3 /101

0404N67

Candidate's Seat No :_____

M.Sc Semester-4 Examination

509

Physics

April-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Q.1 (A) Write a program and draw a flow chart to do following [07]

1. Load the hexadecimal numbers A7 H and 9A H in registers D and E respectively. Add these numbers. If sum > FFH, display 01H at output PORT 0, otherwise display the sum.

(B) Assume that (A) = 18H and CY=0. Illustrate the accumulator contents after the RRC and RAR instructions. Write program and draw flow chart. [07]

OR

Q.1 (A) Write a program and draw a flowchart to do following function and verify output. [07]

1. Load the number 1B H in register D
2. Load the number 5F H in register C
3. Increment (C) by one
4. Add (D) + (C) and display sum at the out put PORT1.

Show status of S, Z and CY flags

(B) Assume that five data bytes are stored in memory location starting from 2020H. Write a program and draw a flow chart to add all the bytes.Set up B as carry register to save any carries generated, while adding data bytes. Store sum at two consecutive memory locations 2050H and 2051H. [07]

Q.2 (A) Design a counter (write a program) to count from FFH to 00H in a system with 0.5 micro second clock period. Use register C to set up one millisecond delay between each count and display number at out put PORT 1. (T-state of inner loop 14 and outer loop = 35) [07]

(B) Write steps to perform addition of two packed BCD numbers: 77 and 48 [07]

Write steps to perform subtraction of two packed BCD numbers: 66 and 38

OR

Q.2 (A) Write a program to count from 0 to 9 with one second delay between each count. At the count of 9, the counter should be zero and repeat the sequence [07]

P.T.O

continuously. Use register pair HL to set up a delay and display each count at one of the output ports. (Clock frequency of system is 1 MHz, T-state of inner loop = 24 and outer loop = 45).

(B) Write a program and draw a flow chart to provide the given ON/OFF time to three traffic lights (Green, Yellow, and Red) and two pedestrian signs (WALK and DON'T WALK). The signal lights and signs are turned on/off by the data bits of an output port as shown below: [07]

Lights/ signs	Data bits	On time
1. Green	D0	15 seconds
2. Yellow	D2	5 seconds
3. Red	D4	20 seconds
4. WALK	D6	15 seconds
5. DONT WALK	D7	25 seconds

The traffic and pedestrian flow are in the same direction; the pedestrian should cross the road when the Green light is on.

Q.3 (A) Draw the schematic diagram of a two cavity klystron amplifier and explain its construction and operation. [07]

(B) Describe the construction of a multicavity cylindrical magnetron tube. Obtain an expression for Hull cut-off voltage. [07]

OR

Q.3 (A) Differentiate between a klystron and a TWT. Draw a schematic diagram of the helix type travelling wave tube and explain its construction. [07]

(B) Write short notes on: [07]
(i) Mode curves in reflex klystron
(ii) Gunn diode

Q.4 (A) Describe the construction and working of the Faraday rotation isolator. [07]

(B) What are E- and H- plane tees? Discuss their properties. [07]

OR

Q.4 (A) What is circulator? Discuss how two magic tees can be used as a four port circulator. [07]

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

N67-3

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

(i) Write difference between CMP R and CPI 8 bit instructions

(ii) Explain instruction 'LDAX D'

(iii) List two common sources of error in programs.

(iv) What is a 'stack'?

(v) CALL is ___ byte instruction.

(vi) Explain instruction 'STC'

(vii) What is the relationship between the speed of axial RF electric field propagating in a slow wave structure in a TWT and speed of light?

(viii) What are cross field devices?

(ix) What are bolometers?

(x) How many elements are there in an S – matrix of a magic tee?

(xi) Define coupling factor of a directional coupler.

(xii) Outline two important uses of microwave attenuators?

***** PAPER ENDS *****