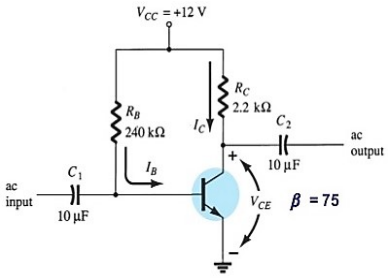
Sample Questions

1) Why collector is made larger than emitter and base?
2) Different between CE, CB, and CC configuration in BJT.
3) Why CE configuration is most popular in amplifier circuits?
4) In the fixed bias circuit of a transistor, V_{CC}= 12 V, R_B= 240 K Ω and R_C= 2.2 K Ω. If β = 50 and V_{BE} = 0.7 V. Determine I_B, I_C, V_{CE}, V_{BC}.
5) What is early effect or base width modulation in BJT?
6) For a BJT, CB current gain is 0.965, I_{CBO}=0.85 μA. This BJT is now connected in CE mode and operated in active region with a base current of 30 μA. Then find the value of collector current.
7) What is the significance of load line and Q-point in BJT? What is the best position of Q point for amplification?
8) Biasing is required for Bipolar Junction Transistor (BJT) amplifier. Justify.
9) The base and collector current are 100 μA, 2.9 mA respectively for BJT in common emitter configuration. Evaluate the value of current gain α and β. Neglect the leakage current for the transistor.
10) Determine the transistor node voltages and current label in the given bias arrangement. Assume the transistor is of Silicon.

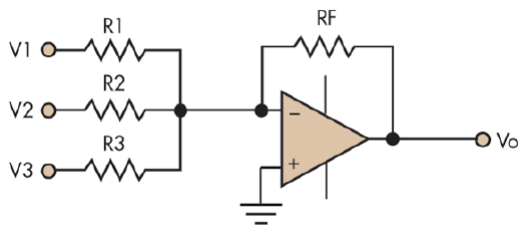
    (i) I_B and I_C (ii) V_{CE}

    (iii) V_B (iv) V_C



11) Draw both the I-V characteristics for NPN transistor in CE configuration. Show different region of operation with proper labeling of V_{CESat}, V_{CEmax}, I_{CEO}, I_{CSat} and dc load line. Discuss about the Q-point and its relevance towards amplifier design.
12) Draw a neat diagram to show the current components for a p-n-p bipolar junction transistor (BJT).
13) Explain the input and output characteristics of a silicon transistor in CB configuration with suitable circuit diagram.
14) If value of β is 150 , find out value of α.
15) Determine the operating point for a silicon transistor biased by base bias method with β=100, R_B = 500 KΩ, R_C = 2.5 KΩ and V_{CC} = 20 V. Also draw the DC load line.
16) For a CE configuration of NPN transistor, if the base current is 80 μA and emitter current is 1.2 mA. Calculate the value of α and β.
17) What is a transistor? Write different types of transistor with symbols.
18) Explain the working of npn and pnp transistor.
19) Explain how transistor acts as an amplifier.

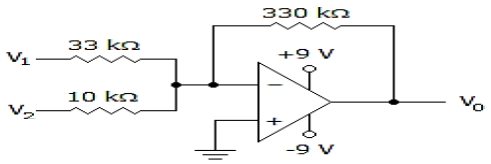
20) Define the terminals of transistor.
21) What are the different types of transistor configuration?
22) Draw and explain common emitter configuration. Also write the expression for output current.
23) Write the relationship between α, β and γ.
24) Draw the input and output characteristics curve of CB configuration.
25) Draw the input and output characteristics curve of CE configuration.
26) What is Faithful amplification?
27) What is biasing? Why we need biasing?
28) State the difference between CB, CE and CC.
29) Explain Fixed biasing with neat diagram.
30) Explain dc load line.
31) What is Q-point? What is the significance of Q-point?
32) The base and collector current are 100 μA, 2.9 mA respectively for BJT in common emitter configuration. Find the value of current gain α and β
33) Si n-p-n transistor with β=100 and ICBO=20μA is connected in CE mode. Find the collector current for a base current of 0.02mA
34) For a BJT, CB current gain is 0.96, I_{CBO}=0.8 μA. This BJT is now connected in CE mode and operated in active region with a base current of 40 μA. Then find the value of collector current.
35) Solve to find I_B, I_C ,V_{CE} and V_C for a fixed bias BJT circuit of a Si transistor, V_{CC} = 10 V, R_B = 100 KΩ and R_C = 2 KΩ and β = 100.
36) Write down any four properties of a practical op-amp.
37) Draw the circuit diagram of integrator and differentiator amplifier using OP-AMP and derive their output voltage expression.
38) A differential dc amplifier has a differential mode gain of 100 and a common mode gain of 0.01. What is its CMRR in dB?
39) For an Op-Amp differential mode gain is 1000 and common mode gain is 10,find CMRR in dB ?
40) Find the output voltage V0 of the following circuit. Given R1=1kΩ, R2=1kΩ, R3=1kΩ, RF=4kΩ, V1=2 V, V2=3 V and V3=5 V. The OPAMP is biased with +12V DC power supply.



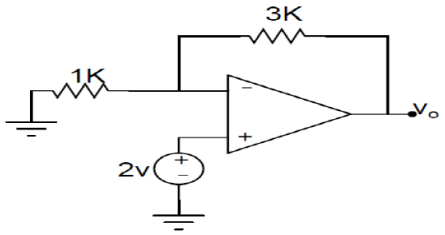
41) Why OPAMP is preferred to be operated as negative feedback configuration?

42) Draw an inverting and non-inverting amplifier configuration using OPAMP and derive its output voltage.

43) Determine the output voltage when V1 = –V2 = 1 V for the given OPAMP configuration.



44) Find the output voltage Vo ?



45) Draw the circuit diagram of Summing and Differential Amplifier using op-amp & derive their output voltage expression.

46) Differentiate between JFET and BJT .

47) Draw and explain the physical structure, drain characteristics and symbolic representation of a n-channel JFET.

48) Draw the physical structure, circuit symbol, drain characteristics and transfer characteristics of a n-channel E-MOSFET. Briefly explain, that how this is different from D-MOSFET?

49) Draw the physical structure, drain characteristics, transfer characteristics and symbol of a n-channel depletion type MOSFET.

50) Find Drain current of a n-channel D-MOSFET. If I_{DSS} = 10 mA & V_p = - 6 V, V_{GS} = - 2 V.

51) What is MOSFET and write down two advantages?

52) Draw the physical structure, drain characteristics, transfer characteristics and circuit symbol of a P-channel D-MOSFET.

53) What is the main difference between depletion and enhancement type MOSFET?

54) Draw the transfer characteristics of an EMOSFET.

55) Write down Shockley's equation for drain current of a FET and interpret all the notations.

56) Why FET is called as Unipolar and Voltage controlled device.

57) Define the parameters (g_m, μ, r_d) of JFET and find the relationship between them.

58) Write down three advantages for which MOSFET is used in VLSI circuits.

59) Name any four factors which make the JFET superior to BJT.

60) Define threshold voltage of EMOSFET.

61) How the pinch-off condition is achieved in JFET?
62) Analyze the CMOS as an inverter. Draw and identify different regions of the output Characteristic of JFET.
63) Design a CMOS inverter circuit and explain its operation.
64) What happens when diode is zero biased, forward biased and reverse biased?
65) Write the diode equation and draw the VI characteristics of diode.
66) Why Si and Ge are commonly used semiconductor.
67) Write the applications of diode.
68) Explain filter circuit. Write different types of filter circuit.
69) Explain center tapped full wave rectifier with its output waveform.
70) Calculate the efficiency of half wave Rectifier and full wave rectifier.
71) What is ripple? Calculate the ripple factor of half wave and full wave rectifier.
72) State the difference between avalanche and zener breakdown.
73) Explain how Zener diode acts as a voltage regulator.
74) Draw the VI characteristics of Zener diode.
75) Calculate the PIV of half wave, centre tapped rectifier.
76) Explain bridge rectifier with its output waveform.
77) Explain the simplified, ideal and equivalent model of diode with its V-I characteristics curve.
78) Explain Semiconductor with its energy band diagram.
79) State the difference between diode and Zener diode.
80) Define doping, diffusion, knee voltage, PIV, and maximum forward current.
81) What is reverse saturation current, drift current, diffusion current.
82) What is effect of adding a capacitor across the load in a rectifier circuit? Explain with diagram.
83) Define static and dynamic resistance of P-N diode.
84) What is the effect of temperature on the conductivity of semiconductor?
85) Write the difference between half wave and centre tap full wave rectifier in terms of efficiency, ripple factor and PIV.
86) A centre tap full wave rectifier uses two diodes with an equivalent forward resistance 50Ω.If the input a.c voltage is 50 sin (200pi t)V and the load resistance of950 Ω.Calculate
    i) Peak, average and r.m.s value of current ii) Efficiency iii) Ripple factor
87) Define modulation? What are the types of analog modulation?
88) What is the need for modulation?
89) What is the difference between amplitude modulation and frequency modulation?
90) Describe the function of core and cladding in optical fiber.

91) What is acceptance angle? Why do we need to know this angle?

92) Why is it necessary to meet the total reflection requirement inside an optical fiber?

93) What is meant by the term critical propagation angle?

94) What are the advantages and disadvantages of fiber optic communications?

95) State Snell's Law.

96) Difference in LED and Laser.