

Instructions: All Questions in SECTION – I carry equal marks
 Attempt any **THREE** questions in SECTION – I
 Question IX in SECTION – II is **COMPULSORY**

SECTION – I

Q.I	A. Explain 4-bit binary ladder and derive the equation for output voltage.	07
	B. Explain counter type A/D converter.	07

Q.II	A. (i) Draw the binary ladder with a digital input of 0100. (ii) With illustration explain monotonicity test	07
	B. Draw the block diagram of successive-approximation converter and explain its working.	07

Q.III	A. Write a program to count continuously in hexadecimal from FFH to 00H in a system with a $0.5\mu\text{s}$ clock period. Use registers B to set up a 2ms delay between each count and display the numbers at output port 02H.	07
	B. Write a program to count from 0 to 20H with delay of 100ms between each count. After 20H, counter should be reset itself and repeat the sequence. Use register pair DE for a delay register. Draw a flowchart and show the calculation for 100ms time delay.	07

Q.IV	A. Write a program to generate a square wave with a period of $400\mu\text{s}$. Assume the system clock frequency is 3MHz. Use bit D_0 to output the square wave.	07
	B. Write a program to turn a light on and off every 5 seconds. Use data bit D_7 to operate the light.	07

Q.V	A. Illustrate how information is exchanged between the program counter and the stack and identify the contents of the pointer register when a subroutine is called.	07																	
	<p>B. Write a program 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 01H as shown below:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Lights</th> <th>Data Bits</th> <th>On Time</th> </tr> </thead> <tbody> <tr> <td>1. Green</td> <td>D₀</td> <td>30 seconds</td> </tr> <tr> <td>2. Yellow</td> <td>D₂</td> <td>5 seconds</td> </tr> <tr> <td>3. Red</td> <td>D₄</td> <td>20 seconds</td> </tr> <tr> <td>4. WALK</td> <td>D₆</td> <td>30 seconds</td> </tr> <tr> <td>5. DON'T WALK</td> <td>D₇</td> <td>25 seconds</td> </tr> </tbody> </table>	Lights	Data Bits	On Time	1. Green	D ₀	30 seconds	2. Yellow	D ₂	5 seconds	3. Red	D ₄	20 seconds	4. WALK	D ₆	30 seconds	5. DON'T WALK	D ₇	25 seconds
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Q.VI	A. Write a 30 ms time delay subroutine using register pair BC. Clear the Z flag without affecting any other flags in the flag register and return to the main program.	07
	B. Write a program to control a railway crossing signal that has two alternately flashing red lights, with a 1-second delay on time for each light.	07

Q.VII	A. Explain 8255A general – purpose programmable devices, compatible with any microprocessor.	07
	B. Explain DAC 0808 giving its features, pin configuration, block diagram and typical applications.	07

Q.VIII	A. Write a note on Mode 0 and BSR Mode.	07
	B. Write a program to generate triangular wave.	07

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SECTION - II

Q.IX Attempt any EIGHT

(08)

A	What is the LSB weight of a 7-bit resistive ladder?	1
B	How many comparators are needed for a 3-bit simultaneous A/D converter?	1
C	What is differential linearity?	1
D	What is the weight of LSB of a 10-bit converter?	1
E	Give the significance of NOP instruction.	1
F	Why a 16-bit address is stored in reversed order?	1
G	Give full form of instruction RAR.	1
H	Which of the flags are affected after the execution of instruction DCX?	1
I	Accuracy of the time delay depends on the accuracy of _____.	1
J	What RST instruction does?	1
K	Define: stack.	1
L	A stack is a _____ - bit register.	1
M	What is the resolution of a 12-bit DAC, if full scale deflection output is 8 V?	1
N	How many bits are required if a DAC get a resolution of 1 mV, if full scale output voltage is 10 V?	1
O	Accumulator is loaded with the bit pattern 10101010. Carry is 1. After RLC what will be the content of accumulator?	1
P	Register D is loaded with A2H. What will be the content of register D after execution of instruction INR A?	1