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Sr. No. 007302

December 2023

B.Tech (EY) B.Tech - III-SEMESTER  
Analog Electronics Circuits (ELPC-302)

Time: 3 Hours

Max. Marks:75

- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
  2. Answer any four questions from Part -B in detail.
  3. Different sub-parts of a question are to be attempted adjacent to each other.
  4. Any other specific instructions

PART-A

- Q1 (a) What do you understand by transistor biasing? (1.5)  
(b) What is negative feedback? (1.5)  
(c) What is an Oscillator circuit? (1.5)  
(d) Three R-C sections are used in R-C phase shift oscillators, why? (1.5)  
(e) Define Cascade amplifier. (1.5)  
(f) Write the equation for collector current in CB configuration. (1.5)  
(g) Compare BJT with FET. (1.5)  
(h) Define Virtual ground property of an OP-AMP? (1.5)  
(i) Draw the Operational amplifier as non-Inverting Amplifier. (1.5)  
(j) Draw the freq. response of the LPF. (1.5)

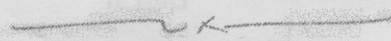
PART-B

- Q2 (a) Draw and explain the working principle of positive clamper with positive and negative biasing. (7)  
(b) Discuss the advantages and disadvantages of direct coupling in multi-stage amplifiers. (8)
- Q3 (a) Half wave rectifier has a load of  $3.5k\Omega$ . If the diode resistance and the secondary coil Resistance together have resistance of  $800\Omega$  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. (8)  
(b) Analysis single-stage transistor amplifier using circuit diagram. Also give its D.C. and A.C. equivalent circuits? (7)
- Q4 (a) Why hybrid model is used for the analysis of BJT amplifier at low frequencies? (7)  
Draw the hybrid model for CE transistor and derive the parameters.  
(b) Draw the equivalent circuit diagram of Op amp and derive the expression for gain of inverting amplifier. (8)
- Q5 (a) Draw the circuit of a differential amplifier with one op-amp and derive the expression for voltage gain. (7)  
(b) Define an active filter and explain the role of op-amps in filter circuits. (8)  
Discuss the advantages of active filters over passive filters.

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- Q6 (a) Describe the operating regions of a MOSFET when used as a switch. How does it transition between these regions? (8)
- (b) Explain the working principle of a monostable multivibrator. (7)
  
- Q7 (a) Discuss the small-signal model of a MOSFET amplifier. How does it simplify the analysis of amplification circuits? (7)
- (b) What are the key components and circuit configurations used in the generation of square waves? (8)



- (1.2) (a) What do you understand by feedback?
- (1.2) (b) What is negative feedback?
- (1.2) (c) What is an oscillator circuit?
- (1.2) (d) Three R-C sections are used in R-C phase shift oscillator. Why?
- (1.2) (e) Define Cascode amplifier.
- (1.2) (f) Write the equation for collector current in CB configuration.
- (1.2) (g) Compare BJT with FET.
- (1.2) (h) Define Virtual ground property of an OP-AMP.
- (1.2) (i) Draw the Operational amplifier as non-inverting Amplifier.
- (1.2) (j) Draw the frequency response of the FET.

PART B

- Q3 (a) Draw and explain the working principle of positive clamper with positive and negative biasing. (7)
- (b) Discuss the advantages and disadvantages of direct coupling in multi-stage amplifiers. (8)
  
- Q4 (a) Half wave rectifier has a load of 1.5k $\Omega$ . If the diode resistance and the secondary coil resistance together have resistance of 800 $\Omega$  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. (7)
- (b) Analyse single-stage transistor amplifier using circuit diagram. Also give its D.C. and A.C. equivalent circuit. (7)
  
- Q4 (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. (7)
- (b) Draw the equivalent circuit diagram of Op-amp and derive the expression for gain of inverting amplifier. (8)
  
- Q5 (a) Draw the circuit of a differential amplifier with one op-amp and derive the expression for voltage gain. (7)
- (b) Define an active filter and explain the role of op-amp in filter circuits. Discuss the advantages of active filters over passive filters. (8)

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