

**GGGS COLLEGE OF MODERN TECHNOLOGY,  
KHARAR**



**DEPARTMENT OF  
ELECTRICAL ENGINEERING**

**Question Bank**  
**Analog Electronics**  
Subject code – BTEE-302-18  
3<sup>rd</sup> Semester B.Tech.

Q. No	Questions
1.	Draw the VI Characteristics of the PN Diode.
2.	What is depletion region in PN junction?
3.	What is forward bias and reverse bias in a PN junction?
4.	Define the term diffusion current.
5.	With suitable expression model transition capacitance and Diffusion capacitance?
6.	What is break down? What are its types?
7.	Predict the diffusion capacitance for a silicon diode with a 10 mA forward current, if the charge carrier transit time is 60ns.
8.	Why BJT is called current controlled device?
9.	The transistor has $I_E = 10 \text{ mA}$ and $\alpha = 0.98$ . Find the value of base and collector currents.
10.	Draw the characteristics of CE configuration.
11.	Define current amplification factor in BJT.
12.	Discuss the major difference between a bipolar & unipolar device?
13.	Give some applications of BJT.
14.	In which region JFET acts as a resistor & why?
15.	Write some applications for JFET.
16.	Discuss the N channel MOSFET with P channel MOSFET.
17.	Why FET is called voltage controlled device?
18.	Draw the V-I characteristics curve of MOSFET.
19.	Compare MOSFET with JFET.
20.	Give the applications of UJT.
21.	With neat sketch compose the construction, operation and its characteristics of PN junction diode. Also list its advantages, disadvantages and its applications.
22.	(i) Summarize the effect of temperature on PN junction diode and draw its switching characteristics. (ii) The reverse saturation of a silicon PN junction diode is $10\mu\text{A}$ . Infer the diode current for the forward bias voltage of 0.6V at $25^\circ$ .
23.	Illustrate the h-parameter model of a BJT-CE amplifier and derive the equations for voltage gain, current gain, input impedance and output impedance.
24.	Analyze the operation of CE amplifier and derive the expression for h parameters of the same. Also derive the expression for gain, input impedance and output impedance of CE amplifier.
25.	The hybrid parameters of a transistor used as an amplifier in the CE configuration are $h_{ie} = 800\Omega$ , $h_{fe} = 46$ , $h_{oe} = 80 \times 10^{-6}$ and $h_{re} = 5.4 \times 10^{-4}$ . If $R_L = 5k\Omega$ and $R_s = 500\Omega$ . Find $A_i$ , $R_i$ , $A_v$ , $R_o$ .
26.	Determine the mid-band gain and bandwidth of a CE amplifier shown in the figure. Assume lower cutoff frequency is 100Hz. Let $h_{fe} = \beta = 100$ , $c_{be} = 4pF$ , $c_{bc} = 0.2pF$ and $V_A = \infty$ .

27.	<p>(i) Show the low frequency h-equivalent model of a transistor amplifier operating in CE mode and write why this circuit is not valid for high frequencies.</p> <p>(ii) Define the trans conductance of BJT in the CE mode. How it is related to h parameters.</p>
28.	<p>Demonstrate the mid band analysis of single stage CE, CB and CC amplifiers.</p>
29.	<p>With neat sketch explain two stage cascaded amplifier and derive its overall <math>A_v</math>, <math>A_i</math>, <math>R_i</math> and <math>R_o</math>.</p>
30.	<p>With neat sketch, explain the BJT differential amplifier with active load and derive <math>A_d</math>, <math>A_c</math> and CMRR. How CMRR can be improved?</p>
31.	<p>Develop the equation for differential mode gain and common mode gain of a differential amplifier using BJT. Derive the expression for differential mode gain and common mode gain.</p>
32.	<p>Illustrate the circuit of emitter coupled BJT differential amplifier, and derive expressions for differential gain, common mode gain and CMRR.</p>
33.	<p>The dual input balanced output differential amplifier having <math>R_s=100\Omega</math>, <math>R_C=4.7k\Omega</math>, <math>R_E=6.8k\Omega</math>, <math>h_{fe}=100</math>, <math>V_{cc}=+15V</math>, <math>V_{EE}=-15V</math>. Find operating point values, differential &amp; common mode gain, CMRR and output if <math>V_{s1}=70mV(p-p)</math> at 1kHz and <math>V_{s2}=40mV(p-p)</math>.</p>
34.	<p>Implement Current mirror circuits using BJT.</p>
35.	<p>Draw the circuit of a differential amplifier with current Mirror load. Draw its equivalent circuit and derive an expression for its gain</p>
36.	<p>Define CMRR. Draw the circuit of an Op-amp differential amplifier and give the expression for CMRR.</p>
37.	<p>Derive the expression for current gain, input impedance and voltage gain of a CE Transistor Amplifier</p>
38.	<p>The following figure shows a common emitter amplifier. Determine the input resistance, ac load resistance, voltage gain and output voltage.</p>

39.	In what way VCO is different from other oscillators?
40.	Point out any two application of 555 Timer in Monostable mode.
41.	Define duty cycle in astable multivibrator using IC 555.
42.	If the supply voltage ( $V_{cc}$ ) to 555 timers is 10V, Evaluate the minimum and maximum value of the voltage across the capacitor connected to trigger input, when it is configured in Astable mode.