

22329

23124

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following :

10

- (a) State the reason for flat frequency response in mid frequency range of single stage common emitter amplifier.
- (b) Define the term related to power amplifier :
 - (i) Efficiency
 - (ii) Voltage gain
- (c) List the advantages of negative feedback over positive feedback (any two).
- (d) Define : (i) Sweep time (ii) Retrace time
with respect to waveform generator circuit.
- (e) List different types of feedback connections used in feedback amplifiers.
- (f) State the necessity of regulated power supply.
- (g) State the applications of transformer coupled amplifier.

2. Attempt any THREE of the following :

12

- (a) State the classification of amplifiers on the basis of
 - (i) I/P applied
 - (ii) Frequency range
 - (iii) Number of stages
 - (iv) Type of coupling



- (b) Identify the feedback topology used in figure 01. Also draw the block diagram of the same topology.

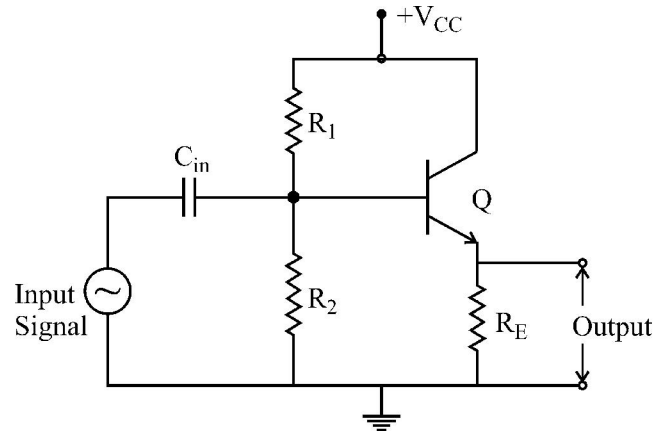


Figure – 01

- (c) Draw the block diagram and explain the working principle of SMPS.
 (d) State the Barkhausen criterion for the generation of sustained oscillations. A RC phase shift oscillator uses 5PF capacitors. Find the value of R to produce a frequency of 800 KHz.

3. Attempt any THREE of the following :

12

- (a) Compare Class A, Class B, Class C and Class AB power amplifiers on the basis of :
 (i) Angle of Conduction (ii) Efficiency
 (iii) Distortion (iv) Position of operating point
- (b) Draw the circuit diagram of complementary symmetry push pull amplifier and explain its working.
- (c) Describe Miller sweep generator circuit with neat input and output waveforms.
- (d) For the regulator shown in figure 02, calculate the value of output voltage, if $R_1 = 500 \Omega$ and $R_2 = 3.5 \text{ K}\Omega$. Assume input voltage applied ranges from 13 V to 40 V, Calculate the value of R_2 if output voltage required is 15 V for the same value of R_1 and input voltage.

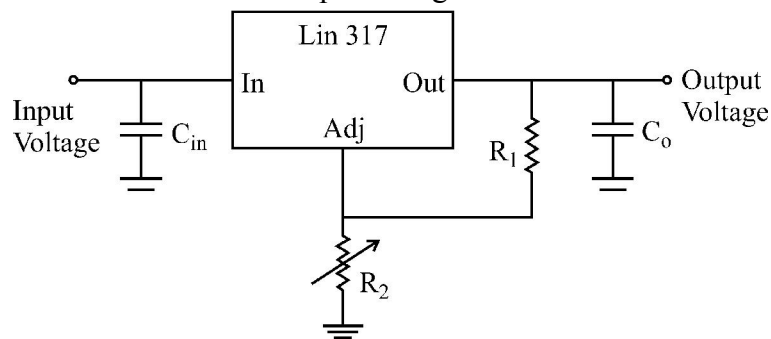


Figure – 02

4. Attempt any THREE of the following :

12

- (a) Describe the working of single stage class A power amplifier with neat circuit diagram.
- (b) Compare RC coupled, transformer coupled, direct coupled amplifiers on the basis of :
- | | |
|----------------------|-------------------------|
| (i) Type of coupling | (ii) Frequency response |
| (iii) Gain | (iv) Application |
- (c) Describe the effect of negative feedback on current shunt feedback amplifier with respect to following parameters :
- | | |
|------------------------|------------------------|
| (i) Gain | (ii) Bandwidth |
| (iii) Input resistance | (iv) Output resistance |
- (d) Explain the working principle of crystal oscillator with neat circuit diagram.
- (e) Draw the functional block diagram of IC 723. Explain the functions of voltage reference amplifier, error amplifier, frequency compensator and series pass transistor.

5. Attempt any TWO of the following :

12

- (a) In an amplifier, the input is applied and output is obtained as shown in figure 03. The output obtained is having some sort of distortions. Identify the amplifier and distortions observed at output of the amplifier. State the methods to overcome such distortions.

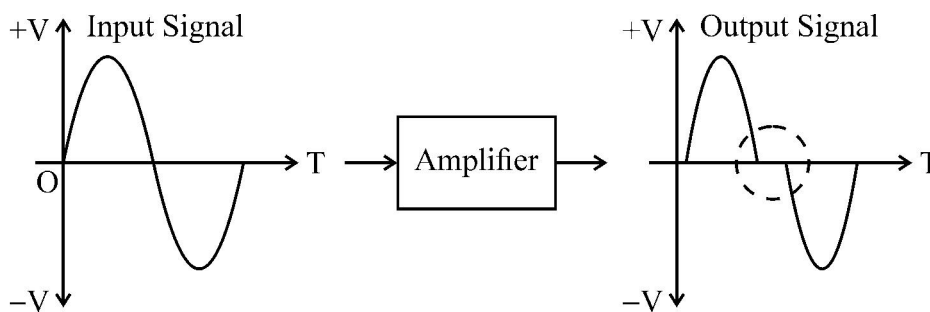


Figure – 03

- (b) Explain with neat circuit diagram the bootstrap sweep generator. State which capacitor will act as bootstrapping capacitor.
- (c) Sketch the circuit diagram of common source FET amplifier and explain its working principle. State any two applications.

6. Attempt any TWO of the following :

12

- (a) Identify the circuit shown in figure 04. Calculate the resonant frequency of given amplifier, if inductor $L = 10 \text{ mH}$ and capacitor $c = 4.7 \mu\text{f}$ of tank circuit.

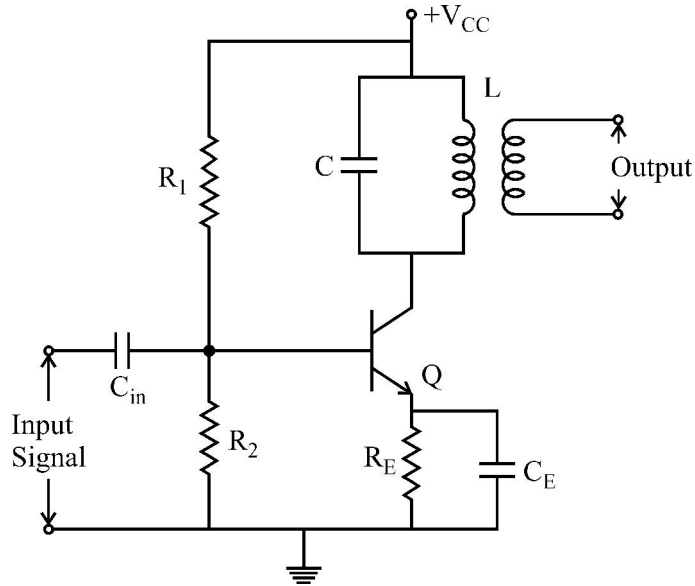


Figure – 04

- (b) When negative voltage feedback is applied to an amplifier of gain 100, the overall gain falls to 50.
- Calculate the fraction of the output voltage feedback.
 - If this fraction is maintained, calculate the value of the amplifier gain required if the overall stage gain is to be 75.
- (c) Compare small signal and large signal amplifier (any six points).