QUESTION BANK

Subject with Code: Fundamentals of Digital Computing Systems (20EC0401) **Course & Branch**: B.Tech - ECE

Year & Sem: I-B.Tech & II-Sem   **Regulation:** R20

UNIT –I

COMPUTERS AND SYSTEMS

1		Briefly explain the different elements that are made of a computer-based information system.	[L2][CO1]	**[12M]**
2	a	Distinguish between primary storage and secondary storage.	[L2][CO1]	**[6M]**
	b	List the uses of primary storage and secondary storage.	[L1][CO1]	**[6M]**
3	a	What are the major considerations and factors that would be important while buying a computer?	[L1][CO1]	**[6M]**
	b	Sketch the IPO model and describe its functional blocks.	[L3][CO2]	**[6M]**
4	a	List the components of a computer system.	[L1][CO1]	**[4M]**
	b	With the help of a neat block diagram, explain the hardware componentsof computer system.	[L2][CO1]	**[8M]**
5		Illustrate and describe the two major categories of software components of a computer system.	[L2][CO1]	**[12M]**
6	a	Briefly explain the communication components of a computer system.	[L2][CO1]	**[6M]**
	b	List the types of computers and write short notes on each computer.	[L1][CO1]	**[6M]**
7	a	Describe the features of IBM -Z series mainframe computers.	[L2][CO1]	**[6M]**
	b	Interpret the concept of virtualization and describe its importance.	[L2][CO3]	**[6M]**
8	a	Analyze why Protocols and standards are important features of networks.	[L4][CO3]	**[6M]**
	b	Describe the brief architectural history of a computer.	[L1][CO1]	**[6M]**
9	a	Briefly explain the computer hardware of a computer system.	[L2][CO1]	**[6M]**
	b	Explain the operating system in detail.	[L2][CO3]	**[6M]**
10	a	Interpret the following terms: (i) Computer network (ii) Internet	[L3][CO3]	**[4M]**
	b	Discuss the various types of network media, network hardware and protocols.	[L2][CO1]	**[4M]**
	c	List the applications of a computer network.	[L1][CO1]	**[4M]**

UNIT –II
AN INTRODUCTION TO SYSTEM CONCEPTS AND SYSTEMS ARCHITECTURE

1	a	Explain the relationship among the following words: system, environment, boundary and interface with a neat sketch.	[L2][CO3]	**[6M]**
	b	With an example, discuss the relationship between a system and its environment.	[L2][CO3]	**[6M]**
2	a	Explain general concept of system with an example.	[L2][CO3]	**[8M]**
	b	Sketch the partial view of business application architecture.	[L3][CO3]	**[4M]**
3	a	Explain the top-down approach in IT system architecture.	[L2][CO3]	**[6M]**
	b	Discuss the importance of application architecture in IT system design.	[L2][CO3]	**[6M]**
4	a	Write short notes on distributed processing systems.	[L2][CO2]	**[4M]**
	b	Sketch the basic client-server architecture and explain briefly.	[L2][CO2]	**[8M]**
5	a	Describe the advantages of client-server computing with some examples.	[L2][CO3]	**[6M]**
	b	Explain the three tier database architecture with a neat diagram.	[L2][CO3]	**[6M]**
6	a	Write short notes on cloud computing.	[L2][CO2]	**[4M]**
	b	Classify the services provided by cloud computing and explain them briefly.	[L2][CO2]	**[8M]**
7	a	Sketch the comparison between cloud service levels and computer system layers.	[L2][CO2]	**[4M]**
	b	Explain the concept of peer-peer computing and its advantages and disadvantages compared with client-server computing.	[L2][CO3]	**[8M]**
8	a	Why web-based system architecture is a popular approach to many organizational systems? Explain with an example.	[L2][CO3]	**[8M]**
	b	Describe the principal responsibilities of a system architect.	[L2][CO2]	**[4M]**
9	a	What is the primary mission of Google?	[L1][CO3]	**[4M]**
	b	With the help of diagrams, explain how Google designed its IT system hardware architecture to achieve its mission.	[L2][CO 3]	**[8M]**
10	a	Explain the architecture of Google data center search application.	[L2][CO2]	**[6M]**
	b	Illustrate Facebook's application architecture and explain how it processes the user application requests.	[L2][CO3]	**[6M]**

UNIT –III
NUMBER SYSTEMS

1	**a**	Discuss various number systems of a computer.	[L2][CO4]	**[8M]**
	b	Tabulate the numbers up to 15 which can be represented in base-2, base-8, base-10 and base -16.	[L2][CO4]	**[4M]**
2	**a**	Some older computers use an 18-bit word to store numbers. Calculate the decimal range for this word size.	[L3][CO4]	**[3M]**
	b	Calculate how many bits it will take to represent the decimal number 3,175,000 and how many bytes will it take to store this number.	[L3][CO4]	**[3M]**
	c	Construct addition and multiplication tables for base 12 arithmetic. Use alphabetic characters to represent digits 10 and larger.	[L3][CO4]	**[6M]**
3	**a**	calculate the value for the following addition: $(25A84)_{12} + (70396)_{12}$	[L3][CO6]	**[6M]**
	b	calculate the value for thefollowing multiplication: $(2A6)_{12}$ x $(B1)_{12}$	[L3][CO6]	**[6M]**
4	**a**	Estimate the values after multiplying the following binary numbers: (i) $(1101)_2$ (ii) $(11011)_2$ $\times (101)_2$ $\times (1011)_2$	[L4][CO6]	**[4M]**
	b	Find the results after performing the following binary divisions: (i) $(1010001001)_2$ by $(110)_2$ (ii) $(11000000000)_2$ by $(1011)_2$	[L3][CO6]	**[8M]**
5	**a**	Find the result of the following binary additions: i) $(101101101)_2 + (10011011)_2$ ii) $(110111111)_2 + (110111111)_2$ iii) $(11010011)_2 + (10001010)_2$ iv) $(1101)_2 + (1010)_2 + (111)_2 + (101)_2$	[L3][CO6]	**[6M]**
	b	Convert the results obtained from (i), (ii), (iii) & (iv) of 5(a) into Decimal and Hexadecimal numbers.	[L2][CO4]	**[6M]**
6	**a**	Convert the given decimal number $(6026)_{10}$ into octal.	[L2][CO4]	**[4M]**
	b	Convert the given decimal number $(6026)_{10}$ into hexadecimal.	[L2][CO4]	**[4M]**
	c	Find the decimal value of the following binary numbers (i) $(1100101.1)_2$ (ii) $(1110010.11)_2$ (iii) $(11100101.1)_2$	[L3][CO4]	**[4M]**
7	**a**	Convert the following numbers from decimal to binary and then to hexadecimal: (i) $(27.625)_{10}$ (ii) $(4192.37761)_{10}$	[L2][CO4]	**[6M]**
	b	Convert the following numbers from their given base to decimal: (i) $(0.1001001)_2$ (ii) $(0.3A2)_{16}$ (iii) $(0.2A1)_{12}$	[L2][CO4]	**[6M]**
8	**a**	Using the division method, convert the following decimal numbers: (i) $(13750)_{10}$ to base 12 (ii) $(6026)_{10}$ to hexadecimal (iii) $(3175)_{10}$ to base 5	[L2][CO4]	**[6M]**
	b	Convert the following numbers from their given base to decimal: (i) $(0.1001001)_2$ (ii) $(0.3A2)_{16}$ (iii) $(0.2A1)_{12}$	[L2][CO4]	**[6M]**
9	**a**	Convert the following hexadecimal numbers to binary: (i) $(4F6A)_{16}$ (ii) $(9902)_{16}$ (iii) $(A3AB)_{16}$	[L2][CO4]	**[6M]**
	b	Convert the following binary numbers into hexadecimal: (i) $(1011011101110)_2$ (ii) $(111111111110001)_2$ (iii) $(110001100011001)_2$	[L2][CO4]	**[6M]**
10	**a**	Using the multiplication method, convert the following numbers to decimal: (i) $(1100010100100001)_2$ (ii) $(C521)_{16}$ (iii) $(3ADF)_{16}$ (iv) $(24556)_7$	[L2][CO4]	**[8M]**
	b	Convert $(0.12201)_3$ to base 10.	[L2][CO4]	**[2M]**
	c	Convert $(0.828125)_{10}$ to base 2.	[L2][CO4]	**[2M]**

UNIT –IV
DATA FORMATS

1	**a**	Summarize various types of common data that is represented in a computer.	[L2][CO5]	**[6M]**
	b	Briefly explain the three standards that are used in common for alphanumeric characters.	[L2][CO5]	**[6M]**
2	**a**	A secret message is transmitted from the other planet to earth in the form of binary and each binary code has a unique character. By using the table given below, analyze the given message and determine the secret code. Binary code: 110011101000001111110000001001101111111101111110000000100100 M 00001 ⁙ 10000 G 11111000 E 00010 U 10011 & 11111011 S 00100 ▯ 10101 → 11111101 Z 01000 ✳ 10110 N 11111110 O 01011 I 11001 P 01101 A 11010 V 01110	[L4][CO5]	**[8M]**
	b	Explain the PNG & JPEG image formats.	[L2][CO5]	**[4M]**
3	**a**	Discuss the characteristics of a bitmap image.	[L2][CO5]	**[4M]**
	b	Why images must be stored and manipulated as bitmap images?	[L4][CO5]	**[8M]**
4	**a**	Define image metadata. Give at least three examples of metadata that would be required for a bitmap image.	[L2][CO5]	**[6M]**
	b	With a neat sketch, explain the bitmap image storing format GIF.	[L2][CO5]	**[6M]**
5		With an example, explain about the object image.	[L2][CO5]	**[12M]**
6		With a neat sketch, describe how an A-to-D converter converts audio data into binary data.	[L1][CO5]	**[12M]**
7		Describe the most important characteristics and features of the following audio file formats: (i) .MP3 (ii) .WAV	[L2][CO5]	**[12M]**
8	**a**	List the advantages of data compression.	[L1][CO5]	**[4M]**
	b	Distinguish lossless and lossy data compressions algorithms.	[L4][CO5]	**[8M]**
9	**a**	Define page description language and list various page description languages.	[L1][CO5]	**[4M]**
	b	List the five simple data types that are provided in most high-level programming languages and write a short note on each data type.	[L1][CO5]	**[8M]**
10		Explain pseudo code procedure that performs string conversion to number.	[L2][CO4]	**[12M]**

UNIT –V
REPRESENTING NUMERICAL DATA

1	**a**	Calculate the value of largest unsigned integer that can be stored as a 16-bit number.	[L3][CO4]	**[4M]**
	b	Describe the unsigned binary and binary coded decimal representations with an example.	[L2][CO6]	**[4M]**
	c	Convert the decimal numbers, 24 and 37 into BCD and also calculate the sum of the two BCD numbers obtained.	[L2][CO6]	**[4M]**
2	**a**	Define 9's complement and 10's complement of a given number and explain the relation between them.	[L1][CO4]	**[6M]**
	b	Determine the result for the following decimal numbers by performing addition. Also convert each result obtained to five-digit 10's complement form. (i) 24379 (ii) 24379 (iii) −24379 +5098 −5098 5098	[L3][CO4]	**[6M]**
3	**a**	Determine the 9's complement representation for the three-digit number −467.	[L3][CO4]	**[3M]**
	b	Explain the procedure for adding two numbers in 2's complement form.	[L2][CO6]	**[3M]**
	c	Define one's complement, two's complement form and explain the relation between them.	[L2][CO6]	**[6M]**
4	**a**	Define the overflow and carry conditions.	[L2][CO6]	**[3M]**
	b	Calculate the 16-bit 1's and 2's complements of the following binary numbers. (i) 10000 (ii) 100111100001001 (iii) 0100111000100100	[L3][CO6]	**[6M]**
	c	Convert +38 and −24 to 8-bit 2's complement form and perform addition operation between them.	[L2][CO4]	**[3M]**
5	**a**	Determine the 16-bit 2's complement binary representation for the decimal numbers, 2021 and -2021.	[L3][CO6]	**[4M]**
	b	Describe the exponential notation with an example.	[L2][CO4]	**[8M]**
6	**a**	Calculate the result by performing addition of the following two floating point numbers and round the result to five places of precision. i) 05199520 ii) 625.2035 iii) 1024.775E2 +04967850 +25.7585 +512.225E0	[L4][CO4]	**[6M]**
	b	Calculate the result by performing subtraction of the following two floating point numbers and round the result to five places of precision. i) 05199520 ii) 625.2035 iii) 7024.775E2 -03967850 -25.7585 -512.225E0	[L3][CO4]	**[6M]**
7	**a**	Compute the floating-point representation for 0.0000019557.	[L3][CO4]	**[4M]**
	b	Compute division of the following two numbers, normalize the result obtained and round it to 3-bit. i) 04220000 / 02712500 ii) 625.2035 / 25.7585 iii) 7024.775E2 / 512.225E0	[L3][CO5]	**[8M]**
8	**a**	Represent the decimal number, 171.625 in IEEE 754 format.	[L2][CO4]	**[3M]**
	b	Convert the decimal number, 253.75 to binary floating point form.	[L2][CO6]	**[3M]**
	c	The IEEE provides a standard 32-bit format for floating point numbers. The format for a number is specified as $\pm 1.M \times 2E - 127$. Explain each part of this format.	[L2][CO4]	**[6M]**
9	**a**	Determine the result of multiplying two floating point numbers, normalize and round the result to 3-digit. i) 05220000 ii) 625.2035 iii) 7024.775E2 ×04712500 x25.7585 x512.225E0	[L3][CO4]	**[8M]**
	b	Illustrate the structure of Typical 32-bit & 64-bit Floating Point Format.	[L2][CO4]	**[4M]**

10	a	Convert the decimal number, 253.75 to 32-bit IEEE 754 floating-point form.	[L2][CO4]	**[4M]**
	b	Briefly explain about IEEE 754 Standard.	[L2][CO4]	**[4M]**
	c	What are the programming considerations and explain.	[L1][CO3]	**[4M]**

Prepared by: Dr.R. Gomalavalli,Mrs J.Jhansi,Mrs.P.Poojitha