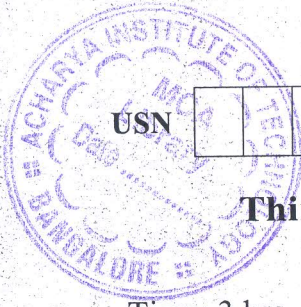


# CBCS SCHEME



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18MT35

## Third Semester B.E. Degree Examination, Dec.2023/Jan.2024 Analog and Digital Electronics

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain the operation of P-N junction diode under.  
i) Reverse bias condition ii) Forward bias condition. (06 Marks)  
b. Explain double ended shunt clippers with neat diagram and waveforms. (06 Marks)  
c. Explain with neat diagram and frequency response, the working of RC coupled BJT amplifier. (08 Marks)

OR

- 2 a. Explain first order low pass Butter worth filter and derive the gain and phase angle equations. (08 Marks)  
b. Design a second order low pass filter for a cut-off frequency of 100Hz and draw the circuit diagram. (06 Marks)  
c. Explain the operation of wide band pass filter. (06 Marks)

### Module-2

- 3 a. Compare RC phase shift oscillator with wein bridge oscillator. (06 Marks)  
b. Using a 741 op-amp with a supply of  $\pm 12V$ , design a RC phase shift oscillator to generate a sinusoidal output of  $f_0 = 100Hz$ . (06 Marks)  
c. Explain the working of wein bridge oscillator with the help of circuit diagram, waveforms and equations. (08 Marks)

OR

- 4 a. With a neat circuit diagram and waveforms, explain the operation of inverting Schmitt trigger circuit. (08 Marks)  
b. Design the capacitor coupled zero crossing detector using op-amp 741 having  $I_{B(max)} = 500nA$  and minimum signal frequency in 500Hz. The supply voltages are  $\pm 12V$ . (08 Marks)  
c. Write a note on voltage level detector. (04 Marks)

### Module-3

- 5 a. Explain the functions of each pin in 555 timer. (10 Marks)  
b. With a neat diagram and waveforms explain working of monostable multivibrator and also derive the expression for pulse width. (10 Marks)

OR

- 6 a. Explain how an Astable multivibrator can be used as square wave generator with necessary circuit and waveforms. (06 Marks)  
b. Compare monostable multivibrator and astable multivibrator. (06 Marks)  
c. Design the astable multivibrator using 555 for a frequency of 1kHz and duty cycle of 70% use  $C = 0.1\mu F$ . (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



**Module-4**

- 7 a. Reduce the following functions using K-map technique:
- $G = f(A, B, C, D) = \pi M(0, 2, 3, 8, 9, 12, 13, 15)$
  - $P = f(r, s, t, u) = \sum(1, 3, 4, 6, 9, 11, 12, 14).$  (08 Marks)
- b. Design full adder using two half address. (06 Marks)
- c. Implement the following Boolean function using 4:1 Mux  
 $f(A, B, C, D) = \sum m(0, 1, 2, 4, 6, 9, 12, 14).$  (06 Marks)

**OR**

- 8 a. Draw the circuit for 3 to 8 line decoder and explain. (08 Marks)
- b. Realize the following Boolean expression using the 3:8 decoder:  
 $F_1(A, B, C) = \sum m(1, 2, 3, 4)$   
 $F_2(A, B, C) = \sum m(3, 5, 7).$  (04 Marks)
- c. With a neat diagram, explain the octal to binary encoder. (08 Marks)

**Module-5**

- 9 a. Explain the working of JK flip-flop. Write its truth table, state diagram and excitation table. (10 Marks)
- b. Draw the logic truth table and timing diagram of positive edge triggered D – flip flop. (10 Marks)

**OR**

- 10 a. Explain 3-bit synchronous binary counter. (10 Marks)
- b. Differentiate between combinational circuit and sequential circuit. (05 Marks)
- c. Differentiate between asynchronous counters and synchronous counters. (05 Marks)

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