

Q.1 (A) Write a program and draw a flow chart to add twelve bytes of data stored in memory locations starting from 2060 H, display sum at output port 02H. [07]

Data (H): A2, 29, 27, 40, 36, 2F, E1, 22, 71, 30, 34, 15

(B) Assume that the accumulator holds data byte A4 H and CY=0. Illustrate the accumulator contents after the execution of instruction RLC, RRC twice. [07]

OR

Q.1 (A) Assume that Register D holds data byte 42 H, Register E holds 45 H and an Accumulator holds 32 H. Write program for each operation and illustrates the results of the instructions ANA D, ORA D, XRA D, DCR E. Store results in Registers B, C, H, L respectively. Show status of sign, zero and carry flags. [07]

(B) Write a program and Draw a flow chart to do following. [07]

Seven bytes of data are stored in memory location starting at 2030H. Add all Data bytes. Use register B to save carries generated, while adding the data Bytes. Store the sum at two consecutive memory locations, 2060H and 2061H.

Data (H): 55, B8, 1A, 8B, E5, 98, 43

Q.2 (A) Write a program and draw a flow chart to generate continuous square wave waveforms with the period of 400 micro second. The system clock period is 325 ns. And use bit D₀ to output to the square wave. (Number of T-state of outer loop = 46, T-state of an inner loop is 14- during last cycle, and 11 before last cycle). [07]

(B) Discuss advanced subroutine concepts (i) Nesting (ii) Multiple calling of a subroutine and (iii) Multiple Ending [07]

OR

Q.2 (A) Write the following [07]

Write a program and draw the flow chart for continuous Modulo ten up Counter to count from 0 to 9 with a one second delay between each count. Use register pair BC to set up one second delay and display each count at one of the Output ports. Clock frequency of the system is 1 MHz (No. of T-state of an inner loop is 24 and an outer loop is 48)

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- (B) A set of ten packed BCD numbers is stored in the memory location starting at 2050H. [07]
- (i) Write a program with a subroutine to add these numbers in BCD. If a carry is generated, save it in register B, and adjust it for BCD. The final sum will be less than 9999_{BCD} .
- (ii) Write second subroutine to unpack the BCD sum stored in registers A and B, and store them in the output buffer memory starting at 2060H. The most significant digit - BCD_4 should be stored at memory 2060H and least significant digit - BCD_1 at memory 2063H.

Q.3 (A) Draw a schematic diagram of two cavity klystron tube. Explain its construction, and working. [07]

- (B) Write short notes on: [07]
- (i) π - modes in magnetron.
- (ii) Multi cavity klystron.

OR

Q.3 (A) Draw a schematic diagram of the helix type travelling wave tube. Explain its construction and working. [07]

(B) What is Gunn diode? Explain electron transfer effect in Gunn diode using two valley theory. [07]

Q.4 (A) Define 'S' parameters of a two-port microwave network? Obtain the scattering matrix for E-plane tee. [07]

(B) What is Magic tee? Describe its working and obtain the scattering matrix for the Magic tee. [07]

OR

Q.4 (A) Write short notes on: [07]

(i) Microwave circulator

(ii) Directional couplers

(B) Describe slotted line method of measuring unknown frequency of a microwave generator. [07]

Q.5 Answer in brief Any Seven questions from the following: (Each question is of two marks). [14]

- (i) Write two 3 bytes instructions.
- (ii) List the difference between PUSH and POP instructions
- (iii) List the difference between CALL and RET instructions

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- (iv) $98_H - 7F_H =$ _____
- (v) Convert $8F_H$ into decimal number
- (vi) Assume two digit BCD number is 72, so its equivalent binary is = _____
- (vii) Explain briefly: mode curves of a reflex klystron.
- (viii) What is READ diode?
- (ix) What are bolometers?
- (x) Why do we call H-plane tee as 3-dB splitter?
- (xi) Define directivity of a directional coupler. What is the directivity of an ideal directional coupler?
- (xii) Why the side arm of H-plane tee is called adder arm?

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