available X & Y. Let each of these two brands have 10M
exactly 50% of the total market in same period and let market be of a fixed size. The
transition matrix is given below:

$$\begin{array}{c} \text{From } n = 0 \\ X \\ Y \end{array} \begin{array}{cc} X & Y \quad (\text{to } n = 1) \\ \begin{bmatrix} 0.8 & 0.2 \\ 0.5 & 0.5 \end{bmatrix} \end{array}$$

If the initial market share break down is 50% for each brand, then determine market share
in steady state.

(P.T.O.)

OR

15. B). Consider the Markov chain with three states, $S = \{1,2,3\}$ that has the following transition matrix: 10M

$$P = \begin{bmatrix} \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ \frac{1}{3} & 0 & \frac{2}{3} \\ \frac{1}{2} & \frac{1}{2} & 0 \end{bmatrix}$$

i) If we know $P(X_1 = 1) = P(X_1 = 2) = \frac{1}{4}$, Find $P(X_1 = 3, X_2 = 2, X_3 = 1)$

ii) Find Steady- State Probabilities.

H.T No:

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R22

Course Code: A404204



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: **DIGITAL ELECTRONICS**

(Common for CSE, CSC & IT)

Date: 07.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Convert (46AD)₁₆ to octal number system. 1 M
2. Draw the symbol of universal gates. 1 M
3. Draw AND gate using universal NAND gate. 1 M
4. What are don't cares? What is the use of these? 1 M
5. What is the use of HDL? 1 M
6. What is multiplexers? 1 M
7. Compare latch and flip-flops. 1 M
8. What are the advantages of sequential circuits? 1 M
9. What is ROM? 1 M
10. What is the use of reduction state? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Translate the following numbers as indicated: 10M
- i) $(4350)_5 = ()_2$
 - ii) $(11010011)_2 = ()_{16}$
 - iii) $(552)_6 = ()_8$
 - iv) $(1001001.011)_2 = ()_{10}$
 - v) $(2AC5.D)_{16} = ()_{10}$

OR

11. B). Use Boolean theorems and properties to reduce the following Boolean expression: 10M
- i) $(A+B+C)(B'+C) + (A+D)(A'+C)$.
 - ii) $(A+B)(A+B')(A'+B)$.

12. A). Simplify the following expressions using K-Map and realize with NAND and NOR gates. 10M
- $F = \pi M(1, 2, 3, 8, 9, 10, 11, 14)$. $\pi d(7, 15)$

OR

12. B). Minimize the following Boolean functions using K-map and draw the logic diagram using NAND gates. 10M
- $F(A, B, C, D) = \Sigma m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$

13. A). Draw the combinational circuit for half subtractor and full subtractor. 10M

OR

13. B). Design Four-bit magnitude comparator gate level circuit. 10M

(P.T.O..)

14. A). Explain the JK flip-flop and D flip flop with the help of circuit diagram, graphic symbol and characteristic table. 10M

OR

14. B). Explain in detail about registers and counters with an example. 10M

15. A). Construct the PLA for the following Boolean function: 10M
(i) $F1 = \Sigma m(0,1,3,4)$ (ii) $F2 = \Sigma m(0,1,2,3,4,5)$.

OR

15. B). Design a gated latch circuit with 2 inputs G and D, one output Q. The gated latch is a memory element that accepts the value of D when G=1 and retains this value after G goes to 0. One G=0 a change in D doesn't change the value of output Q. 10M

H.T No:

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R22

Course Code: A404203



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: **ELECTRONICS DEVICES AND CIRCUITS**

(Common for CSE, IT, CSC, CSM, CSD & AID)

Date: 09.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. Show the circuit diagram of the PN junction diode under the forward biased condition. 1 M
2. Recall the PN junction diode current equation. 1 M
3. List the two applications of rectifiers. 1 M
4. Show the circuit diagram of the bridge rectifier. 1 M
5. What is the relationship between α and β of a transistor? 1 M
6. Show the circuit diagram of a transistor when it is in the active region. 1 M
7. What is the Shockley equation of a junction field effect transistor? 1 M
8. Define the pinch-off voltage of a JFET. 1 M
9. Show the circuit diagram of a Zener diode as a voltage regulator. 1 M
10. Show the symbol of a UJT. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the operation of a PN junction diode under forward and reverse biased conditions with the help of suitable diagrams. 10M
- OR**
11. B). Illustrate the forward and reverse characteristics of a PN junction diode and also write the equations for static and dynamic resistances. 10M
12. A). Explain the operation of a full-wave rectifier with a suitable diagram and also derive the expressions for the average DC load current and the RMS value of the load current. 10M
- OR**
12. B). Determine the power delivered to the load, the percentage of regulation at full load, the rectification efficiency, and the secondary's TUF when a transformer with a center-tapped secondary winding feeds a full wave rectifier circuit. From either end of the secondary to the center tap, the rms voltage is 25V. Given a load of $2k\Omega$ and a diode with a forward resistance of 4Ω and a secondary resistance of 10Ω . 10M
13. A). Explain the input and output characteristics of a common-emitter configuration with a suitable diagram. 10M
- OR**
13. B). Determine the current will flow in the collector circuit of this transistor when connected in CE configuration with a base current of $30\mu A$ when a transistor operating in CB configuration has $I_C = 2.98mA$, $I_E = 3mA$ and $I_{CO} = 0.01mA$. 10M

(P.T.O.)

14. A). Construct an n-channel JFET and explain its operation in detail with a suitable diagram. 10M

OR

14. B). Choose a datasheet of a JFET gives the following information: $I_{DSS} = 4\text{mA}$, $V_{GS(\text{off})} = -9\text{V}$ and $g_{m(\text{max})} = 4000\mu\text{s}$. Determine the transconductance for $V_{GS} = -3\text{V}$ and find drain current I_D at this point. 10M

15. A). Construct and explain the workings of LEDs in detail with a suitable diagram. 10M

OR

15. B). Construct and explain the workings of a tunnel diode in detail with a suitable diagram. 10M

H.T No:

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R22

Course Code: A412301



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: COMPUTER ORGANIZATION AND MICROPROCESSOR
(Information Technology)

Date: 12.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. What is computer organization and architecture. 1 M
2. Draw the block diagram of digital computer. 1 M
3. What is the minimum mode of general bus operation? 1 M
4. What is the I/O addressing capability of 8086? 1 M
5. What are the 8086 interrupt types? 1 M
6. What will happen if a label within a macro is not declared local? 1 M
7. What is priority interrupt? 1 M
8. What is a peripheral device in computer architecture? 1 M
9. Define pipeline. 1 M
10. What is the basic idea of cache memory? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Explain about the instruction execution cycle. 5M
ii) Draw and explain Control unit of Basic computer system. 5M
- OR**
11. B). i) Draw and explain a common bus system for four registers. 5M
ii) Give the list of Memory Reference Instruction. Explain any THREE of it. 5M
12. A). i) Write short notes on pipeline architecture in 8086 microprocessors. 5M
ii) Explain the Addressing modes of 8086 microprocessor 5M
- OR**
12. B). Explain the register organization of 8086 microprocessor. 10M
13. A). Explain the following assembler directive in 8086 i) ASSUME ii) EQU iii) DW 10M
iv) DD.
- OR**
13. B). Explain the process of Interrupt handling in 8086 with a neat sketch. 10M
14. A). i) Write an assembly language program in 8086 for the addition of any two numbers. 5M
ii) Write short notes on Intel 8089 IOP. 5M

(P.T.O..)

OR

14. B). Explain about booth multiplication algorithm for any two numbers. 10M
15. A). How many stages are required for pipeline of a RISC processor? explain in detail. 10M

OR

15. B). i) Explain the design and characteristics of Memory Hierarchy in computer organization. 5M
ii) Write short notes on vector processing. 5M

H.T No:

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R22

Course Code: A412302



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular Examinations February-2024

Course Name: INTRODUCTION TO IOT
(Information Technology)

Date: 14.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

1. List the IoT protocols used in Link layer and explain any two in detail. 1 M
2. Differentiate between sensors and actuators. 1 M
3. Define Physical layer. 1 M
4. What is the Network Function Virtualization? 1 M
5. Define Tuple with an example in Python program. 1 M
6. What is the interpreted language? 1 M
7. What is the work of I2C in Raspberry Pi? 1 M
8. What is the work of SPI interface in Raspberry Pi? 1 M
9. Write any one Administration & one Security services in Boto. 1 M
10. Write the role of a Router in WAMP. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What are the roles of communication protocols and Embedded Systems? 10M
- OR**
11. B). Explain in Detail about IoT Protocols. 10M
12. A). Why the network wide configuration is important for IoT systems with multiple nodes explain in detail. 10M
- OR**
12. B). Write in details introduction to Arduino Programing. 10M
13. A). What is the difference between a python module and a package? Explain with an Example. 10M
- OR**
13. B). Explain about Domain model specification. 10M
14. A). How is software define network in IOT different from traditional networking. 10M
- OR**
14. B). How is Raspberry Pi different from a desktop Computer? 10M
15. A). Explain the component of IOT healthcare. 10M
- OR**
15. B). Write a short notes on i) Smart Grid ii) Industrial IOT. 10M
