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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - CARRY OVER THEORY EXAMINATION - SEPTEMBER 2022

Subject: Analog Circuits

Time: 3 Hours Max. Marks: 100

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 mark each & Question No- 2 carries 2 mark each.
3. Section B - Question No-3 is based on external choice carrying 6 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A 20

1. Attempt all parts:-

1 What is the output of a class B amplifier for sinusoidal input? (CO1) 1

Question Instruction

4

(a) Sinusoidal amplifier

(b) Half-sinusoidal

(c) Sinusoidal with higher frequency

(d) Square wave

1 What is the disadvantage of a class B push-pull amplifier? (CO1) 1

(a) The efficiency reduces

(b) The figure of merit increases

(c) The cross-over distortion occurs

(d) The Q-power dissipation is very large

1 Op-Amp is abbreviated as _____. (CO2) 1

(a) Operational Amplifier

(b) Operand amplitude

(c) Operational amplitude

(d) None of the above

1 Op-Amp has ….....gain. (CO2) 1

(a) High

(b) low

(c) medium

(d) None of these

1 An Op Amp can be used to generate the waveform having _____shape. (CO3) 1

(a) Square

(b) Pulse

(c) Triangular

(d) All of the mentioned

1 The bandwidth of a band-pass filter is the _____. (CO3) 1

(a) sum of the two cutoff f

(b) diffrence of the two cutoff frequencie

(c) lower cutoff frequency

(d) None of these

1 In an LC transistor oscillator, the active device is_____. (CO4) 1

(a) LC tank circuit

(b) Biasing circuit

(c) Transistor

(d) None of the above

1 In a phase shift oscillator, we use ……. RC sections. (CO4) 1

(a) Two

(b) Three

(c) Four

(d) None of the above

1 Constant current source in differential amplifier is also called as _____. (CO5) 1

(a) Current Mirror

(b) Current Source

(c) Current Repeaters

(d) All of the mentioned

1	A Current Mirror circuit can be design using_____. (CO5) (a) BJT (b) FET (c) MOSFET (d) All of the above	1

2. Attempt all parts:-

2.a.	What is feedback ? Explain different types of feedback topologies. (CO1)	2
2.b.	Define CMRR of an Op-Amp and what is its ideal value? (CO2)	2
2.c.	What are the advantages of active filters over Passive filters? (CO3)	2
2.d.	What is an Oscillator? (CO4)	2
2.e.	Draw the simple BJT current mirror circuit. (CO5)	2

SECTION B 30

3. Answer any five of the following:-

3	Draw and explain the class B Power amplifier. (CO1)	6
3	Prove that the input impedance is decreased in voltage shunt feedback amplifier. (CO1)	6
3	What is the difference between Inverting and non-inverting operational amplifier? (CO2)	6
3	What are the characteristics of an ideal op-amp? (CO2)	6
3.e.	Differentiate between the comparator and Schmitt trigger with circuit diagram. (CO3)	6
3.f.	In a Wien – bridge oscillator , if the value of R is 100 KΩ, and frequency of oscillations is 10 kHz, Find the value of capacitor C. (CO4)	6
3.g.	Draw the simple BJT current mirror circuit and obtain the expression for current transfer ratio using matched transistors. (CO5)	6

Question Instruction

Attempt all Questions.

SECTION C 50

4. Answer any one of the following:-

4	Explain the advantage and disadvantage of negative feedback amplifier. (CO1)	10
4	Explain the crossover distortion in class B amplifier and explain how it can be reduced? (CO1)	10

5. Answer any one of the following:-

5-a.	Define the following electrical parameters: (a) input offset voltage (b) input resistance, (c) CMRR (d) output voltage swing (e) slew rate. (CO2)	10
5-b.	What is differential gain and common-mode gain of a differential amplifier? (CO2)	10

6. Answer any one of the following:-

6-a.	Discuss with neat diagram of Schmitt trigger circuit with waveform and write its applications. (CO3)	10
6-b.	Draw and explain the logarithmic amplifier with output expression. Also write its applications. (CO3)	10

7. Answer any one of the following:-

7-a.	Explain the Operation of RC Phase Shift Oscillator with neat diagram and give the condition for sustained oscillation. (CO4)	10
7-b.	Draw the circuit diagram of Wien- bridge oscillator and explain its working. (CO4)	10

8. Answer any one of the following:-

8-a.	Why current mirror circuit is used? Explain performance parameters of current mirror circuit with its characteristics. (CO5)	10
8-b.	Explain the performance parameters of the simple current mirror circuit using BJT and MOSFET with neat circuit diagrams. (CO5)	10

Question Instruction

Attempt all questions.