4058

Electronic Circuits & Applications
(1080)

P. Pages : 3

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. From each question attempt **any two** sub questions (a, b, c)
5. Only non-programmable calculator is allowed.
6. Figures to the right indicate full marks.
7. Assume suitable data if required.

UNIT – I

1. a) Draw and explain parallel clipper with positive clipping using reference voltage VR with transfer characteristics.   **10**

    b) Draw and explain differential amplifier using FET. Also give it's D.C. analysis.   **10**

    c) Fig. 1 shows the differential amplifier, find when $V_{S_1} = 40\,mv(p-p)$, $V_{S_2} = 20\,mv(p-p)$.   **10**

       i) Quiescent point value for transistor

       ii) R in and Ro

       iii) The voltage gain.

       iv) Output voltage

       v) The maximum output voltage without clipping Let $hfe = 100$, $V_{BE} = 0.7\,v$ and $hfe = 2.2k\Omega$
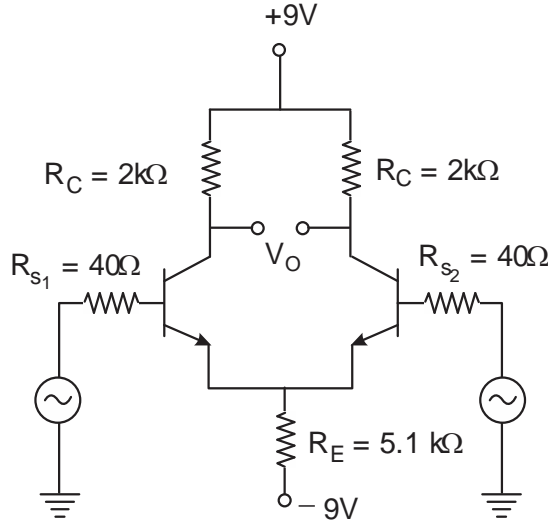
Fig. 1

UNIT - II

2. a) Derive the expression for CE short circuit current gain using Hybrid-π model. Define f_B and f_T, derive them also. **10**

b) A single tuned RF amplifier having transistor with o/p resistance of 40 kΩ, output capacitance of 20 pf and input resistance of next stage is 15 kΩ. The tuned circuit consists of 40 pf capacitance in parallel with series of 2 μH inductance and 3Ω resistance. calculate, **10**
   i)   Resonance frequency
   ii) Effective quality factor.
   iii) B.W. of circuit.

c) Write short notes. **10**
   i)   Double Tuned   ii) Staggered tuned

UNIT – III

3. a) Give expression for d.c. power input, A.C. power output, efficiency, maximum efficiency and power dissipation of series fed directly coupled class-A amplifier. **10**

b) A class B push-pull amplifier supplies power to resistive load or 10Ω. The output transformer has the turn ratio of 6:2 and efficiency of 75%. Assume hfe = 25 and $V_{CC} = 30V$, calculate, **10**
   i)   Maximum power output.
   ii) Maximum base and collector current for each transistor.
   iii) Maximum power dissipation in each transistor.

c) What is cross-over distortion ? Explain complementary symmetry class-B Amplifier to over come this type of distortion in details. **10**

UNIT - IV

4. a) Identify the topology for circuit shown in fig. 2. Calculate A_{V_f}. **10**

Transistors are identical and their parameter are
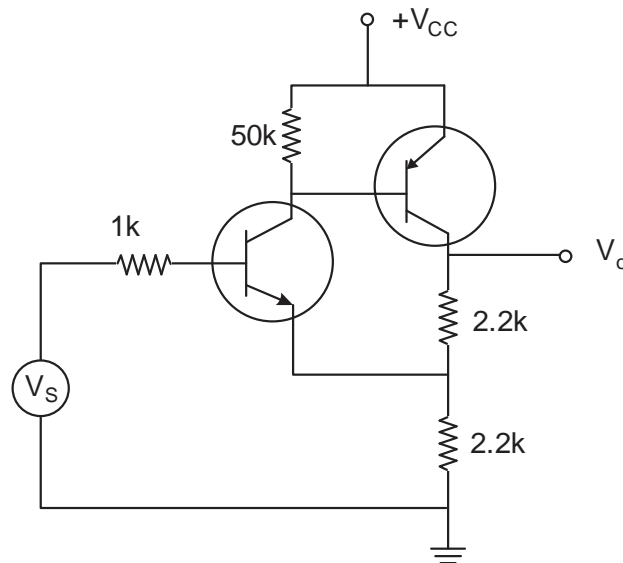hie = 1k, hfe = 50, hre = hoe = 0

Fig. 2

b) Draw a Colpitt oscillator circuit, explain it's operation and derive the expression for its frequency. **10**

c) Calculate the range over which the capacitor of transistorised Hartley oscillator having two inductance of 3mH and 30μH and frequency changed from 1000 kHz to 2100 kHz. **10**

UNIT – V

5. a) Design adjustable regulator using LM317 which will satisfy the requirement as output voltage 5 to 12V and 1A current. **10**

b) Derive the expression for the output voltage and explain how it can be varied for the feedback type series regulator. **10**

c) Draw and explain SMPS with output waveform. List the important specification of UPS. **10**

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