

[This question paper contains 5 printed pages.]

6002

Your Roll No.

B.Sc. (H) ELECTRONICS / III Sem. B

Paper – ELHT-302

Analog Electronics – I

(Admissions of 2010 and onwards)

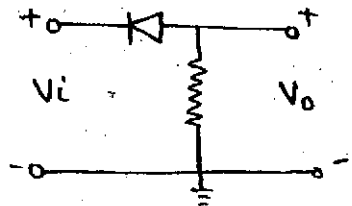
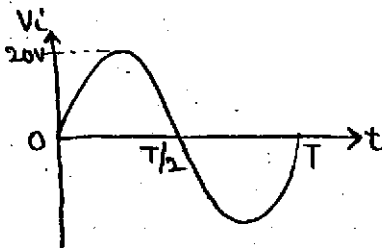
Time : 3 Hours

Maximum Marks : 75

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt Five questions in all
including Q. No. 1 which is compulsory.
Scientific calculator is allowed.*

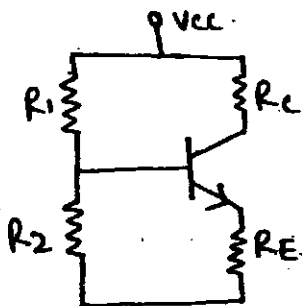
1. (a) (i) Sketch the output V_o and find the DC level of the output for the network given below.
- (ii) Find the dc level of the output if an ideal diode is replaced by a Si diode.
- (iii) Also find the dc level of the output if V_m is increased to 200V.



P.T.O.

- (b) Explain the effect of change in β on the characteristics curves of BJT.
- (c) Calculate the Efficiency of Class A Power Amplifier with resistive load.
- (d) How is phase shift introduced in Phase-Shift Oscillator. Why minimum 3 RC combinations are required for the same.
- (e) Prove that Negative feedback in amplifiers increases the Bandwidth. (5×3)
2. (a) Derive an expression for the Ripple Factor for a Full Wave Rectifier.
- (b) A 220V, 50 Hz ac is applied to the primary of 5:1 step up transformer with centre tapped secondary. This rectifier has a resistive load of $1K\Omega$. Calculate
- (i) DC power to the load
 - (ii) Power Rating of Secondary
 - (iii) Ripple factor
 - (iv) PIV across each diode
- (c) With the help of a circuit diagram, describe the operation of Positive Clamper.
- (d) Give a block diagram of DC Power Supply. (6+4+3+2)

3. (a) What do you understand by Biasing? Explain how a Self Bias circuit would establish a stable Q point.
- (b) The operating point is selected such that $I_C = 5 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $R_C = 2 \text{ k}\Omega$ and $V_{CC} = 20 \text{ V}$. Find R_1 , R_2 and R_E . Current through R_1 is 10 times the Base Current. Take $\beta = 50$ & $V_{BE} = 0.7 \text{ V}$. (9+6)

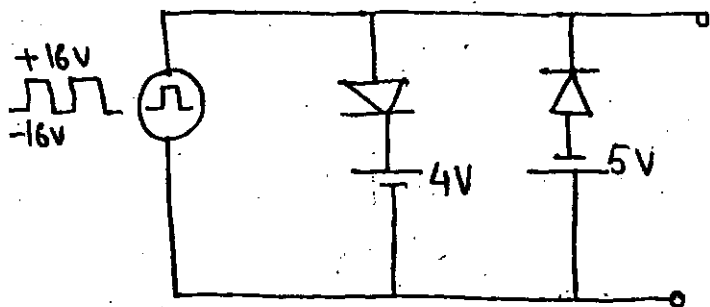


4. (a) Draw a circuit for Class B Push Pull Amplifier and show that all the even harmonics get cancelled.
- (b) A Class B Push Pull amplifier uses $V_{CC} = 25 \text{ V}$, $R_L = 8 \Omega$. If peak output voltage is 16 V , what is the power drawn from the source.
- (c) Draw the h-parameter equivalent circuit for RC coupled amplifier. Calculate its lower cut-off frequency by taking the coupling capacitor into consideration and all other capacitors as short circuited. (6+3+6)

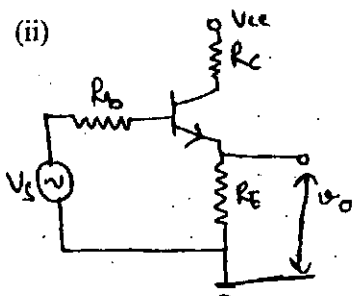
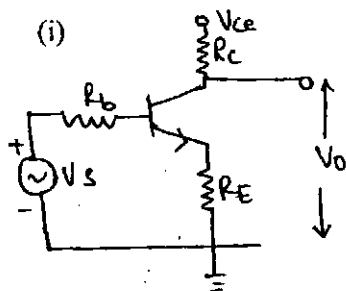
5. (a) What are advantages of NEGATIVE feedback? Calculate the change in input and output impedance for a Current Series feedback circuit.
- (b) Design a capacitor filter (full wave) that meets the following specifications, $V_{dc} = 20V$, $I_{dc} = 100 \text{ mA}$, ripple factor = 0.01. Use $f = 60 \text{ Hz}$.
- (c) Draw the output for the following ckt.

Take $V_T = 0.7V$

(8+3+4)



6. (a) Derive an expression for the frequency of oscillation for a Colpitt Oscillator.
- (b) Identify the type of feedback and calculate the value of β for the given circuits



(9+6)

7. (a) Explain the IV characteristics of N-channel enhancement mode MOSFET and indicate the 3 distinct regions of operation.
- (b) An enhancement type N-MOS transistor with $V_T = 0.7\text{V}$ conducts a current $i_D = 100\ \mu\text{A}$ when $V_{GS} = V_{DS} = 1.2\text{V}$. Find the value of i_D for $V_{GS} = 1.5\text{V}$ and $V_{DS} = 3\text{V}$. Also, calculate the value of the drain-to-source resistance r_{DS} for small V_{DS} and $V_{GS} = 3.2\text{V}$.
- (c) Draw the circuit diagram of a CS MOSFET Amplifier and analyse it to find the voltage gain. (5+3+7)