

# CBCS SCHEME

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18EC42

## Fourth Semester B.E. Degree Examination, Jan./Feb. 2023 Analog Circuits

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 working of classical discrete circuit Bias – voltage divider bias. (10 Marks)  
b. Design a collector – to – base bias circuit for the specified conditions. Given :  
 $V_{CC} = 15V$ ,  $V_{CE} = 5V$ ,  $I_C = 5mA$ ,  $\beta = 100$ . (10 Marks)

OR

- 2 a. Draw and explain the MOSFET biasing circuit using Fixed  $V_G$ . (10 Marks)  
b. Derive the expression for  $g_m$  and  $A_V$  for the MOSFET amplifier circuit. (10 Marks)

### Module-2

- 3 a. Write a note on three basic configuration of a MOSFET amplifier. Derive expression for characterizing parameters of MOSFET amplifier. (10 Marks)  
b. Draw the high frequency equivalent circuit of a MOSFET and explain the significance of the different elements of the circuit. (10 Marks)

OR

- 4 a. Explain the working of RC – phase shift oscillator using FET. (10 Marks)  
b. In Hartley oscillator  $L_1 = 20\mu H$ ,  $L_2 = 2mH$  and  $C$  variable. Find the range of  $C$ , if frequency is to be varied from 1 MHz to 2.5 MHz. Neglect the mutual inductance. (10 Marks)

### Module-3

- 5 a. Draw the block diagram of current series feedback amplifier and derive an expression for input resistance, voltage gain, and output resistance. (10 Marks)  
b. How power amplifiers are classified? Explain them briefly. (10 Marks)

OR

- 6 a. Explain the working of class B push pull amplifier with relevant waveforms. Show that maximum conversion efficiency is 78.5%. (10 Marks)  
b. Explain series – shunt (voltage series) feedback amplifier. Determine input and output resistance of the amplifier. (10 Marks)

### Module-4

- 7 a. Explain the working of inverting schmit trigger. Derive the equation for the trigger points. (10 Marks)  
b. Derive an expression for the output of an inverting summing amplifier with 3 inputs and hence prove the circuit can act averaging amplifier. (10 Marks)

OR

- 8 a. Explain the working of instrumentation amplifier. Mention its applications. (10 Marks)  
b. Explain the working of practical non-inverting amplifier. (10 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-5**

- 9 a. Explain Successive – Approximation type – ADC with neat block diagram. (10 Marks)  
b. Explain the working of precision full wave rectifier with relevant circuit and waveforms. (10 Marks)

**OR**

- 10 a. Explain the working of a monostable multifier with relevant circuit and wave forms. Mention few applications of this circuit. (10 Marks)  
b. Design a second order low-pass Butterworth filter having high cut-off frequency of 1 KHz. Draw its frequency response. (10 Marks)

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