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22-CS-11

M.Sc. I SEMESTER [MAIN/A.T.K.T.] EXAMINATION DECEMBER 2022 - JANUARY 2023

COMPUTER SCIENCE

Paper - I

[Computer and Communication Fundamentals]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 a) What is Digital and Analog Computers ? Describe the major components of computer with diagram. **(10 marks)**

b) Explain error detecting code. **(5 marks)**

OR

a) What is Binary Code ? Explain BCD, ASCII and Excess-3 code with example. **(4 marks)**

b) Convert the following - **(11 marks)**

i) $(24.36)_{10} = (\ )_2$ ii) $(125.23)_{10} = (\ )_{16}$

iii) $(235.62)_8 = (\ )_2$ iv) $(425)_8 = (\ )_{16}$

v) $(110010)_2 = (\ )_{gray}$ vi) $25 = (\ )_{XS3}$

vii) $(3f2)_{16} = (\ )_2$

Q. 2 a) How can you represent a binary –ve integers and also explain why 2's compliment method is used for subtraction of binary numbers. **(6 marks)**

b) Solve the following using complement method - **(9 marks)**

i) $(+17) + (-26)$

ii) $(-1110)_2 + (-1011)_2$

iii) $(-47) + (-31)_2$

OR

Simplify the following Boolean Expression in SOP and POS forms and Implement using Universal gates. **(15 marks)**

$F = A \cdot \overline{B} \cdot \overline{C} + \overline{A} \cdot B \cdot \overline{C} + A \cdot B \cdot \overline{C} + A \cdot B \cdot C$

P.T.O.

Q. 3 a) What is combinational logic circuit ? Explain with example. (7 marks)

b) What is binary parallel adder ? Design a logic circuit for adding two binary 4 bit numbers. (8 marks)

OR

a) Explain encoders ? Design octal to binary encoder. (7 marks)

b) What is Multiplexer and Demultiplexer ? Design a 8 : 1 multiplexer. (8 marks)

Q. 4 a) What is Sequential logic circuit ? Design a JK flip-flop. (8 marks)

b) Give difference between Meady and Moore models. (7 marks)

OR

a) What is the difference between synchronous and Asynchronous counter. (7 marks)

b) What is Registers. Explain the classification of registers in brief. (8 marks)

Q. 5 a) What is computer network ? Explain different type of computer networks. (7 marks)

b) What are network topologies ? Explain any three. (8 marks)

OR

a) What is bounded and unbounded media ? (7 marks)

b) Give difference between OSI and TCP/IP model. (8 marks)