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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Analog Electronic Circuits (18EC0443) **Course & Branch**: B.Tech – CSE

Year & Sem: II-B.Tech & I-Sem **Regulation:** R18

Part – A Questions:

UNIT –I
DIODE CIRCUITS

1. What is depletion region? [L1][CO1][2M]
2. Mention the advantages of Full Wave Rectifier. [L1][CO1][2M]
3. Write down the need for filters in power supplies. [L1][CO1][2M]
4. What are the applications of Zener Diode? [L1][CO1][2M]
5. Classify the types of Diode Clippers. [L1][CO1][2M]
6. What is meant by biasing. how many types of biasings we have ? what are they? [L1][CO1][2M]
7. Compare PN junction diode and zener diode [L1][CO1][2M]
8. draw the pn junction diode VI characteristics [L1][CO1][2M]
9. Draw the zener diode VI characteristics [L1][CO1][2M]
10. how many types of active filters we have? what are they? [L2][CO1][2M]

UNIT –II
BJT CIRCUITS

1. What are the different configurations of BJT? [L1][CO2][2M]
2. Mention the applications of Transistor. [L1][CO2][2M]
3. Define Q Point of BJT. [L1][CO2][2M]
4. What is stability factor? [L1][CO2][2M]
5. Draw the generalized hybrid model for BJT amplifier. [L1][CO2][2M]
6. what is the need of biasing [L1][CO2][2M]
7. write the equation for collector current in CE configuration [L1][CO2][2M]
8. express β in terms of α [L2][CO2][2M]
9. write relationship between α, β, γ [L1][CO2][2M]
10. write the equation for collector current in CB configuration [L1][CO2][2M]

UNIT –III
FET CIRCUITS

1. Why a Field Effect Transistor is called so? [L1][CO3][2M]
2. Mention the advantages of FET? [L1][CO3][2M]
3. Define Pinch off Voltage. [L1][CO3][2M]
4. What is MOSFET? Classify the types of MOSFET. [L1][CO3][2M]
5. Classify the types of FET amplifiers. [L1][CO3][2M]
6. Mention the applications of FET [L1][CO3][2M]
7. Write the Circuit symbol of Enhancement Type p-channel MOSFET [L1][CO3][2M]
8. draw the FET configurations [L1][CO3][2M]
9. compare BJT with FET [L1][CO3][2M]
10. what is ment by pinchoff voltage [L1][CO3][2M]

UNIT-4
OPERATIONAL AMPLIFIER

1. Define an operational amplifier. [L1][CO4][2M]
2. List out the ideal characteristics, and draw the equivalent diagram of an OP-MP [L2][CO4][2M]
3. Define Virtual ground property of an OP-AMP [L1][CO4][2M]
4. Determine the slew rate of the op-amp [L1][CO4][2M]
5. Define the following parameters as applied to an op-amp: [L1][CO4][2M]
   i) Input bias current ii) Input offset current iii) Input offset voltage iv) C.M.R.R
6. Draw the Operational amplifier Internal Circuit [L1][CO4][2M]
7. define thermal Drift [L1][CO4][2M]
8. define Slew rate [L1][CO4][2M]
9. Draw the Operational amplifier as Inverting Amplifier [L1][CO4][2M]
10. Draw the Operational amplifier as non-Inverting Amplifier [L1][CO4][2M]

UNIT –V
APPLICATIONS OF OP-AMP

1. State the important features of an instrumentation amplifier. [L2][CO5][2M]
2. Draw the freq. response of the LPF. [L1][CO5][2M]
3. Draw the circuit of an integrator [L2][CO5][2M]
4. What are the types of ADC and DAC. [L1][CO5][2M]
5. Find the resolution of a 12 bit DAC converter [L3][C**O**5][2M]
6. Draw the Operational amplifier as Scale Changer [L1][CO5][2M]
7. Draw the Operational amplifier as Summing Amplifier [L1][CO5][2M]
8. Draw the Operational amplifier as Subtractor [L1][CO5][2M]
9. Draw the Operational amplifier as R-2R Ladder DAC [L1][CO5][2M]
10. Write ADC/DAC Specifications [L1][CO5][2M]

II. Part – B Questions:

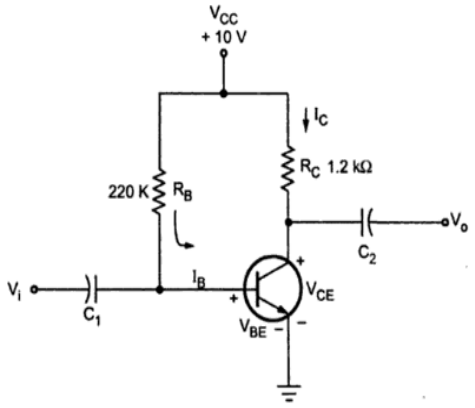
UNIT –I
DIODE CIRCUITS

1. a) What is a PN Junction? Explain the formation of depletion layer in a PN junction. [L2][CO1][6M]
   b) Discuss the applications of a PN Junction Diode. [L2][CO1][4M]
2. With neat diagrams, explain forward and reverse biasing of a PN Junction diode. Draw its V-I Characteristics. [L2][CO1][10M]
3. a) Draw the circuit diagram of half wave rectifier and explain its operation with the help Of waveforms. [L2][CO1][5M]
   b) Derive the expressions for Ripple Factor and Efficiency of Half Wave Rectifier. [L1][CO1][5M]
4. Derive the expressions for Average DC current, Average DC Voltage, RMS Value of Current, DC Power Output and AC Power Input of a Half Wave Rectifier. [L1][CO1][10M]
5. a) Draw the circuit diagram of Full wave rectifier and explain its operation with the help of waveforms. [L2][CO1][5M]
   b) Derive the expressions for Ripple Factor and Efficiency of Full Wave Rectifier. [L1][CO1][5M]
6. Derive the expressions for Average DC current, Average DC Voltage, RMS Value of Current, DC Power Output and AC Power Input of a Full Wave Rectifier. [L1][CO1][10M]
7. A Half wave rectifier has a load of 3.5kΩ. If the diode resistance and the secondary coil Resistance together have resistance of 800Ω and the input voltage of 240V, Calculate (i) Peak, Average and RMS value of the current flowing, (ii) DC power output, (iii) AC Power input and (iv) efficiency of the rectifier. [L4][CO1][10M]
8. a) With neat diagram, describe Bridge Rectifier. [L2][CO1][5M]
   b) Compare the different types of rectifier circuits. [L4][CO1][5M]
9. a) Explain the working of capacitor filter with circuit diagram. [L1][CO1][5M]
   b) Calculate the ripple factor of a LC filter with FWR for a inductance of 10H and capacitance of 8μF for 50Hz AC input supply. Draw the neat circuit diagram. [L4][CO1][5M]
10. a) Discuss the working of inductor filter with circuit diagram. [L1][CO1][5M]
    b) Calculate the ripple factor for a π type filter, employing 10H choke and two equal capacitors 16μF each and fed from a full wave rectifier and 50Hz mains. The load resistance is 4KΩ. Draw the neat circuit diagram. [L4][CO1][5M]
11. a) Draw and discuss the VI characteristics of a Zener Diode. [L2][CO1][5M]
    b) Write notes on Diode Clippers and Clampers with diagram. [L1][CO1][5M]

UNIT –II
BJT CIRCUITS

II. Part – B Questions:

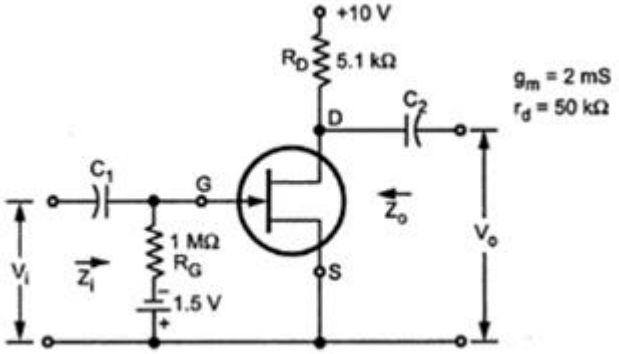
1. a) Discuss the operation of NPN transistor with diagram. [L2][CO2][5M]
   b) If the base current in a transistor is 20μA when the emitter current is 6.4mA, what are the values of α and β? Also calculate the collector current. [L3][CO2][5M]
2. a) What is early effect of a BJT? [L1][CO2][2M]
   b) With neat diagram, explain the Input and Output characteristics of a BJT in CB Configuration. [L2][CO2][8M]
3. Discuss the Input and Output characteristics of a BJT in CE Configuration. Indicate the regions of operations in the output characteristics. [L2][CO2][10M]
4. a) Describe the Input and Output characteristics of a BJT in CC Configuration. Indicate the regions of operations in the output characteristics. [L2][CO2][8M]
   b) Mention the advantages of Common Emitter amplifier. [L1][CO2][2M]
5. a) Define Transistor Biasing and explain the need for Biasing? [L1][CO2][5M]
   b) Explain the concept of Load line and Q-point in BJT. [L2][CO2][5M]
6. a) Mention different types of Biasing a Transistor and explain the Fixed Bias of a Transistor [L2][CO2][5M]
   b) Describe Collector to Base bias of a Transistor with neat circuit diagram [L2][CO2][5M]
7. With neat diagram, discuss Voltage Divider bias of BJT and derive the expression for Its stability factor. [L3][CO2][10M]
8. a) For the circuit shown in the Figure, calculate I_B, I_C, V_{CE}, V_B , V_C and V_{BC}. Assume that $V_{BE} = 0$ and $\beta = 50$. [L3][CO2][5M]



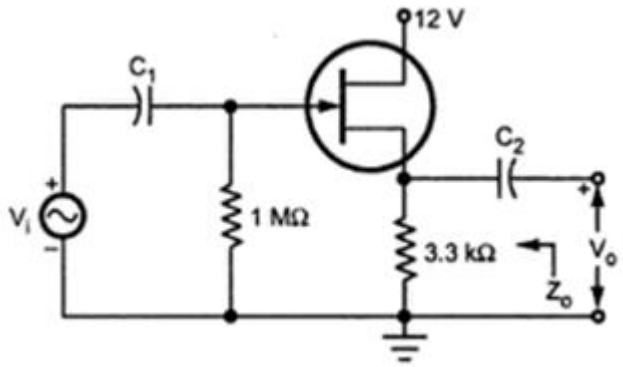
   b) Compare CB, CE and CC configurations of BJT. [L4][CO2][5M]
9. a) Derive the expression for Stability Factor S of a Fixed Bias Circuit. [L3][CO2][5M]
   b) Derive the expression for Stability Factor S of a Collector to Base Bias Circuit. [L3][CO2][5M]
10. a) Why hybrid model is used for the analysis of BJT amplifier at low frequencies? Draw the hybrid model for CE transistor and derive the parameters. [L2][CO2][5M]
    b) Discuss the applications of CB, CE and CC amplifiers. [L2][CO2][5M]

UNIT –III
FET CIRCUITS

1. a) Describe the construction and working principle of N-channel JFET. [L2][CO3][8M]
   b) Mention the applications of JFET. [L1][CO3][2M]
2. a) Define the JFET Volt-Ampere Characteristics and determine FET parameters. [L1][CO3][5M]
   b) Compare the performance of BJT with FET. [L3][CO3][5M]
3. Draw the circuit diagram for Common Source configuration of n channel JFET and discuss the Drain and Transfer Characteristics. [L2][CO3][10M]
4. a) With the help of neat diagram, explain the operation and characteristics of n-channel enhancement type MOSFET. [L2][CO3][8M]
   b) Mention the differences between depletion and enhancement MOSFET. [L3][CO3][2M]
5. Discuss the operation and characteristics of n-channel depletion type MOSFET with diagram. [L2][CO3][10M]
6. a) Draw and explain the small signal model of FET at low frequency. [L1][CO3][4M]
   b) For the circuit shown in Fig. determine input impedance, output impedance and voltage gain. [L4][CO3][6M]



7. Derive input impedance, output impedance and voltage gain of JFET Common Drain amplifier with neat diagram. [L2][CO3][10M]
8. a) Discuss JFET Fixed Bias with neat diagram and derive the expression for Input impedance, Output impedance and Voltage gain. [L3][CO3][8M]
   b) Compare n channel JFET with p channel JFET. [L3][CO3][2M]
9. a) Draw the circuit diagram of JFET Common Source amplifier with voltage divider bias for bypassed R_s and determine the expression for input impedance, output impedance and voltage gain. [L2][CO3][5M]
   b) For Common Drain Amplifier as shown in the Figure, g_m = 2.5mS, r_d = 25KΩ. Calculate Input impedance, Output impedance and Voltage gain. [L4][CO3][5M]



10. a) With diagram explain Common Gate Amplifier of JFET. [L1][CO3][**5**M]
    b) Compare CG, CS and CD configurations of JFET. [L4][CO3][5M]

UNIT-4
OPERATIONAL AMPLIFIER

1. a) Draw the various functional blocks of an operational amplifier IC. Explain each block. [L1][C4][5M]
   b). Draw the equivalent circuit diagram of Op amp and derive the expression for gain of inverting amplifier. [L1][C4][5M]
2. a). What is level translator? Explain the necessity of level translator stage in cascading differential amplifiers. [L1][C4][5M]
   b). Compare different configurations of differential amplifier. [L2][C4][5M]
3. a) Discuss the electrical characteristics of an OP-AMP in detail. [L2][C4][5M]
   b). Explain the term slew rate and write the importance in op-amp circuits? [L2][C4][5M]
4. a)What are the four different configuration of differential amplifier? [L1][C4][5M]
   b). Compare and contrast ideal and practical op-amp? [L2][C4][5M]
5. a).The op-amp non-inverting amplifier and derive the voltage gain? [L2][C4][5M]
   b). Explain ac characteristics of op-amp? [L1][C4][5M]
6. a)Explain dc characteristics of op-amp ? [L1][C4][5M]
   b) Define the terms cmrr, common mode gain, differential mode gain, slew rate [L1][C4][5M]
7. a) List out the ideal characteristics of an operational amplifier. [L1][C4][5M]
   b) An op-amp has a slew rate of 2V/μs. What is the maximum frequency of an output sinusoid of peak value 5V at which the distortion sets in due to the slew rate limitation [L3][C4][5M]
8. a) what is voltage follower? What are its features and applications? [L1][C4][5M]
   b) Explain briefly i)virtual ground concept b)current mirror circuit [L1][C4][5M]
9. a) draw and explain frequency response of practical op-amp [L1][C4][5M]
   b) Define the terms drift, offset voltage, psrr, offset current [L1][C4][5M]
10. a) what is frequency compensation and explain how the frequency response is varied with respect to Compensation network [L2][C4][5M]
    b) Design an inverting amplifier with gain A= 10 [L3][C4][5M]

UNIT –V
APPLICATIONS OF OP-AMP

1. a). Derive the expression for 3 input summing amplifier with circuit diagram? [L3][C5][5M]
   b).Write the design steps of the first order low pass filter and draw its circuit. [L2][C5][5M]
2. a) Draw the circuit of a difference amplifier with one op-amp and derive the expression for voltage gain. [L1][C5][5M]
   b) Draw a neat circuit of an integrator circuit. Explain the functioning with the input-output waveforms [L1][C5][5M]
3. a) Draw the circuit diagram of the instrumentation amplifier and derive the gain? [L2][C5][5M]
   b) Design and explain the operation of inverting summing amplifier. [L3][C5][5M]
4. explain different types of ADC and DAC [L1][C5][10M]
5. a). Draw a neat circuit of an differentiator circuit. Explain the functioning with the input-output Wave forms [L1][C5][5M]
   b) What is regulator and explain IC 723 [L1][C5][5M]

6. a). Draw and explain successive approximation type ADC? [L1][C5][5M]
   b).The basic step of a 9 bit DAC is 10.3 mV. If "000000000" represents 0 V. What output is Produced if the input is "101101111"? [L3][C5][5M]

7. a). Draw and explain the weighted resistor DAC [L1][C5][5M]
   b). An 8-bit Analog to Digital converter has a supply voltage of +12 volts. Calculate: [L3][C5][5M]
   (i) The voltage step size for LSB.
   (ii) The value of analog input voltage for a digital output of 01001011.
8. a) Explain about flash type ADC? [L1][C5][5M]
   b) Discuss the parameters specifications of ADC? [L2][C5][5M]
9. Draw the circuit diagram of Dual Slope ADC and explain its working with neatsketches [L1][C5][10M]
10. a) Draw and explain in detail about R-2R DAC [L1][C5][5M]
    b) Explain about counter type ADC [L1][C5][5M]

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