BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
F.Y.B.Sc.(Computer Science) Sem-I : WINTER- 2022
SUBJECT : PRINCIPLES OF DIGITAL ELECTRONICS-I

Day : Friday | Time : 10:00 AM-01:00 PM

Date : 16-12-2022 | **W-20071-2022** | Max. Marks : 60

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw diagrams **WHEREVER** necessary.

Q.1 Answer **ANY TWO** of the following: **(12)**

a) Explain the working of 4:1 multiplexer with necessary diagram and truth table.

b) Construct the Hamming code for the data 1010 with odd parity.

c) Give the symbol, Boolean equations and truth table for the following gates:
i) NAND **ii)** EX-OR **iii)** AND

Q.2 Answer **ANY TWO** of the following: **(12)**

a) Explain the working of decimal to BCD encoder with logic diagram.

b) Reduce the following four variable functions to its minimum sum-of-product-form:
$Y = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + A\overline{B}\overline{C}\overline{D} + A\overline{B}C\overline{D} + \overline{A}B\overline{C}\overline{D} + \overline{A}BCD + A\overline{B}CD + \overline{A}\overline{B}C\overline{D} + \overline{A}BC\overline{D} + AB\overline{C}\overline{D} + A\overline{B}C\overline{D}$
Also implement it by using logic gates.

c) With neat diagram explain 4-bit parallel adder circuit.

Q.3 Answer **ANY TWO** of the following: **(12)**

a) Explain the working of 1:4 demultiplexer with necessary diagram and truth table.

b) Explain the working of octal-to-binary priority encoder.

c) With logic diagram and truth table explain the working of 1-of-4 decoder.

Q.4 Answer **ANY THREE** of the following: **(12)**

a) Draw the logic diagram and give the truth table for:
i) Half adder **ii)** Half subtractor

b) Construct NOT and OR gate using NOR gate.

c) Simplify the following expressions:
i) $\overline{\overline{A}\overline{B} + \overline{A} + AB}$
ii) $\left[A\overline{B}(C + BD) + \overline{A}\overline{B}\right]C$

d) Define the following parameters for logic families:
i) Speed of operation ii) Power dissipation
iii) Noise immunity iv) Fan-out

Q.5 Answer **ANY FOUR** of the following: **(12)**

a) Contruct OR and AND gates using NAND gates.

b) State and prove De-Morgan's first theorem.

c) Perform the following conversions:
i) i) $(132)_{10} = (?)_8$ **ii)** $(1010111001011)_2 = (15CB)_{16}$
iii) $(145)_{10} = (?)_2$

d) Explain the concept tree multiplexing.

e) Perform the following subtraction using 2's complement method
$(011001)_2 - (10110)_2$

f) Explain the concept of analog multiplexer.

* * * *