

# **SRM VALLIAMMAI ENGINEERING COLLEGE**

**(An Autonomous Institution)**

SRM Nagar, Kattankulathur – 603 203

**DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING**

**Common to**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**DEPARTMENT OF MEDICAL ELECTRONICS**

## **QUESTION BANK**



**III SEMESTER**

**EI3361 ELECTRON DEVICES AND CIRCUITS**

**Regulation – 2023**

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## DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

### QUESTION BANK

**SUBJECT : EI3361 –ELECTRONIC DEVICES AND CIRCUITS**

**SEM / YEAR: III / II**

UNIT I - PN JUNCTION DEVICES				
PN junction diode – Structure, Operation and V-I characteristics, Diffusion and Transition capacitance - Rectifiers – Half Wave and Full Wave Rectifier – Zener diode - Zener Reverse characteristics – Zener diode as voltage regulator - Display devices- LED, Laser diodes, Photo diode.				
PART – A				
Q.No	Questions	COs	BT Level	Competence
1.	What is transition capacitance and diffusion capacitance?	CO1	BTL-1	Remember
2.	What is rectifier and list its types?	CO1	BTL-1	Remember
3.	Summarize the two types of junction capacitances.	CO1	BTL-2	Understand
4.	Assess the term hole current in PN diode?	CO1	BTL-2	Understand
5.	Define depletion region.	CO1	BTL-1	Remember
6.	Examine the current components in a PN diode.	CO1	BTL-2	Understand
7.	Differentiate between avalanche breakdown & Zener breakdown.	CO1	BTL-2	Understand
8.	A 6.2V Zener diode has a resistance of 20 Ohms. Calculate the terminal voltage when the current is 20 mA?	CO1	BTL-2	Understand
9.	List out the factors on which barrier potential depends.	CO1	BTL-1	Remember
10.	Give the drawback of Zener Voltage Regulator.	CO1	BTL-2	Understand
11.	Discuss about the working principle of Laser diodes.	CO1	BTL-2	Understand
12.	Label the structure of PN Junction diode.	CO1	BTL-1	Remember
13.	Show the expressions of RMS current & ripple factor for bridge rectifier.	CO1	BTL-2	Understand
14.	Mention some of the applications of laser diode.	CO1	BTL-1	Remember
15.	Choose few applications of zener diode.	CO1	BTL-1	Remember
16.	A silicon diode has a saturation current $7.5\mu\text{A}$ at room temperature 300k. Find the saturation current at 400k.	CO1	BTL-2	Understand
17.	List out the applications of LEDs.	CO1	BTL-1	Remember

18.	Compare N-type impurity and P-type impurity in a semiconductor.	CO1	BTL-2	Understand
19.	Define the term transition capacitance $C_T$ of a PN diode.	CO1	BTL-1	Remember
20.	Formulate on form factor and peak factor of rectifier circuits.	CO1	BTL-1	Remember
21.	Discuss the effect of temperature on semiconductor.	CO1	BTL-2	Understand
22.	Draw the VI characteristics of PN junction diode.	CO1	BTL-2	Understand
23.	List out the importance of peak inverse voltage?	CO1	BTL-1	Remember
24.	What are the advantages of bridge rectifier over centre tapped Counterpart?	CO1	BTL-1	Remember

**PART-B**

1.	(i) Draw the circuit diagram and explain the working principle of full wave rectifier. (8) (ii) Derive the expression for ripple factor, voltage, PIV, transformer Utilization Factor. (8)	CO1	BTL-3	Apply
2.	Derive the expression for diffusion capacitance of PN junction diode. (16)	CO1	BTL4	Analyze
3.	Derive the expression of the Space charge or transition capacitance of PN diode under reverse bias with a neat diagram. (16)	CO1	BTL4	Analyze
4.	Explain the working principle of a Half wave rectifier and its various parameters. (16)	CO1	BTL4	Analyze
5.	With neat sketch explain the construction, operation, and its characteristics of PN junction diode. (16)	CO1	BTL-3	Apply
6.	Explain the construction and working of full wave rectifier with neat diagram. (16)	CO1	BTL4	Analyze
7.	Describe the action of a full wave bridge rectifier using diodes and give waveforms of input and output voltages. (16)	CO1	BTL-3	Apply
8.	Briefly describe about the following (i) Laser Diode (8) (ii) LED. (8)	CO1	BTL4	Analyze
9.	Explain the working, advantages, and applications of Light Emitting Diodes. (16)	CO1	BTL-3	Apply
10.	(i) Examine the construction and working principle of Zener diode with a neat sketch. (8) (ii) Explain how Zener diode can be acts as a voltage regulator. (8)	CO1	BTL4	Analyze
11.	Make use of a diagram, explain the working of Zener diode and its Characteristics. (16)	CO1	BTL-3	Apply
12.	Derive the expression for a ripple factor in a half wave bridge rectifier with resistive load. (16)	CO1	BTL-4	Analyze
13.	Derive the expression for a ripple factor in a full wave bridge rectifier with resistive load. (16)	CO1	BTL-4	Analyze
14.	Explain the construction and working of different types of Display Devices with neat diagram. (16)	CO1	BTL-3	Apply

15.	Write short notes on (i) Break down voltage (8) (ii) Knee voltage (8)	CO1	BTL-3	Apply
16.	Explain the term (i) static and dynamic resistance (6) (ii) junction resistance (6) (iii) reverse resistance of the diode (4)	CO1	BTL-3	Apply
17.	Explain the following term in a PN junction diode. (i) Maximum forward current (5) (ii) Peak inverse voltage (6) (iii) Maximum power rating. (5)	CO1	BTL-3	Apply

### UNIT II - BJT AND SMALL SIGNAL AMPLIFIERS

BJT - structure, operation of NPN and PNP transistor, Input and output characteristics of CE, CB and CC configurations. Two port Devices and Hybrid Model of BJT for CE, CB and CC configurations - small signal model – Analysis of CE, CB, CC amplifiers.

#### PART – A

Q.No	Questions	COs	BT Level	Competence
1.	Define early effect.	CO2	BTL-1	Remember
2.	Determine the base current of CE transistor Circuit if $I_c = 80$ mA and $\beta = 170$ .	CO2	BTL-2	Understand
3.	How does a transistor act as a switch?	CO2	BTL-1	Remember
4.	A transistor has a typical $\beta$ of 100. If the collector current is 40 mA, calculate is the value of emitter current?	CO2	BTL-2	Understand
5.	What is meant by biasing?	CO2	BTL-1	Remember
6.	List the transistor parameters.	CO2	BTL-2	Understand
7.	Write the relationship between $\alpha$ and $\beta$ .	CO2	BTL-2	Understand
8.	Express the operation of NPN and PNP Transistor.	CO2	BTL-2	Understand
9.	Give the input and output characteristics of a transistor in CB configuration.	CO2	BTL-1	Remember
10.	Draw the diode equivalent model of a transistor.	CO2	BTL-2	Understand
11.	What is Thermal runaway in transistors and mention how it can be	CO2	BTL-2	Understand
12.	Draw the Hybrid pi model for CE configuration.	CO2	BTL-1	Remember
13.	Mention the benefits of h parameters.	CO2	BTL-2	Understand
14.	Write the conversion formula of h parameter from CE to CB.	CO2	BTL 2	Understand
15.	Why BJT is called as current controlled device?	CO2	BTL-2	Understand
16.	A BJT has a base current of $200\mu\text{A}$ . Determine the collector current and $\beta$ .	CO2	BTL-1	Remember
17.	Give the relationship between currents in NPN transistor.	CO2	BTL-2	Understand
18.	Find the value of $\beta$ if a transistor has $\alpha = 0.97$ . Also find $\alpha$ if $\beta = 200$ .	CO2	BTL-1	Remember
19.	What is high level injection effect?	CO2	BTL-1	Remember
20.	Explain about multi emitter transistor.	CO2	BTL-2	Understand
21.	Name the three possible connections in transistors.	CO2	BTL-1	Remember
22.	Draw the symbol of PNP and NPN transistor.	CO2	BTL-2	Understand
23.	Define current amplification factor.	CO2	BTL-2	Understand
24.	What are the advantages of hybrid models?	CO2	BTL-1	Remember

**PART – B**

1.	Explain the configurations and the principle of operation of BJT. (16)	CO2	BTL-3	Apply
2.	(i) Describe the input and output characteristics of a transistor in CC configuration. (10) (ii) Derive the relationship among $\alpha$ , $\beta$ , $\gamma$ . (6)	CO2	BTL-4	Analyze
3.	With neat diagram explain the input and output characteristics of a transistor in CE configuration. (16)	CO2	BTL-4	Analyze
4.	(i) The reverse leakage current of a transistor when connected in CB configuration is $0.2 \mu\text{A}$ and it is $18 \mu\text{A}$ when the same transistor is connected in CE configuration calculate $\alpha$ , $\beta$ . (9) (ii) Describe early effect with relevant expressions and diagram. (7)	CO2	BTL-2	Understand
5.	Explain the construction and operation of CB configuration with neat sketch. (16)	CO2	BTL-4	Analyze
6.	Explain the construction and operation. (i) NPN transistor. (8) (ii) PNP transistor. (8)	CO2	BTL-4	Analyze
7.	Explain the following and determine the stability factor for each case. (16) (i) Fixed bias (ii) Collector to base bias (iii) Voltage divider bias.	CO2	BTL-3	Apply
8.	(i) Justify transistor as an amplifier. (8) (ii) Compare and contrast between CE, CB and CC configurations. (8)	CO2	BTL-3	Apply
9.	(i) The reverse leakage current of a transistor when connected in CB configuration is $0.2 \mu\text{A}$ and it is $18 \mu\text{A}$ when the same transistor is connected in CE configuration calculate $\alpha$ , $\beta$ . (8) (ii) Describe early effect with relevant expressions and diagram. (8)	CO2	BTL-4	Analyze
10.	Describe hybrid parameters for all three configurations and relations between them. (16)	CO2	BTL-3	Apply
11.	Explain the construction and operation of CE configuration with neat sketch. (16)	CO2	BTL-3	Apply
12.	Explain the construction and operation of CB configuration with neat sketch. (16)	CO2	BTL-4	Analyze
13.	Design a voltage divider bias circuit for transistor to establish the quiescent point at $V_{CE} = 12\text{V}$ , $I_C = 1.5\text{mA}$ , Stability factor $S \leq 3$ , $\beta = 50$ , $V_{BE} = 0.7\text{V}$ , $V_{CC} = 22.5\text{V}$ and $R_C = 5.6 \text{K}\Omega$ . (16)	CO2	BTL-3	Apply
14.	Describe the input and output characteristics of a transistor in CE configuration. (16)	CO2	BTL-4	Analyze
15.	(i) Analyze the working mechanism of CB configuration of BJT. (8) (ii) Distinguish between h and $\pi$ model. (8)	CO2	BTL-4	Analyze
16.	Asses the operation of various types of configurations of BJT with neat diagram. (16)	CO2	BTL-3	Apply
17.	Given an NPN transistor for which $\alpha = 0.98$ , $I_{CO} = 2 \mu\text{A}$ and $I_{EO} = 1.6 \mu\text{A}$ . A common emitter connection is used and $V_{CC} = 12\text{V}$ and $R_L = 40 \text{k}\Omega$ . What is the minimum base current required in order that transistor enter in to saturation region. (16)	CO2	BTL-4	Analyze

### UNIT III - FIELD EFFECT TRANSISTORS AND THYRISTORS

JFET, MOSFET and IGBT - Structure, operation and characteristics - FET small signal model - Analysis of CS, CG and CD amplifier. Thyristor - SCR operation and characteristics, UJT - operation and characteristics.

#### PART – A

Q.No	Questions	COs	BT Level	Competence
1.	Compare BJT and FET.	CO2	BTL-2	Understand
2.	Measure the value of ideal voltage gain for a certain JFET has a	CO2	BTL-2	Understand
3.	Evaluate the value of Transconductance. When $V_{GS}$ of a FET	CO2	BTL-2	Understand
4.	Define the term pinch off voltage of MOSFET.	CO2	BTL-1	Remember
5.	Demonstrate the concept of operating point with suitable graph.	CO2	BTL-2	Understand
6.	What are the different types of power MOSFET?	CO2	BTL-2	Understand
7.	Design a basic circuit for an operation of enhancement type MOSFET.	CO2	BTL-1	Remember
8.	Differentiate the between the IGBT and MOSFET.	CO2	BTL-2	Understand
9.	Show how an SCR can be triggered on by the application of a pulse to gate terminal.	CO2	BTL 2	Understand
10.	Give the VI characteristics of SCR.	CO2	BTL-2	Understand
11.	Draw the symbol of IGBT.	CO2	BTL-1	Remember
12.	Draw the two-transistor equivalent circuit of SCR.	CO2	BTL-2	Understand
13.	What is break over voltage of SCR?	CO2	BTL-1	Remember
14.	List few applications for thyristors.	CO2	BTL-1	Remember
15.	Distinguish the latching current & holding current.	CO2	BTL-2	Understand
16.	Compare the merits and demerits of IGBT.	CO2	BTL-1	Remember
17.	Write down the applications of IGBT?	CO2	BTL-2	Understand
18.	Illustrate the need of snubber circuit.	CO2	BTL-2	Understand
19.	Name the three possible connections in transistors.	CO2	BTL-1	Remember
20.	Draw the symbol of P- channel and N- channel MOSFET.	CO3	BTL 2	Understand
21.	Define negative resistance region in UJT.	CO3	BTL 1	Remember
22.	What are the advantages of UJT?	CO3	BTL 2	Understand
23.	Draw the structure of UJT.	CO3	BTL 2	Understand
24.	Write about the intrinsic standoff ratio of a UJT.	CO3	BTL 1	Remember
<b>PART – B</b>				
1.	Show the construction and operation of MOSFET with neat diagram. (16)	CO2	BTL-3	Apply
2.	Explain the construction and working of (i) N-channel JFET. (8) (ii) P-channel JFET. (8)	CO2	BTL-4	Analyze

3.	(i) Explain the construction and working of Depletion mode MOSFET. (8) (ii) Enhancement mode MOSFET. (8)	CO2	BTL-4	Analyze
4.	Describe with circuit IGBT static I-V, transfer and turn-on and turn-off characteristics. (16)	CO2	BTL-2	Understand
5.	Discuss the operation of thyristor with the help of its static V-I characteristics. (16)	CO2	BTL-4	Analyze
6.	Compare and contrast the performance characteristics of SCR and MOSFET. (16)	CO2	BTL-4	Analyze
7.	Explain the basic construction and equivalent circuit of a UJT and briefly explain the device operation. (16)	CO2	BTL-3	Apply
8.	Show the four-layer construction of SCR and two transistor equivalent circuit and explain the device operation. (16)	CO2	BTL-3	Apply
9.	Describe the working principle of SCR and its VI characteristics. (16)	CO2	BTL-4	Analyze
10.	With neat sketch explain the turn on and turn off characteristic of SCR. (16)	CO2	BTL-3	Apply
11.	Explain the construction and working of IGBT with neat diagram. (16)	CO2	BTL-3	Apply
12.	Describe the construction and working principle of DIAC with neat sketches. (16)	CO2	BTL-4	Analyze
13.	Take part in discussion about the working of thyristor and two transistor analogy of a thyristor in detail. (16)	CO2	BTL-3	Apply
14.	Describe the construction and working principle of UJT with neat sketches. (16)	CO2	BTL-4	Analyze
15.	Describe the UJT triggering circuit with neat sketch. (16)	CO2	BTL-4	Analyze
16.	(i) Describe the operation of UJT as a relaxation oscillator. (8) (ii) Derive its frequency of oscillation. (8)	CO2	BTL-3	Apply
17.	Draw and explain the steady state and switching characteristics of SCR. (16)	CO2	BTL-4	Analyze

#### UNIT IV- DIFFERENTIAL AMPLIFIER AND POWER AMPLIFIERS

Differential amplifier – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response –Power amplifiers Types: - Class A, B, AB and C Power amplifiers- Push-Pull amplifiers (Qualitative analysis only).

#### PART – A

Q.No	Questions	COs	BT Level	Competence
1.	Define a common mode rejection ratio for a differential amplifier. What is the value of CMRR for ideal cases?	CO4	BTL 1	Remember
2.	CMRR of an amplifier is 100 dB, estimate common mode gain, if the differential gain is 1000.	CO4	BTL 2	Understand
3.	A multistage amplifier employs 5 stages each of which has a power gain of 30. What is the total gain of the amplifier in dB?	CO4	BTL 1	Remember

4.	Model the ideal tuned circuit and write the expression for its resonant frequency.	CO4	BTL 2	Understand
5.	Discuss the need for cascading the amplifiers.	CO4	BTL 1	Remember
6.	Why neutralization is important? And give its types.	CO4	BTL 1	Remember
7.	Define differential mode signals of a differential amplifier.	CO4	BTL 1	Remember
8.	Construct a Differential amplifier and what is the ideal value of CMRR?	CO4	BTL 2	Understand
9.	Outline the need for constant current source for difference amplifier.	CO4	BTL 2	Understand
10.	Compare the performance of various power amplifier types.	CO4		
11.	Classify amplifiers according to the input.	CO4	BTL 2	Understand
12.	Summarize the advantages and performance of class-c amplifier.	CO4	BTL 2	Understand
13.	Define conversion efficiency of power amplifier.	CO4	BTL 1	Remember
14.	Distinguish common mode and difference mode.	CO4	BTL 2	Understand
15.	Take part in discussing the term cross over distortion.	CO4	BTL 1	Remember
16.	Compare gain and frequency.	CO4	BTL 1	Remember
17.	Assess the frequency response of double tuned amplifier for coupling coefficient= $k > 1, k < 1$ .	CO4	BTL 2	Understand
18.	Discuss the need for complementary symmetry amplifier.	CO4	BTL 1	Remember
19.	Write the advantages of push pull amplifier.	CO4	BTL 2	Understand
20.	A single tuned amplifier is tuned to receive the signal at 650 kHz with bandwidth of 10 kHz. Design the loaded quality factor of the tuned amplifier.	CO4	BTL 2	Understand
21.	What is meant by differential amplifier?	CO4	BTL 1	Remember
22.	List out the importance of CMRR?	CO4	BTL 2	Understand
23.	Define output offset voltage.	CO4	BTL 1	Remember
24.	Define input offset current.	CO4	BTL 1	Remember

**PART – B**

1.	Design the circuit diagram of a single tuned amplifier and explain it working in detail. (16)	CO4	BTL 4	Analyze
2.	Draw a differential amplifier and its equivalent circuit. Derive for $A_d$ and $A_c$ . (16)	CO4	BTL 3	Apply
3.	(i) Explain the working of class-C power amplifier with diagrams. (8) (ii) Derive the expression for efficiency of the class-C power amplifier. (8)	CO4	BTL 4	Analyze
4.	Describe the complementary symmetry (class B) push pull amplifier in detail. (16)	CO4	BTL 4	Analyze
5.	What is neutralization? Explain any two methods in brief. (16)	CO4	BTL 4	Analyze
6.	With neat diagram, explain the emitter coupled BJT differential amplifier, and express differential gain, common mode gain and CMRR. (16)	CO4	BTL 4	Analyze
7.	With neat sketch explain two stage cascaded amplifier and analyze its overall $A_v, A_t, R_t$ and $R_o$ . (16)	CO4	BTL 3	Apply
8.	(i) Explain the working of transformer coupled class-A power amplifier with diagrams. (8) (ii) Derive the expression for efficiency of the class-A power amplifier. (8)	CO4	BTL 4	Analyze

9.	(i) Classify the power amplifiers and calculate the efficiency for various types of power amplifiers. (10) (ii) List the characteristics of power amplifiers. (6)	CO4	BTL 4	Analyze
10.	Describe the working principle of single tuned amplifier with neat circuit diagram. (16)	CO4	BTL 3	Apply
11.	Describe the common mode and differential mode analysis of differential amplifier using FET and determine its CMRR. (16)	CO4	BTL 4	Analyze
12.	Examine the common mode and differential mode analysis of differential amplifier and determine its CMRR. (16)	CO4	BTL 3	Apply
13.	With neat diagram, describe the working of a differential amplifier using FET. (16)	CO4	BTL 3	Apply
14.	Discuss the operation of class AB amplifier to avoid cross over distortion with neat diagram. (16)	CO4	BTL 3	Apply
15.	Discuss about the AC analysis of differential amplifier. (16)	CO4	BTL 3	Apply
16.	Describe about the different coupling schemes in amplifiers. (16)	CO4	BTL 4	Analyze
17.	Explain in detailed about the RC coupled amplifiers. (16)	CO4	BTL 4	Analyze

#### UNIT V - FEEDBACK AMPLIFIERS AND OSCILLATORS

Advantages of Negative feedback – voltage / current, Series, Shunt feedback – Positive feedback – Condition for oscillations, RC Phase shift, Wien bridge, Hartley, Colpitts and Crystal oscillators.

#### PART –A

Q.No	Questions	COs	BT Level	Competence
1.	The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied the gain is reduced to 17.5. Find the fraction of the output that is feedback to the input.	CO5	BTL 1	Remember
2.	Assess the two Barkhausen conditions required for sinusoidal oscillation to be sustained.	CO5	BTL 2	Understand
3.	A tuned circuit has a resonant frequency of 1600 kHz and a bandwidth of 10 kHz. What is the value of its Q factor?	CO5	BTL 1	Remember
4.	List the disadvantages of negative feedback in amplifiers and how it can be overcome?	CO5	BTL 1	Remember
5.	Show the expression for the frequency of oscillations of a RC phase shift oscillator.	CO5	BTL 2	Understand
6.	An amplifier has a current gain of 240 and input impedance of 15KΩ without feedback. If negative current feedback (current attenuation = 0.015) is applied, what will be the input impedance of the amplifier?	CO5	BTL 1	Remember
7.	What is the advantage of a Colpitts oscillator compared to a phase shift oscillator?	CO5	BTL 2	Understand
8.	Which is the most used feedback arrangement in cascaded amplifier and why?	CO5	BTL 1	Remember
9.	Which type of feedback circuit increases gain of an amplifier?	CO5	BTL 1	Remember
10.	Outline the advantages of crystal oscillator.	CO5	BTL 2	Understand
11.	Discuss about Nyquist's stability criteria for feedback amplifiers.	CO5	BTL 2	Understand
12.	Develop the oscillator model which uses both positive and negative feedback? Why?	CO5	BTL 1	Remember

13.	Determine the operating frequency of transistor Hartley oscillator if $L_1=50\mu\text{H}$ , $L_2=1\text{mH}$ , and mutual inductance between the coils $M=10\mu\text{H}$ and $C=10\text{pF}$ .	CO5	BTL 2	Understand
14.	Point out the five characteristics of an amplifier which are modified by negative feedback.	CO5	BTL 1	Remember
15.	List out the advantages of RC phase shift oscillator.	CO5	BTL 1	Remember
16.	Analyze the effects on bandwidth and output impedance due to various types of feedback.	CO5	BTL 2	Understand
17.	Illustrate the expression for frequency of oscillation of a Wein bridge oscillator.	CO5	BTL 1	Remember
18.	Distinguish between negative and positive feedback.	CO5	BTL 2	Understand
19.	Discuss the limitations of LC and RC oscillators.	CO5	BTL 2	Understand
20.	A Wein bridge oscillator is used for operating at $f_0 = 10\text{KHz}$ . If the value of R is $100\Omega$ . Design the value of capacitor.	CO5	BTL 1	Remember
21.	What is the effect of lower cut off frequency with negative feedback?	CO5	BTL 1	Remember
22.	What are the essential for oscillator?	CO5	BTL 2	Understand
23.	What are the draw backs of phase shift oscillators?	CO5	BTL 2	Understand
24.	Mention any two high frequency LC oscillator.	CO5	BTL 2	Understand

**PART – B**

1.	With neat block diagram, explain the operation of following feedback amplifiers. (i) Voltage series feedback amplifier. (8) (ii) Current shunt feedback amplifier. (8)	CO5	BTL 4	Analyze
2.	(i) Explain with neat circuit diagram, the working of Hartley oscillator using transistor. (8) (ii) Derive an expression for frequency of oscillation. (8)	CO5	BTL 4	Analyze
3.	(i) With neat diagram explain Wien – Bridge oscillator. (8) (ii) Derive an expression for frequency of oscillation. (8)	CO5	BTL 3	Apply
4.	Illustrate the CE amplifier with voltage shunt- feedback with neat diagram. (16)	CO5	BTL 3	Apply
5.	Illustrate the circuit of CE amplifier with current series feedback and obtain the expression for feedback ratio, voltage gain, input resistances and output resistances. (16)	CO5	BTL 3	Apply
6.	(i) Explain the operation of Colpitts Oscillator with neat diagram. (8) (ii) Derive the expressions for the frequency of oscillation and the condition for maintenance of oscillation. (8)	CO5	BTL 4	Analyze
7.	Explain the construction and working of crystal oscillator with neat diagram. (16)	CO5	BTL 4	Analyze
8.	Explain the construction and working of Hartley oscillator with neat diagram. (16)	CO5	BTL 4	Analyze
9.	Design a Colpitts oscillator with $C_1 = 100\text{pf}$ and $C_2 = 7500\text{pf}$ . The inductance is variable. Determine the range of inductance values, if the frequency of oscillation is to vary between 950 KHz and 2050 KHz. (16)	CO5	BTL 3	Apply
10.	Sketch a circuit diagram of a two-stage capacitor coupled BJT amplifier that uses series voltage negative feedback. (16)	CO5	BTL 4	Analyze

<b>11.</b>	Explain the working of a phase shift oscillator. Discuss its advantages and Disadvantages. .(16)	<b>CO5</b>	<b>BTL 3</b>	Apply
<b>12.</b>	Explain the operation of current series feedback amplifier and derive its expression for (i)Input resistance (5) (ii)Output resistance (6) (iii)Voltage gain (3) (iv)Feedback ratio (2)	<b>CO5</b>	<b>BTL 4</b>	Analyze
<b>13.</b>	Describe about the basic concept of feedback and explain about the positive feedback. (16)	<b>CO5</b>	<b>BTL 3</b>	Apply
<b>14.</b>	Discuss the advantages of negative current feedback on the Performance of amplifiers. (16)	<b>CO5</b>	<b>BTL 4</b>	Analyze
<b>15.</b>	State and briefly explain barkhausen criteria for oscillation. (16)	<b>CO5</b>	<b>BTL 4</b>	Analyze
<b>16.</b>	Explain the operation of tank circuit with neat diagram. (16)	<b>CO5</b>	<b>BTL 4</b>	Analyze
<b>17.</b>	Differentiate oscillator with the amplifiers. (16)	<b>CO5</b>	<b>BTL 3</b>	Apply

