

19 OCT 2019

M.Sc. Physics Examination  
Phys C-104 : Electronics: Digital and Op-amp  
Paper Code : 4515

Duration : 2.30 Hour

Total Marks : 70

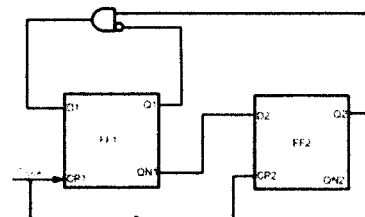
- Q.1 (A) (i) What is magnitude comparator? Write detailed note on 4-bit magnitude comparator [8]  
using logic diagram and Boolean expressions for each conditions. Explain it with an example.

- (ii) Draw logic diagram of keyboard encoder. Explain it with an example. [6]

OR

- (A) (i) Write detailed note on shift register. What is bidirectional shift register? Explain it [8]  
with logic diagram and an example. Also draw function/truth table.

- (ii) Determine the output waveforms Q1, Q2, D1 and D2 of this circuit when the Clock [3]  
input is applied as square wave. Initially all the flip flops are in reset state.



- (iii) What are the T-flip flops and D-flip flops? How they are realized? [3]

- (B) Attempt any four questions.

- (i) Define propagation delay time of flip flop. [1]  
(ii) On which principle does the parity generator work? [1]  
(iii) Draw logic diagram of 2-input multiplexer. [1]  
(iv) What is data selector? [1]  
(v) Define hold time of flip flop. [1]  
(vi) How many bytes are required for storing 1kBytes? [1]  
(a) 1000, (b) 1024, (c) 1064, (d) 10.00,000

- Q.2 (A) (i) Describe the term "digital counter". Design and implement mod-10 asynchronous [8]  
counter using logic diagram, block diagram and function table.

- (ii) Explain edge triggered SR flip flop in detail. Also draw timing diagram. [6]

OR

- (A) (i) Explain operation of universal shift register in detail. [10]

- (ii) Write flip flop operating characteristics. [4]

- (B) Attempt any four questions.

- (i) What are preset and clear inputs in flip flop? [1]  
(ii) How can a SR flip flop be converted into a D flip flop? [1]  
(iii) If clock is square wave with frequency 4 khz and S and R inputs are also square [1]  
waves with frequencies 2 kHz and 1 kHz respectively. Draw timing diagram of  
output waveform of SR flip flop.  
(iv) What is meant by stable state? [1]  
(v) What is toggling? [1]  
(vi) What does the triangle symbol of clock in a flip-flop means? [1]

- Q.3 (A) (i) Derive formula for gain of first order low pass filter and explain it. Draw its [10]  
frequency response.

