| Reg                                                        | g. I                                                                            | No:                                                                                                       |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           |          |            |
|------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------|---------------------------------|-----------------------------------------|---------------------|-----------------------|-----------------------|------------------|----------|-------|-----------|----------|------------|
| - SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR |                                                                                 |                                                                                                           |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           | IIR      |            |
|                                                            | ĸ                                                                               | JIDDI                                                                                                     |                                                           |                                 | 1110                            | IL U                                    | (AU                 | TON                   | OMOL                  | US)              |          |       | 001       | 1011     | ŮŇ         |
|                                                            |                                                                                 | B.Te                                                                                                      | ch I Y                                                    | ear II                          | Seme                            | ester                                   | Supp                | oleme                 | ntary                 | Exa              | ninat    | ions  | Februa    | ary-202  | 22         |
|                                                            |                                                                                 |                                                                                                           |                                                           |                                 |                                 | DIC                                     | GITA                | L LOO                 | GIC D                 | ESIG             | <b>N</b> |       |           |          |            |
| Time                                                       |                                                                                 | hours                                                                                                     |                                                           |                                 |                                 | (C                                      | ommo                | on to C               | SE &                  | CSII             | )        |       | May       | Marka    | o: 60      |
| 1 11110                                                    |                                                                                 | nouis                                                                                                     |                                                           |                                 | (1 m                            |                                         |                     | o Unit                | a <b>5 w</b> 1        | 2 - 6            |          | lza)  | IVIAN     | . WIAIKS | 5. 00      |
|                                                            |                                                                                 |                                                                                                           |                                                           |                                 | (All                            | iswei a                                 |                     |                       | <u>з 5 х 1</u><br>Т-Т | $\mathbf{L} = 0$ | U IVIAI  | KS)   |           |          |            |
| 1                                                          | a                                                                               | Redu                                                                                                      | ce the f                                                  | followi                         | ing Bo                          | oolean                                  | Expre               | ession                | s to the              | e indic          | cated r  | numbe | r of lite | rals:    | <b>6</b> M |
|                                                            |                                                                                 | (i)                                                                                                       | ) A'C                                                     | 2+ABC                           | C+AC                            | '+AB'                                   | to tw               | o liter               | als.                  |                  |          |       |           |          |            |
|                                                            | h                                                                               | (1)<br>Conv                                                                                               | l) A´B(<br>ert the                                        | D'+C<br>oiven                   | D)+B(<br>expres                 | (A+A´<br>ssion i                        | CD) t<br>n stan     | to one<br>Idard F     | literal.              | rm·V             | -Δ(Δ-    | -B+C) |           |          | 6M         |
|                                                            | v                                                                               | Conv                                                                                                      | ert the                                                   | Siven                           | expres                          | 551011                                  | ii Staii            | Ol                    | R                     |                  | -/ 1(/ 1 | (Bre) |           |          | UIVI       |
| 2                                                          | a                                                                               | Conv                                                                                                      | ert the                                                   | follow                          | ving                            |                                         |                     |                       |                       |                  |          |       |           |          | <b>6</b> M |
|                                                            |                                                                                 | (1)<br>(1)                                                                                                | ) (1A1<br>i) (543                                         | 5) <sub>16</sub> =(             | $)_{10}$                        |                                         |                     |                       |                       |                  |          |       |           |          |            |
|                                                            | b                                                                               | Subtr                                                                                                     | act (11                                                   | $1001)_2$                       | from                            | (1010                                   | )11) <sub>2</sub> ι | using 2               | 2's cor               | nplem            | ent?     |       |           |          | <b>6M</b>  |
|                                                            |                                                                                 |                                                                                                           |                                                           |                                 |                                 |                                         |                     | UNI                   | Г-II                  |                  |          |       |           |          |            |
| 3                                                          | Si<br>E                                                                         | mplify                                                                                                    | the B<br>(D E)                                            | oolean                          | expre                           | ession                                  | using               | K-maj                 | p meth                | 10d.             | )        |       |           |          | 12M        |
|                                                            | 1.(                                                                             | , А, В, С                                                                                                 | ,D,E)-                                                    | - Zm(c                          | <i>,</i> ∠, <del>4</del> ,0     | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 15,15,              | ,17,21,<br><b>O</b> l | ,23,27<br><b>R</b>    | ,29,31           | )        |       |           |          |            |
| 4                                                          | a                                                                               | <b>a</b> Design the circuit by Using NAND gates $F = ABC' + DE + AB'D'$                                   |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           |          | <b>6</b> M |
|                                                            | b                                                                               | Simplify the Boolean expression using K-map method.<br>$F(A \cap B \cap D) = \sum m(0.2,3,8,10,11,12,14)$ |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          | 6M    |           |          |            |
|                                                            |                                                                                 | 1 (77,1                                                                                                   | ,с,D)                                                     |                                 | (0,2,5)                         | ,0,10,1                                 | 1,12,               |                       | -III                  |                  |          |       |           |          |            |
| 5                                                          | a                                                                               | <b>a</b> Design a 4 bit adder-subtractor circuit and explain the operation in detail?                     |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           |          |            |
|                                                            | <b>b</b> Design the combinational circuit of Binary to Excess-3 code converter. |                                                                                                           |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           | 6M       |            |
| 6                                                          | a                                                                               | Imple                                                                                                     | ment t                                                    | he foll                         | owing                           | g Bool                                  | ean fu              | Inction               | <b>k</b><br>Lusing    | 8:1 n            | nultipl  | exer  |           |          | 6M         |
| -                                                          |                                                                                 | $F(A,B,C.D) = \Sigma M(0,1,2,5,7,8,9,14,15)$                                                              |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           |          |            |
|                                                            | b                                                                               | Expla                                                                                                     | in abo                                                    | ut Prio                         | rity ei                         | ncoder                                  | •                   |                       |                       |                  |          |       |           |          | <b>6</b> M |
| 7                                                          | я                                                                               | Fynla                                                                                                     | in the                                                    | Logic                           | diaora                          | am of                                   | IK flir             | UNIT<br>p-flop        | <b>-1</b> V           |                  |          |       |           |          | 6M         |
| ,                                                          | b<br>b                                                                          | Desig                                                                                                     | n and                                                     | draw th                         | he 3 b                          | it up-c                                 | lown s              | synchr                | onous                 | count            | er.      |       |           |          | 6M         |
| 0                                                          |                                                                                 | <b>F</b> 1                                                                                                |                                                           |                                 |                                 |                                         |                     | O                     | R                     |                  |          |       |           |          |            |
| 8                                                          | a<br>h                                                                          | Expla<br>What                                                                                             | What is state assignment? Explain with a suitable example |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           |          |            |
|                                                            | U                                                                               | vv nat                                                                                                    | 15 5140                                                   | <i>assig</i>                    | mien                            | с. Елр                                  | iaiii v             | UNI                   | Γ-V                   | e exui           | npie.    |       |           |          | UNI        |
| 9                                                          | a                                                                               | Implement the following Boolean function using PLA:                                                       |                                                           |                                 |                                 |                                         |                     |                       |                       |                  |          |       |           |          | <b>6</b> M |
|                                                            |                                                                                 | F1(A, E2(A))                                                                                              | B,C)=                                                     | Σm (3,<br>Σm (0                 | (5,6,7)                         | )                                       |                     |                       |                       |                  |          |       |           |          |            |
|                                                            | b                                                                               | F2(A)<br>What                                                                                             | is mer                                                    | nory d                          | ,2,4,7)<br>ecodii               | )<br>ng? Ex                             | plain               | about                 | the co                | nstruc           | tion o   | f4X   | 4 RAM     | •        | <b>6</b> M |
|                                                            |                                                                                 |                                                                                                           |                                                           | <i>.</i>                        |                                 | 0                                       | 1                   | O                     | R                     |                  | 0        |       |           |          |            |
| 10                                                         | a                                                                               | Imple                                                                                                     | ment t<br>B(C)                                            | he foll $\Sigma m$              | owing                           | g Bool                                  | ean ex              | xpressi               | ons us                | ing R            | OM       |       |           |          | <b>8M</b>  |
|                                                            |                                                                                 | F2(A)                                                                                                     | ,с)–<br>В,С)=                                             | $\Sigma m (0, \Sigma m (1, 1))$ | ,∠, <del>ч</del> ,7)<br>(3,5,7) | ,<br>)                                  |                     |                       |                       |                  |          |       |           |          |            |
|                                                            | b                                                                               | Write                                                                                                     | differ                                                    | ence b                          | etwee                           | n PRC                                   | OM, PI              | LA &                  | PAL.                  |                  |          |       |           |          | <b>4M</b>  |
|                                                            |                                                                                 |                                                                                                           |                                                           |                                 |                                 |                                         | *:                  | ** EN                 | D ***                 |                  |          |       |           |          |            |

**R19**