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

Time: 02:00 PM-05:00 PM

Day: Friday Max. Marks: 60 W-20083-2022 Date: 16-12-2022 N.B.: All questions are **COMPULSORY**. 1) Figures to the RIGHT indicate FULL marks. 2) Draw neat labeled diagram WHEREVER necessary. 3) Use of **CALCULATOR** is allowed. 4) [12] Answer ANY TWO of the following: **Q.1** What is a flip-flop. State different types of flip-flop. Explain T-flip-flop with logic diagram and truth table. Explain the following memory: **b**) iii) EPROM ii) ROM RAM c) Draw and explain the working of ring counter. [12] Answer ANY TWO of the following: Q.2Explain the working of R-S flip-flop using NAND gates. Also draw truth table for it. b) With neat diagram explain the working of 3-bit up/down counter. c) Explain the action of monostable multivibrator using IC 555. Draw the necessary waveform and derive expression for its frequency. Answer **ANY TWO** of the following: [12] Q.3 With neat diagram explain the working of J-K flip-flop. Also draw its symbol and truth table. b) What is a shift register? Explain the action of 3-bit serial – in -serial – out shift c) Explain MOD – 2 and MOD – 10 counter using IC 7490. 0.4 Answer **ANY THREE** of the following: [12] A timer 555 is configured to turn in a stable mode with $R_A=4k\Omega$, $R_B=4k\Omega$ and $C = 0.01 \mu F$. determine the frequency of the output and also calculate duty **b)** Explain the action of 3-bit asynchronous up-counter in detail. c) Explain the following flip-flop with respect to logic diagram and truth table: D – flip-flop ii) J-K MS flip-flop d) Explain the role of preset and clear terminals in flip-flop. Q.5 Answer ANY FOUR of the following: [12] a) i) State one application of bistable multivibrator. ii) A 555 timer is connected for monostable operation If $R = 10k\Omega$ and $C = 0.022 \mu F$, what is the width of output pulse? b) What is a counter? Write any two applications of counter. c) What is a bidirectional shift register? Draw logical diagram for parallel in shift d) Draw well labelled logic diagram for 3 – bit synchronous counter. What is race around condition? How is it avoided? f) Which are the four modes of shift register? Which is fastest of them? Why?