S.E. Sem 4

Dec. PR 126 EXTC. Electronics -II 10/12/08

Con. 5358-08. **RC-6164.**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions from remaining.
(3) Assume **suitable** additional data wherever **necessary**.

1. Design the two stage R-C coupled CS amplifier to meet the following specifications. **20**

$|A_V| \geq 100$. $F_L \leq 20$ Hz $V_O = 4$ V. $I_{DSQ} = 1{\cdot}2$ mA

Assume $g_{mo} = 5000\ \mu H$ $I_{DSS} = 7$ mA $r_d = 50\ K\Omega$.

$V_p = 4V$.

Assume suitable V_{DD}

2. (a) Design a large signal transformer coupled class A power amplifier to provide 10W output to the 4 Ω load. **10**
(b) Explain working and analyze class B power amplifier. **10**

3. (a) Draw the circuit diagram using op-amps to realize $V_O = 6V_1 + 3V_2 - 3V_3$. Derive output expression. **10**
(b) Design op-amp based Wein-Bridge oscillator which generates 15 KHz frequency. **10**

4. (a) Draw equivalent circuit of FET amplifier at high frequency for the given amplifier and hence draw low frequency response. **10**
(b) What are the various methods to improve CMRR of differential amplifier ? **10**

5. (a) Draw BiFET, BiMOS differential amplifier circuits. State application for each. **10**
(b) Using suitable block diagrams explain various types of negative feedback circuits. **10**

6. (a) Draw the circuit diagram of a temperature compensated log amplifier. Derive expression of output. **10**
(b) What are advantages of crystal oscillator over other high and low frequency oscillator. **10**

7. Write a short notes :– **20**
(a) Cascode Amplifier
(b) Darlington Pair Amplifier
(c) Tuned Collector Oscillator
(d) Design of Heat Sink.

DATA SHEET

nsistor type	Pdmax @ 25°C Watts	Icmax @ 25°C Amps	$V_{CE}^{(sat)}$ volts d.c.	V_{CBO} volts d.c.	V_{CEO} (Sus) volts d.c.	V_{CER} (Sus) volts d.c.	V_{CEX} volts d.c.	V_{BEO} volts d.c.	T_j max °C	D.C. current gain min	typ.	max.	Small Signal h_{fe} min.	typ.	max.	V_{BE} max.	θ_{fc} °C/W	Derate above 25°C W/°C
3055	115·5	15·0	1·1	100	60	70	90	7	200	20	50	70	15	50	120	1·8	1·5	0·7
N 055	50·0	5·0	1·0	60	50	55	60	5	200	25	50	100	25	75	125	1·5	3·5	0·4
N 149	30·0	4·0	1·0	50	40	—	—	8	150	30	50	110	33	60	115	1·2	4·0	0·3
N 100	5·0	0·7	0·6	70	60	65	—	6	200	50	90	280	50	90	280	0·9	35	0·05
147A	0·25	0·1	0·25	50	45	50	—	6	125	115	180	220	125	220	260	0·9	—	—
525(PNP)	0·225	0·5	0·25	85	30	—	—	—	100	35	—	65	—	45	—	—	—	—
147B	0·25	0·1	0·25	50	45	50	—	6	125	200	290	450	240	330	500	0·9	—	—

nsistor type	hie	hoe	hre	θja
147A	2·7 K Ω	18μ ℧	1·5 × 10^{-4}	0·4°C/mw
525 (PNP)	1·4 K Ω	25μ ℧	3·2 × 10^{-4}	—
147B	4·5 K Ω	30μ ℧	2 × 10^{-4}	0·4°C/mw
N 100	500 Ω	—	——	——
N 149	250 Ω	—	——	——
N 055	100 Ω	—	——	——
3055	25 Ω	—	——	——

BFW 11—JFET MUTUAL CHARACTERISTICS

–VGS volts	0·0	0·2	0·4	0·6	0·8	1·0	1·2	1·6	2·0	2·4	2·5	3·0	3·5	4·0
IDS max. mA	10	9·0	8·3	7·6	6·8	6·1	5·4	4·2	3·1	2·2	2·0	1·1	0·5	0·0
IDS typ. mA	7·0	6·0	5·4	4·6	4·0	3·3	2·7	1·7	0·8	0·2	0·0	0·0	0·0	0·0
IDS min. mA	4·0	3·0	2·2	1·6	1·0	0·5	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0

-Channel *JFET*

Type	V_{DS} max. Volts	V_{DG} max. Volts	V_{GS} max. Volts	P_d max. @25°C	T_j max.	I_{DSS}	g_{mo} (typical)	$-V_P$ Volts	r_d	Derate above 25°C	θ_{ja}
V3822	50	50	50	300 mW	175°C	2 mA	3000 μ ℧	6	50 KΩ	2 mW/°C	0·59°C/mW
FW 11 (typical)	30	30	30	300 mW	200°C	7 mA	5600 μ ℧	2·5	50 KΩ	——	0·59° C/mW