

22329

22232

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.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) Draw circuit diagram of single stage Common Source FET amplifier.
- (b) State the ideal values of maximum efficiency of class A and class B power amplifiers.
- (c) Define the following terms with one example of each :
  - (i) Positive feedback
  - (ii) Negative feedback
- (d) State Barkhausen criteria for sustained oscillations.
- (e) State the advantages of negative feedback.
- (f) Identify the output voltage which can be obtained from following regulator ICs :
  - (i) 7805
  - (ii) 7915
- (g) State the need of tuned amplifier.



**2. Attempt any THREE of the following :****12**

- (a) Describe the effect of coupling and bypass capacitors and transistor internal capacitance on frequency response of single stage CE amplifier.
- (b) State the effect of negative feedback on following performance parameters of current shunt feedback amplifier :
  - (i) Gain
  - (ii) Input resistance
  - (iii) Output resistance
  - (iv) Bandwidth
- (c) Draw the block diagram of SMPS and explain each block in brief.
- (d) Draw circuit diagram of RC phase shift oscillator using BJT. Also a phase shift oscillator has  $R = 6 \text{ k}\Omega$ ,  $C = 1500 \text{ PF}$ . Calculate frequency of sine wave generated by oscillator.

**3. Attempt any THREE of the following :****12**

- (a) Draw circuit diagram of Class A push pull amplifier and explain its operation.
- (b) Compare class A, class B, class AB and class C power amplifiers on the basis of :
  - (i) Position of Q point
  - (ii) Conduction angle
  - (iii) Efficiency
  - (iv) Application
- (c) The ac equivalent circuit of crystal has  $L = 1\text{H}$ ,  $C = 0.01 \text{ PF}$ ,  $R = 1 \text{ k}\Omega$ , mounting capacitance  $C_M = 20 \text{ PF}$ .  
Determine series resonance and parallel resonance frequencies.
- (d) Draw and explain the working of low voltage, low current generation (Basic low voltage regulator) using IC723.

## 4. Attempt any THREE of the following :

12

- (a) Describe cross-over distortion. Determine methods to eliminate cross-over distortion.
- (b) Compare RC coupled, transformer coupled and direct coupled amplifiers.
- (c) Convert the following amplifier into voltage series and voltage shunt feedback amplifier topology.

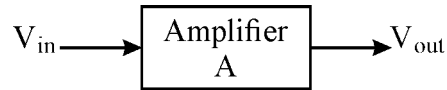


Fig. (a)

- (d) Draw and explain Miller sweep generator circuit.
- (e) Draw circuit diagram of DC regulated dual power supply for  $\pm 12V$  output using suitable regulator ICs.

## 5. Attempt any TWO of the following :

12

- (a) Explain the working of Bootstrap time base generator with circuit diagram and input output waveforms.
- (b) Calculate the collector efficiency and overall efficiency of a class-A, CE amplifier circuit shown in fig. (b) with following parameters :

$$(V_{ce})_Q = 10V, (I_c)_Q = 500 \text{ mA}, (I_{out})_{Peak} = \pm 250 \text{ mA}$$

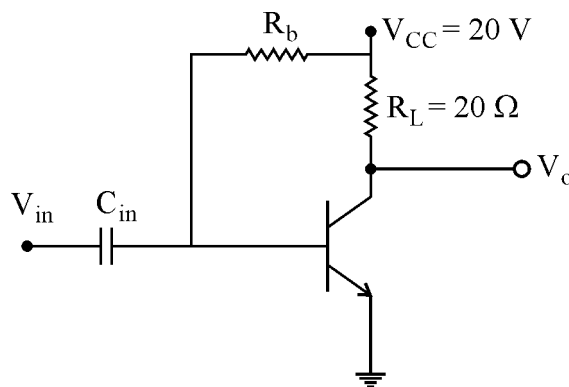


Fig. (b)

- (c) Describe the operation of double tuned amplifier with neat circuit diagram, frequency response, bandwidth. Give its advantages and disadvantages.

P.T.O.

## 6. Attempt any TWO of the following :

12

- (a) Derive an expression for overall voltage gain of two stage cascaded amplifier. Draw circuit diagram of two stage RC coupled amplifier. Overall voltage gain of two stage amplifier is 100. If gain of individual stages is identical. Find the gain of individual stages.
- (b) Identify the feedback topology of circuit show in Fig. (c). Also state the effect of stated feedback on following performance parameters of given circuit :
- (i) Input resistance (ii) Output resistance (iii) Bandwidth and (iv) Gain

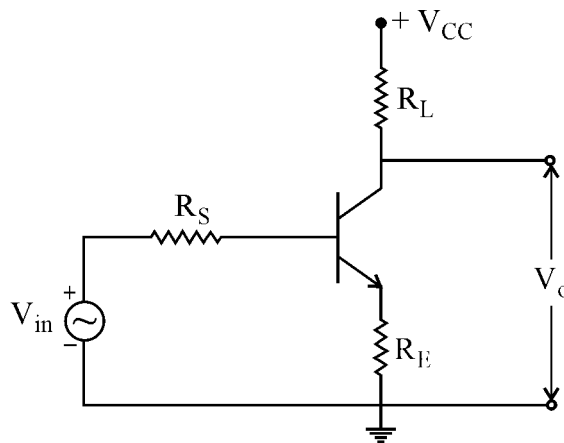


Fig. (c)

- (c) Draw and explain the working of class B push pull amplifier. Also state its advantages and disadvantages.
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