

24227

B. Tech. 5th Semester (F) Scheme (EEE)

Examination, December-2018

ANALOG ELECTRONIC CIRCUIT

Paper-EE-305-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : *First question is compulsory. Attempt five questions in all, selecting one question from each section.*

1. (a) Explain the effects of coupling and bypass capacitor in a circuit.
- (b) What is an oscillator ? How does it differ from an amplifier ?
- (c) Distinguish between Class -A, Class-B and Class-C operation of amplifiers.
- (d) Differentiate between linear and non linear applications of operational amplifiers. 5×4

Section-A

2. Define the lower cut-off frequency and upper cut-off frequency. Derive expression for these frequencies in terms of circuit components. Draw the frequency response curve of an R-C coupled amplifier. 20

(2)

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3. (a) Differentiate between positive and negative feedback. How does negative feedback modify the gain of an amplifier ? 10
- (b) What is the effect of unbypassed emitter lead resistance R_E on the gain of an amplifier ? 10

Section-B

4. (a) What are the Barkhausen condition of oscillations in electronic systems ? What are the factors which affect the frequency stability of an oscillator? 10
- (b) Explain how oscillations are initiated and sustained in an oscillator. Draw the ckt diagram of an R-C phase shift oscillator and briefly explain the principle of operation. 10
5. Enumerate the advantages of R-C oscillators. Explain the working of an R-C phase shift oscillator and find the expression for its frequency of oscillation. Find the limit on the gain of amplifier used in this oscillator. 20

Section-C

6. (a) Explain how the position of Q-point varies in case of Class-A, B and C operation. 10

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7. Draw the circuit diagram of an inverting amplifier using op-amp and derive the expression for its voltage gain. Explain the significance of virtual ground. Define CMRR of a differential amplifier. Realize a differentiator using op-amp. 10

Section-D

8. Write note on -
- (i) Bridge amplifier
 - (ii) Current to voltage converter
 - (iii) Scale changer
 - (iv) Phase shifter
- 20
9. Write notes on :
- (i) Comparators
 - (ii) Logarithmic Amplifier
 - (iii) APC
 - (iv) Waveform Generator.
- 20

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**B. Tech. 4th Semester (EE)
Examination – May, 2017**

ANALOG ELECTRONICS

Paper : EE-202-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Why is silicon preferred over germanium in the manufacturing of semiconductor devices ? 4
- (b) Make a difference between E-MOSFET and DE-MOSFET. 4
- (c) What is the requirement of biasing circuit in BJT ? 4

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(d) Why transistor is called current controlled device ? 2

(e) What is differential amplifier ? 2

(f) Define the concept of virtual ground in an Op-Amp. 4

SECTION - A

2. (a) Explain the behaviour of PN junction at no bias, reverse bias and forward bias. Sketch V-I characteristics of PN junction diode. 10

(b) A simple full wave bridge rectifier circuit has an input voltage of 240 V ac rms. Assume the diodes to be ideal. Find the output dc current, dc voltage and rms values of output currents and voltages. Assume load resistance to be 10 K Ω . 10

3. (a) What is meant by a clamping circuit ? Give different types of clamping circuits along with their output waveforms. 10

(b) Explain the following : 10

(i) Filter circuits

(ii) Peak to peak detector

SECTION - B

4. Write short note on the following :

(a) High frequency MOSFET model. 10

(b) MOSFET internal capacitances. 10

5. (a) Draw and explain MOSFET as an amplifier. 10

(b) Develop small signal equivalent circuit of NMOS device including body effect. 10

SECTION - C

6. (a) Write short note on transistor as a switch. 10

(b) Discuss analysis of transistor amplifier in CE configuration using its hybrid- π model. 10

7. (a) Draw and explain circuit diagram of transistor CE amplifier. Also plot its frequency response curve. 10

(b) Write in detail about transistor internal capacitances. 10

SECTION – D

8. (a) Discuss large signal operation of Op-Amp. 10
- (b) Write a short note on shunt-shunt feedback amplifier. 10
9. (a) Draw the circuit diagram of an Op-Amp used as inverting amplifier and derive the expression for its voltage gain, input resistance and output resistance. 10
- (b) Explain the small signal operation of MOS differential amplifier. 10

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3. (a) Derive an expression for the overall gain of a voltage series-feedback amplifier. 10
- (b) An amplifier has an internal gain of 80; the harmonic distortion in the output is 12%. To reduce the distortion within a tolerable limit of 3%. Calculate the feedback factor in the amplifier. 10

Section-B

4. Explain the working of crystal oscillator with a neat and clean circuit diagram. Discuss general form of oscillator. 20
5. (a) What is an oscillator? How does it differ from an amplifier? What are the essential parts of an Oscillator circuit? 10
- (b) Draw the circuit diagram of Hartley Oscillator and briefly explain, how the oscillations are maintained in the oscillator. 10

Section-C

6. (a) Differentiate between voltage and power amplifiers. Give the classification of power amplifier with their applications. 10
- (b) What do you mean by Push-pull amplifier? Find out the efficiency for the same. 10

(3)

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7. (a) What are the Practical characteristics of OPAMP? 10
- (b) Explain the following in context with practical Op-Amp: 10
- (i) CMMR (ii) Output Impedance
- (iii) Slew rate (iv) Input Impedance

Section-D

8. Explain the working of op amp as:
- (a) Differentiator 5
- (b) Bridge Amplifier 5
- (c) Current to Voltage Converter 5
- (d) Scale Changer 5
9. Explain how op amp can be used as:
- (a) Anti-log Amplifier 7
- (b) Schmitt Trigger 7
- (c) Digital to Analog Conversion 6

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B. Tech. 3rd Semester (EE)
Examination – March, 2021

ANALOG ELECTRONICS

Paper : PCC-EE-205-G

min: 35

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

Any five

1. (a) Explain the term cut in voltage of a diode. 2.5
- (b) Why silicon diode is more popular than the Ge diode ? 2.5
- (c) Define the term transconductance. 2.5
- (d) Define clipping circuits. 2.5
- (e) Explain in brief the applications of EMOSFET. 2.5

(f) What do you mean by difference amplifier ? 2.5

UNIT - I

2. (a) Explain in detail the VI characteristics of a diode. 8

(b) Explain the working of zener diode. 7

3. (a) Explain the working of BJT in common emitter configuration. 10

(b) Explain in brief BJT act as a switch. 5

UNIT - II

4. Explain in detail the construction and operation of n channel D MOSFET. 15

5. (a) Discuss how MOSFET act as an amplifier ? 8

(b) Explain the working of small signal model of MOSFET. 7

UNIT - III

6. Explain the effect of open loop gain and bandwidth on circuit performance of operational amplifier. 15

7. (a) Derive an expression of inverting and non inverting configuration of operational amplifier. 8

(b) Explain the role of feedback in the amplifiers. 7

UNIT - IV

8. Explain in detail the following :

(a) Precision amplifier. 8

(b) Lead and lag compensator using op-amp. 7

9. (a) Explain the analog to digital conversion using operational amplifier. 8

(b) How operational amplifier can be used as voltage regulator ? 7

301301

December, 2019

**B.Tech.(CE/IT/CSE/EL/EEE) - III SEMESTER
ANALOG ELECTRONIC CIRCUITS
(ESC-301/ELPC-302)**

Time : 3 Hours]

[Max. Marks : 75

Instructions :

- 1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
- 2. Answer any four questions from Part -B in detail.*
- 3. Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Draw a negative waveform clipper circuit. (1.5)
- (b) What is a zener diode? (1.5)
- (c) Differentiate between full-wave rectifier and half-wave rectifier in terms of average current and voltages. (1.5)
- (d) What is the Q point? What is the importance of Q point? (1.5)

- (e) In BJT, the collector junction is reversed biased still a large current flow through it, explain how? (1.5)
- (f) Why the emitter follower circuit is called so? (1.5)
- (g) Explain the transconductance of a FET. (1.5)
- (h) What is input offset current and slew rate? (1.5)
- (i) What is the PID controller? (1.5)
- (j) Draw the circuit of the peak detector using OP-AMP. (1.5)

PART - B

2. (a) The four diodes used in a bridge rectifier current have forward resistance of 10Ω and load resistance of 480Ω . The alternating supply voltage is 240 V (RMS) , calculate (i) DC load current (ii) DC power loss in all diode (iii) rectification efficiency (iv) ripple factor (v) Peak inverse voltage. (10)
- (b) Explain V-I characteristics of the diode and differentiate between static and dynamic resistance of a diode. (5)

3. (a) How MOSFET is different from BJT? With the help of a neat diagram, explain the construction, working and characteristics of n-channel enhancement type MOSFET. (10)

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- (b) Draw the equivalent small-signal model and high-frequency equivalent model for CE configuration of a transistor amplifier. (5)

4. (a) Enumerate the various requirements for biasing a circuit. (3)
- (b) Deduce collector current, draw and explain input and output characteristics in the Common emitter configuration of a transistor. (6)
- (c) Draw and explain the input and output characteristics of the common source amplifier. (6)

5. (a) List the characteristics of an ideal OP-AMP. (3)
- (b) Differentiate between differential and common mode operation of an OP-AMP. Define CMRR and its significance. (6)
- (c) Design an adder circuit to get the output expression as $V_o = -[0.1V_1 + V_2 + 10V_3]$ (6)

6. (a) Draw and explain the integrator circuit using OP-AMP. Derive the expression for output voltage. (8)
- (b) Design a phase shift oscillator with a frequency of 100 Hz using OP-AMP. (7)

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[P.T.O.]

7. (a) What are the advantages and features of the instrumentation amplifier? Derive the expression for the output voltage of instrumentation amplifier. (8)
- (b) What is the function of the precision rectifier circuit? What is the significance of UTP and LTP in Schmitt trigger circuit? (7)