UNIT III

SYNCHRONOUS SEQUENTIAL LOGIC

Part A – 2 Marks

1. What is sequential circuit?

Sequential circuit is a broad category of digital circuit whose logic states depend on a specified time sequence. A sequential circuit consists of a combinational circuit to which memory elements are connected to form a feedback path.

2. List the classifications of sequential circuit.

i) Synchronous sequential circuit.
ii) Asynchronous sequential circuit.

3. What is Synchronous sequential circuit?

A Synchronous sequential circuit is a system whose behavior can be defined from the knowledge of its signal at discrete instants of time.

4. What is a clocked sequential circuit?

Synchronous sequential circuit that use clock pulses in the inputs of memory elements are called clocked sequential circuit. One advantage as that they don't cause instability problems.

5. What is called latch?

Latch is a simple memory element, which consists of a pair of logic gates with their inputs and outputs inter connected in a feedback arrangement, which permits a single bit to be stored.

6. List different types of flip-flops.

i) SR flip-flop
ii) Clocked RS flip-flop
iii) D flip-flop
iv) T flip-flop
v) JK flip-flop
vi) JK master slave flip-flop

7. What do you mean by triggering of flip-flop?

The state of a flip-flop is switched by a momentary change in the input signal. This momentary change is called a trigger and the transition it causes is said to trigger the flip-flop.

8. What is an excitation table?

During the design process we usually know the transition from present state to next state and wish to find the flip-flop input conditions that will cause the required transition. A table which lists the required inputs for a given chance of state is called an excitation table.

9. Give the excitation table of JK-flip flop?

Present state	Next state	Flip-flop Inputs	
Q_n	Q_{n+1}	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

10. Give the excitation table of SR-flip flop?

Present state	Next state	Flip-flop Inputs	
Q_n	Q_{n+1}	R	S
0	0	X	0
0	1	0	1
1	0	1	0
1	1	0	X

11. What is counter?

A counter is used to count pulse and give the output in binary form.

12. What is synchronous counter?

In a synchronous counter, the clock pulse is applied simultaneously to all flip-flops. The output of the flip-flops change state at the same instant. The speed of operation is high compared to an asynchronous counter

13. What is Asynchronous counter?

In an Asynchronous counter, the clock pulse is applied to the first flip-flops. The change of state in the output of this flip-flop serves as a clock pulse to the next flip-flop and so on. Here all the flip-flops do not change state at the same instant and hence speed is less.

14. What is the difference between synchronous and asynchronous

counter? Synchronous counter:

1. Clock pulse is applied simultaneously Clock pulse is applied to the first flip-flop, the change of output is given as clock to next flip-flop
Asynchronous counter:
    1. Speed of operation is high Speed of operation is low.

15. Name the different types of counter.

a) Synchronous counter
b) Asynchronous counter
    i) Up counter
    ii) Down counter
    iii) Modulo – N counter
    iv) Up/Down counter

16. What is up counter?

A counter that increments the output by one binary number each time a clock pulse is applied.

17. What is down counter?

A counter that decrements the output by one binary number each time a clock pulse is applied.

18. What is up/down counter?

A counter, which is capable of operating as an up counter or down counter, depending on a control lead.

19. What is a ripple counter?

A ripple counter is nothing but an asynchronous counter, in which the output of the flip-flop changes state like a ripple in water.

20. What are the uses of a counter?

i) The digital clock
 ii) Auto parking control
iii) Parallel to serial data conversion.

21. What is Johnson counter?

It is a ring counter in which the inverted output is fed into the input. It is also known as a twisted ring counter.

22. Define Flip flop.

The basic unit for storage is flip flop. A flip-flop maintains its output state either at1 or 0 until directed by an input signal to change its state.

23. Give the comparison between combinational circuits and sequential circuits

Combinational circuits	Sequential circuits
Memory unit is not required	Memory unit is required
Parallel adder is a combinational circuit	Serial adder is a sequential circuit.