Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐ Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/EEE/ME) (Sem–7, 8)
ELECTRONIC DEVICES
Subject Code : BTEC-301-18
M.Code : 90606
Date of Examination : 09-06-2025

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :

   a) What is mobility in semiconductors and what factors affect it?

   b) Explain the significance of the energy band diagram in a semiconductor.

   c) Mention any two differences between Schottky and p-n junction diodes.

   d) What is the function of a varactor diode in RF applications?

   e) Define the role of the Poisson and continuity equations in diode analysis.

   f) Compare CE, CB and CC configurations of a BJT.

   g) What are BJTs?

   h) Differentiate between depletion-type and enhancement-type MOSFETs.

   i) For a BJT in the active region, with I_C = 6 mA and I_B = 0.2 mA. Calculate the current gain (β).

   j) A full-wave rectifier has an input of 220V (rms). Calculate the DC output voltage, assuming ideal diodes and a transformer with a turn's ratio of 1:1.

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SECTION - B

2. What is sheet resistance? Derive the expression and discuss its applications in integrated circuit design.

3. Draw and explain the V-I characteristics of a p-n junction diode. Include forward bias, reverse bias, and breakdown regions.

4. Describe the working and applications of the Zener diode. Include its use as a voltage regulator with a circuit diagram.

5. What is the Ebers-Moll model for BJTs? Explain the significance of the model and list its assumptions.

6. Describe the process of photolithography in semiconductor fabrication. Include the steps involved and its role in IC manufacturing.

SECTION - C

7. Compare the construction, working principles and applications of special-purpose diodes such as Schottky diode, Tunnel diode and Varactor diode. Include circuit diagrams wherever necessary.

8. Explain the construction and working of an n-channel enhancement-mode MOSFET. Discuss the I-V characteristics and derive expressions for drain current in different regions of operation.

9. Discuss the various steps involved in the fabrication of an integrated circuit using the CMOS twin-tub process. Include oxidation, diffusion, ion implantation, photolithography and metallization.

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B.Tech. (Electronics & Communication Engineering) (Sem.–7,8)

PYTHON PROGRAMMINNG

Subject Code : BTEC-907D-18

M.Code : 90676

Date of Examination : 06-06-2025

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Answer briefly :**

   a) Discuss different python IDEs and compare them.

   b) Write a python command to open a file in write mode. What is the difference between file modes 'w' and 'a'?

   c) What are exceptions and assertions in python?

   d) How do global, local and non-local variables interact within nested functions?

   e) What are sets in Python? How do they differ from lists?

   f) What are dictionaries in Python? Provide an example.

   g) What is a tuple in python? How does it differ from a list?

   h) What is the purpose of lambda functions in python?

   i) What is an abstract data type?

   j) What is a class constructor in python?

2. Explain the Sieve of Eratosthenes algorithm with a suitable example.

3. Explain type conversion in python with a focus on implicit and explicit conversions. Provide at least three examples of each.

4. Describe the concept of boolean expressions in python. How does operator precedence affect boolean expressions? Provide suitable examples.

5. What are higher order functions? Explain how functions can be treated as first-class objects in python?

6. What is a module in python? Explain how to create and import user-defined modules with an example?

SECTION-C

7. Discuss the principles of object-oriented programming and how they are implemented in python? Provide examples to illustrate encapsulation, inheritance and polymorphism.

8. Explain the programming cycle for python in detail. Explain the significance of each step with the help of examples.

9. Explain how to determine the length of a string in python. Discuss the concatenation and repetition operations with appropriate examples. Explain the concepts of indexing and slicing in strings with examples.

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Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.–7,8)

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Subject Code : BTEC-909D-18

M.Code : 90686

Date of Examination:04-06-2025

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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SECTION-A

1. Define briefly:

    a. Strong AI

    b. Expert Systems

    c. Prolog

    d. Heuristic Search

    e. Ontology

    f. Default Information

    g. Supervised Learning

    h. Regression

    i. Nonparametric Models

    j. Natural Language Processing.

2. What is the role of environmental factors when dealing with intelligent agents?

3. Discuss the various concepts of boolean algebra. Give suitable examples.

4. Explain any two application areas of problem solving agents.

5. Write a short note on the internet shopping world.

6. How best hypothesis are chosen and evaluated?

SECTION - C

7. Compare the various techniques for knowledge representation.

8. Discuss the advantages and disadvantages of various search strategies.

9. Discuss the process of machine learning by giving examples.

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B.Tech. (ECE)   (Sem–7,8)

COMPUTER ORGANISATION AND ARCHITECTURE

Subject Code : BTES401-18

M.Code : 90491

Date of Examination : 28-04-2025

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write short note on following :

a) What is virtual memory?

b) What is mapping function?

c) Define Cache memory.

d) What is parallel processing?

e) Discuss the Input output Interface.

f) Discuss briefly about read only memory.

g) Discuss Peripheral Component Interconnect (PCI).

h) Highlight major points about the concept of pipelining.

i) What is micro-programmed design approach?

j) Describe arithmetic and logical unit.

SECTION - B

2. Explain memory hierarchy with a graphical pyramid.

3. **Explain the following addressing modes :**

   a) Register mode

   b) Immediate mode

   c) Indirect mode

   d) Absolute mode.

4. Explain I/O device interfaces - SCII and USB.

5. Division of restoring and non-restoring techniques in computer organization and architecture.

6. Discuss parallel processors.

SECTION - C

7. Role of interrupts in process state transitions.

8. Define the term micro programmed control? Draw the basic organization of a micro programmed control unit and explain it.

9. Explain instruction set of 8085 processor.

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