

4th-Sem Electrical Engg
Analog ETC and op-amp

Model - 1

No1. Answer all the questions!

(5x10)
2x10

- Define ripple and ripple factor.
- Define CMRR and slew rate.
- What are the essentials of transistor oscillators?
- Define Peak inverse voltage and knee voltage?
- Draw the equivalent circuit of an op-amp.
- Define stabilization and stability factors.
- Name different H-parameters of transistor.
- Write application of Zener diode. What will happen if it is connected in forward biased condition?
- What is Barkhausen condition for sustained oscillation?
- What is load line and Q-point of transistor? Draw it for CE connection of transistor.

No2. Answer any six questions!

(5x6)

- Explain briefly shunt capacitor filter and choke input filter.
- Explain construction & working of PN junction diode in forward and reverse bias condition.
- Derive relationship between α , β and γ .

d) Discuss the ESSENTIAL of transistors.

e) Explain working of tunnel diode with its characteristics curve, oscillator.

f) Write down the advantage of FET over BJT.

g) Derive the expression of voltage gain of negative feedback transistor amplifiers with diagram.

No 3 with neat diagram explain the working of class-B Push Pull amplifier. (10)

No 4 Describe the operating of different types of clipping and clamping circuit with diagram. (10)

No 5 Describe working of Integrator & differentiator with proper circuit diagram by op-amp. (10)

No 6 Derive expression for rectification efficiency of a full wave bridge rectifier with neat sketch. (10)

No 7 Define transistor biasing. Explain voltage divider biasing method with neat diagram. (10)

Model - 2

Answer any five questions including
Q No. 1 & 2

No 1 Answer all questions in brief. (2 x 10)

(a) Define knee voltage.

(b) Define transistor biasing.

(c) What is transconductance in case of an FET?

(d) Define the characteristics of an ideal op-amp.

(e) Define stabilization and write its need.

(f) Define DC load line.

(g) What is filter and need of filter?

(h) What is the need of negative feedback?

(i) What is a Colpitt oscillator?

(j) Why CE transistors are used in most of applications of transistors?

No 2 Answer any six questions! (5 x 6)

(a) Explain the operation of choke-input filter.

(b) Explain the V-I characteristics of diode.

(c) What is stability factor and derive it?

(d) Write the difference between Avalanche and Zener breakdown.

② Draw the neat circuit diagram and explain the operation of phase-shift oscillator.

(f) Explain the summing amplifiers.

⑨ Write down the difference between voltage amplifiers and power amplifiers.

No 3

Draw neat sketch of full wave bridge rectifier and explain it. (10)

No 4

With neat circuit arrangement explain input and output characteristics of common emitter transistor configuration. (10)

No 5

Describe the inverting and non-inverting op-amp. (10)

No 6

Describe the working principle of transformer coupled amplifiers with neat diagram and give its frequency response curve. (10)

No 7

Write down the construction and working of FET with neat diagram. (10)

Model - 3

Answer any five questions including
Q. Nos 1 and 2

No1 Answer all questions

(2x10)

- (a) What is doping?
- (b) Write down the ripple factor value for Half-wave and full-wave rectifiers.
- (c) Why filter circuit is used?
- (d) Define transistor biasing.
- (e) Draw the diagram of OP-amp differentiator.
- (f) Define oscillator and write the different type of oscillator.
- (g) Draw the diagram of a combination clipper.
- (h) What do you mean by virtual ground in an op-amp?
- (i) Define α and β .
- (j) Why 3 RC phase shift circuit are used in RC phase shift oscillator?

No2 Answer any six questions: 5x6

- a) With proper diagram explain the working of π filter.
- b) Discuss the different modes of operation of transistor.

- ① Write the different parameters of FET and find the relation between them.
- ② Draw the block diagram of op-amp and explain each block.
- ③ Define and explain the comparator using op-amp.
- ④ What is Zener diode and write its application as a voltage regulator?
- ⑤ Draw the neat circuit diagram and explain the operation of Colpitt's oscillator.

Q3 With neat circuit diagram explain⁽¹⁰⁾ working of half wave rectifier with neat diagram and derive its efficiency, ripple factor.

Q4 Describe the working principle of⁽¹⁰⁾ R-C coupled amplifiers with neat diagram and explain its frequency response curve.

Q5 Describe the operation of Integrator⁽¹⁰⁾ and differentiator using op-amp.

Q6 What is filter? Explain the different⁽¹⁰⁾ type of filters.

Q7 Write short notes on⁽¹⁰⁾

- i) Tunnel diode
- ii) H-parameters of transistor.

MODEL-4

Answer any five questions including
Q.No - 1 and 2.

No1 Answer all questions

- a) Draw the O/P characteristics of CE type transistor?
- b) What is an operating point in a transistor characteristic?
- c) What do you mean by transistor biasing?
- d) Write the value of rectification efficiency of half wave and full wave rectifier.
- e) Draw the frequency response curve of a RC coupled amplifier.
- f) What is tank circuit?
- g) Draw the Pin diagram 741 IC op-amp.
- h) What is class-C amplifier?
- i) What do you mean by forward biased and reverse biased condition in crystal diode.
- j) What are the advantages of negative feedback?

No2 Answer any six questions

- a) Compare CB, CE and CC amplifiers.
- b) Differentiate between positive and negative feedback.

- c) Discuss the working of center tapped full wave rectifier.
- d) Construct and explain the working of an subtractor.
- e) What are the various types of transistor oscillator? Discuss one of them.
- f) What is complimentary symmetry push-pull amplifier.
- g) Derive the expression for the voltage gain with -ve feedback.

No 3 With neat sketch explain the working of full wave bridge rectifier and calculate the efficiency and TUF

No 4 What is a transistor and write about the different terminal and working of transistor.

No 5 Explain the voltage divider biasing.

No 6 Describe the V-I characteristic of a P-N junction diode under forward and reverse bias condition.

MODEL - 5

Answer any five questions including
Q. Nos 1 & 2

No1 Answer the following in short: 2x10

- What do you mean by depletion layer?
- Define PIN diode and where it is used.
- Define clamping and write its application.
- Define T.U.F (Transformer Utilization factor) and write its value.
- Define potential barrier.
- What is reverse saturation current?
- Why FET is called unipolar device?
- Define DC load line.
- What do you mean by collector efficiency in case of a power amplifier?
- Justify the name OP-amp.

No2 Answer any six questions.

- Derive an expression for efficiency of a half wave rectifier.
- Write the seven ideal characteristics of OP-amp.
- With neat circuit diagram explain the working principle of Hartley oscillator.

d) write the advantages of JFET over BJT.

e) what is breakdown of a P-n junction? Differentiate avalanche breakdown from Zener breakdown.

f) find the relation between α , β and γ

g) what is feedback? write the different type of feedback.

No 3

What is FET? write its construction in details with neat sketch. (10)

No 4

With neat diagram explain the R-C coupled amplifier and write its frequency response with advantage, disadvantage and application. (10)

No 5

What is transistor biasing? write the voltage divider biasing. (10)

No 6

Describe the operation of summing amplifier and subtractor using op-amp. (10)

No 7

Write short notes on (any two) (10)

① Integrator

② π -filter

③ H-Parameters

④ PIN diode