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Semester VI (B.Tech)

Er. No..22103145

Academic Year: 2024-25

Jaypee University of Engineering & Technology, Guna

T-1(Even Semester 2025)

18B11CI414 - Computer Organization and Architecture

Maximum Duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has five questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

		Marks	CO No.
Q1.	Design a 4-bit combinational circuit decrementer using four full-adder circuits.	**[02]**	**CO2**
Q2.	An 8-bit register contains the binary value 10011100. What is the register value after arithmetic shift right? Starting from the initial number 10011100, determine the register value after an arithmetic shift left, and state whether there is an overflow.	**[03]**	**CO2**
Q3.	A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers. How many multiplexers are there in the bus and the number of selection inputs in each multiplexer? Draw diagram of a common bus system for 4 registers of 4 bits each using three-state buffers and a decoder instead of the multiplexers.	**[03]**	**CO2**
Q4.	Design an arithmetic circuit with one selection variable S and two n-bit data inputs A and B. The circuit generates the following four arithmetic operations in conjunction with the input carry C_{in}. Draw the logic diagram for the first two stages.	**[03]**	**CO2**

S	C_{in}=0	C_{in}=1
0	D = A+B	D = A+1
1	D = A-1	D = A+B′+1

Q5.	Represent $(-12)_{10}$ in unsigned, signed, 1's and 2's complement formats using 8-bits and $(-24.875)_{10}$ into IEEE 754 single and double precision formats.	**[04]**	**CO1**

Semester VI (B.Tech)

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Er. No..22.1.B.14.5.....
Academic Year: 2024-25

Jaypee University of Engineering & Technology, Guna

T-1(Even Semester 2025)

18B14CI845 – Introduction to Natural Language Processing

Maximum Duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has 03 questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

		Marks	CO No.
Q1.	Find type of the error (Morphological, Semantic, Syntactic, Pragmatic, Discourse Integration) in finding correct meaning of the following statements using Natural Language Processing techniques. Justify your answer. (Marks will be awarded only if proper justification is made) (a) An the ate apple computer. (b) The computer eated an apple. (c) He is absent in the class (d) I am f9. (e) I saw a boy with telescope.	**[05]**	**CO2**
Q2.	An affix is a syllable or a set of letters with a specific meaning which can be added to a word or root to make a new word. Suggest a technique to remove affixes without using a dictionary, in English language. Critically analyze advantages and disadvantages of using this technique for stemming?	**[05]**	**CO3**
Q3.	Describe Viterbi Algorithm and analyze the statement 'fish sleep' using Hidden Markov model based POS tagging, for following data: **Transmission Probabilities:** start → noun = 0.8 start → verb = 0.2 noun → noun = 0.1 noun → verb = 0.8 noun → end = 0.1 verb → verb =0.1 verb → noun = 0.2 verb → end = 0.7 **Emission Probabilities:** • P(fish | noun) :0.8 • P(sleep | noun) : 0.2 • P(fish | verb) : 0.5 • P(sleep | verb) : 0.5	**[05]**	**CO3**

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Semester VI (B.Tech)

Er. No. 221B145

Academic Year: 2024-25

Jaypee University of Engineering & Technology, Guna

T-2 (Even Semester 2025)

18B19HS599-Indian Constitution and Traditional Knowledge

Maximum duration: 1 Hour 30 Minutes

Maximum Marks: 25

Notes:

1. This question paper has 04 questions.
2. Write relevant answers only.
3. Do not write anything on question paper (except your Enrl. No.)

		Marks	CO No
Q1.	How did the Indian Councils Act of 1909, also known as the Morley-Minto Reforms, influence the political representation of Indians in British colonial governance? Discuss its key provisions, including the introduction of separate electorates, and analyze its impact on the Indian nationalist movement.	**[06]**	**CO3**
Q2.	Critically analyze the Government of India Act of 1919 (Montagu-Chelmsford Reforms) in the context of its impact on Indian self-governance. How did the introduction of dyarchy influence provincial administration, and what were its major limitations?	**[06]**	**CO4**
Q3.	Imagine that a group of lawmakers in the fictional country of 'Homeland' is debating whether to include a Preamble in their new Constitution. Some argue that a Preamble is unnecessary; while others believe it is essential to define the nation's core principles. Drawing from the Indian Constitution, analyze the significance of the Preamble and describe its four key ingredients. How do these ingredients reflect the fundamental values of the Indian Constitution, and how might they guide Homeland in shaping its own Preamble?	**[06]**	**CO5**
Q4.	A state government introduces a new law that restricts access to certain high-paying government jobs only to individuals from urban areas, arguing that they have better education and skills. A group of rural citizens challenges this law in court, claiming it violates the principle of civic equality as outlined in the Preamble of the Indian Constitution. As a constitutional law expert, analyze whether this law upholds the ideals of the Preamble, particularly the concept of equality. Consider its implications on justice, opportunity, and fraternity while forming your legal argument. Provide a structured response with constitutional reasoning to support your conclusion.	**[07]**	**CO3**

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Semester VI (B.Tech)

Er. No. 22181145

Academic Year: 2024-25

Jaypee University of Engineering & Technology, Guna

T-2(Even Semester 2025)

18B14CI845 – Introduction to Natural Language Processing

Maximum Duration: 1 Hour 30 minutes | Maximum Marks: 25

Notes:

1. This question paper has five questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

		Marks	CO No.
Q1.	The sentence *"Colorless green ideas sleep furiously"* was introduced by Noam Chomsky to illustrate a key concept in linguistics. What linguistic concept does this sentence demonstrate, in terms of syntax and semantics? How would n-gram language model likely evaluate the probability of this sentence, and why?	**[05]**	CO2
Q2.	Can collocations be translated into other languages word by word? Justify your answer. Give criteria for collocation with examples.	**[05]**	CO3
Q3.	Define Zipf's law and explain its significance in language modeling. Consider a corpus where the most frequent word appears 10,000 times. According to Zipf's law, approximately how many times would the 5th most frequent word appear?	**[05]**	CO3
Q4.	In an N-gram language model, if a particular combination of words has a zero probability, then any sentence containing this combination will also have a zero probability. However, a sentence may have a zero probability not because it is grammatically or semantically invalid, but simply because the specific combination of words has not been observed in the training corpus. Describe a method to avoid assigning a zero probability to a sentence in such cases.	**[05]**	CO2
Q5.	Perform Morphological, Syntactic, Semantic analysis, Discourse integration and Pragmatic analysis on following sentence: "I want to print my NLP assignment".	**[05]**	CO1

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Semester VI (B.Tech)

Er. No. 22181[illegible]

Academic Year: 2024-25

Jaypee University of Engineering & Technology, Guna

T-2(Even Semester 2025)

18B11CI414 – Computer Organization and Architecture

Maximum Duration: 1 Hour 30 minutes

Maximum Marks: 25

Notes:

1. This question paper has five questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

Marks **CO No.**

Q1. Design a 2-bit, 8-operation Arithmetic Logic Unit (ALU) which performs following operations as given in the table. Consider C_{in} as initial carry of full adder. **[05]** **CO2**

Selection (S1, S0, Cin)	Micro-Operation	Expression
000	Addition (A + B)	A+B
001	Decrement A by 3	A−3
010	Increment A by 2	A+2
011	Subtract (A - B)	A−B
100	Logical Right Shift of B	shr (B)
101	Logical Left Shift of A	shl (A)
110	XOR (A XOR B)	A⊕B
111	AND (A AND B)	A∧B

Q2. A bus-organized CPU having 15 registers with 32 bits in each, an ALU, and a destination decoder. **[05]** **CO3**

a. How many multiplexers are there in the A bus, and what is the size of each multiplexer?

b. How many selection inputs are needed for MUX A and MUX B?

c. How many inputs and outputs are there in the decoder?

d. How many inputs and outputs are there in the ALU for data, including input and output carries?

e. Formulate a control word for the system assuming that the ALU has 35 operations.

Q3. Consider a 16-bit computer system which executes an assembly language program stored in the memory as shown in the table. Show the contents of PC, IR, AC, DR, AR and memory in tabular form after execution of each instruction. **[05]** **CO3**

Memory Address in Hexadecimal	Hexadecimal Contents of memory	Instructions
700	2902	LDA
701	9901	ADD
702	3904	STA
703	7001	HLT
901	0903	
902	C61A	
903	0AD7	
904		

Q4. Illustrate address symbol table and pseudo- instructions. Write the difference between 1st pass and 2nd pass assembler? **[05]** **CO4**

Q5. Discuss the registers used in basic computer. Draw the common bus system for the registers and memory unit. **[05]** **CO2**