## FACULTY OF ENGINEERING

## B.E. II/IV Year (ECE) II Semester (Main) Examination, May/JUNE 2011

 ANALOG ELECTRONIC CIRCUITSTime : 3 Hours]
[Max. Marks : 75

> Answer all questions from Part $A$. Answer any five questions from Part $B$.
> Part $\mathbf{A}-($ Marks : $10 \times 2.5=25)$

1. Draw waveforms for class $-\mathrm{A}, \mathrm{AB}, \mathrm{B}$ AND C amplifiers.
2. Draw a current-series feedback circuit using FET.
3. Why mismatching techniques are used in RF amplifiers.

4. Draw a circuit diagram of a crystal oscillator. ..... 2
5. Define the Inter modulation frequencies and mention their significance. ..... 3
6. Why electrolytic capacitors are used as emitter or source bypass capacitors? ..... 3
7. Why feedback is employed in amplifiers? ..... 2
8. Two cascaded RC network couldbe used in a phase - shift oscillator, if yes or no explain. ..... 3
9. Show that $6 \mathrm{ndB} / \equiv$ octave $\equiv 20 \mathrm{NdB} /$ decode. ..... 2
10. Explain Gain Margin with the help of Bode-plots. ..... 3
Part B - (Marks : 50)11. Find: (a) the voltage gain with feed back $A_{v s f}$ taking load and source resistancesinto account (b) $\mathrm{R}_{\mathrm{if}}$ and (c) $\mathrm{R}_{\text {of }}$ for the Emitter - follower amplifier circuit, using CEtransistor hybrid model.10
11. Show that for class - B tuned amplifier
(i) The maximum power dissipation is $40 \%$ of the maximum available poweroutput.10
(ii) $\mathrm{P}_{\mathrm{D} \max }=\left(\frac{4}{\pi^{2}}\right) \mathrm{Po}_{\max }=0.4 \mathrm{Po}_{\text {max }}$
(iii) $\% \eta=78.5 \%$
12. Derive the expression for conversion efficiency for series -fed and transformer coupled power amplifier circuits.
13. Explain the class -D amplifier with a neat diagram and show that $\mathrm{F}=\frac{r_{s 1}}{0.4 R_{L}}$
14. Draw a flartley oscillator with an RFC using BJT obtain the expressions for the condition and frequency of oscillations.
15. If $\mathrm{R}_{1}=25 \mathrm{k} \Omega, \mathrm{R}_{2}=60 \mathrm{~K} \Omega, \mathrm{R}_{\mathrm{c}}=40 \mathrm{~K} \Omega, \mathrm{R}=7.1 \mathrm{k} \Omega$ and $\mathrm{h}_{\mathrm{ie}}=1.8 \mathrm{k} \Omega$. Obtain the values of C and $\mathrm{h}_{\mathrm{fe}}$ for a working frequency of 10 KHz for an RC phase shift oscillator using a BJT.
16. For the circuit shown below is a TC (class-A) amplifier, for the specified circuit components values result in a dc base current $I_{B}=6 \mathrm{~mA}$ and the input signal $\left(\mathrm{V}_{\mathrm{i}}\right)$ results in a peak base current saving $I_{b \text { peak }}=4 \mathrm{MA}$.

$\mathrm{I}_{\mathrm{b} \text { peak }}=4 \mathrm{~mA}$ due to Vi
Assume $=\mathrm{V}_{\mathrm{CEQ}}=10 \mathrm{v}$ and $\mathrm{I}_{\mathrm{CEQ}}=140 \mathrm{~mA}\left(\right.$ for $\left.\mathrm{I}_{\mathrm{B}}-6 \mathrm{~mA}\right)$
$\mathrm{V}_{\mathrm{CE} \text { min }}=1.7 \mathrm{~V} ; \mathrm{I}_{\mathrm{C} \text { min }}=25 \mathrm{~mA}$
$\mathrm{V}_{\mathrm{CE} \text { max }}=18.3 \mathrm{~V} ; \mathrm{I}_{\mathrm{C} \text { mac }}=255 \mathrm{~mA}$
Calculate: (i) effective ac load reflected at the primary side $\left(\mathrm{R}_{\mathrm{L}}{ }^{1}\right)$
(ii) $\mathrm{I}_{\mathrm{C}}$ for $\mathrm{R}_{\mathrm{L}}{ }^{1}$
(iii) a c power delivered to the load.
(iv) dc input power and power dissipated by transistor.
(v) efficiency of the amplifier for the input signal.
