SE (EXTC) Sem - IV (Rev) Exam - May - 2010 Dt:- 01/06/201

Con. 3334-10. (REVISED COURSE) AN-3493

Sub:- EDSC - II

(Lab)

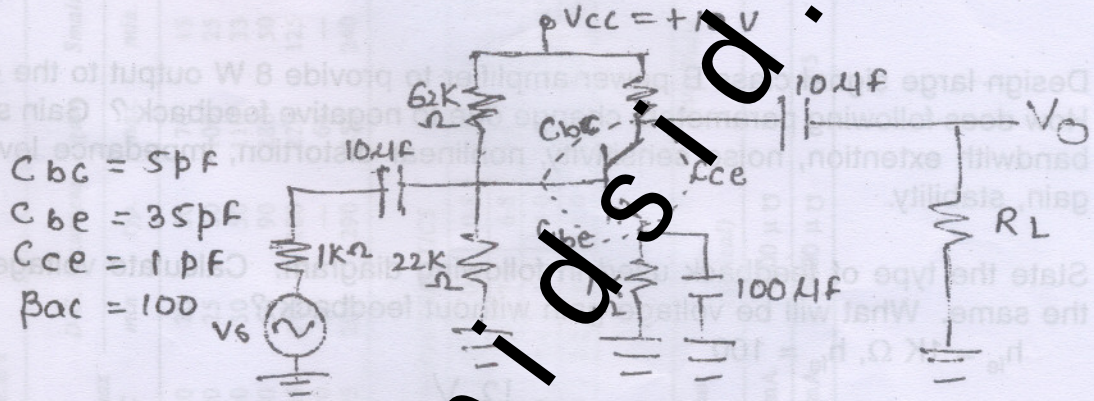
(3 Hours) [Total Marks : 100

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

3pm to 6pm

1. Design the two stage R-C coupled CS amplifier to meet the following specifications. 20
$|Av| \geq 1000$, $S_{ICO} \leq 10$, $F_L \leq 20$ Hz, $V_{CC} = 12$ V
Find Vo rms, Rin, Ro.
Given : $h_{ie} = 2{\cdot}7$ KΩ, $h_{oe} = 18$ μ℧, $h_{fe} = 200$, $h_{re} = 1{\cdot}5 \times 10^{-4}$. Draw the diagram with designed values.

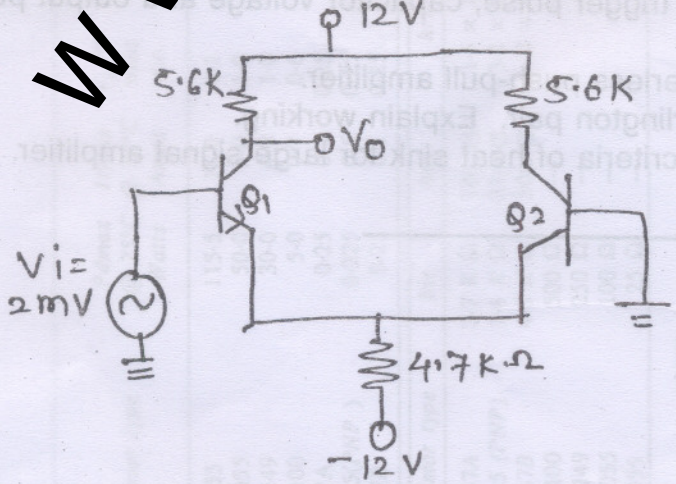
2. (a)



(i) Determine total low frequency response i.e. low frequency due to input RC circuit, bypass RC circuit, output RC ciurcuit. 5
(ii) Determine total high frequency response. 5
(iii) Determine bandwidth of circuit. 2

(b) (i) Determine bandwidth of two stage amplifier in which each stage has lower critical frequency of 300 Hz and upper critical frequency of 1000 KHz. 4
(ii) Why coupling capacitor of an amplifier do not have significant effect on gain at high signal frequencies ? 4

3. (a) Prove that for Wien-bridge oscillator, gain of feedback loop is 1/3. 10
(b) Derive the formula for resonant frequency for Wien-bridge oscillator. 5
(c) Find single ended output voltage Vo for the following circuit. 5

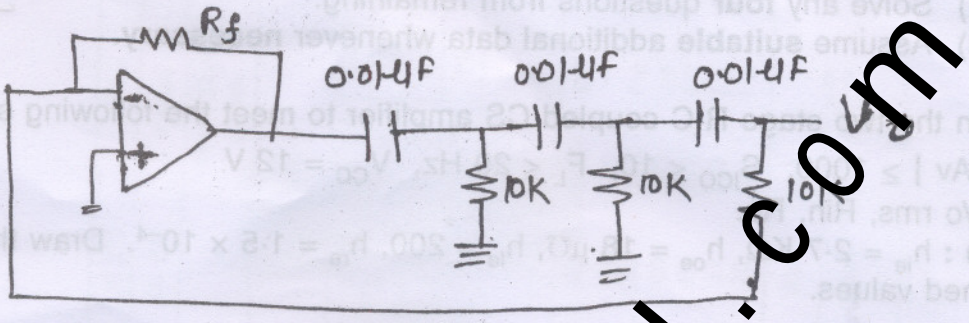


$\beta_1 = \beta_2 = 100$
$R_i = 11$ KΩ

[TURN OVER

4. (a) Explain with block diagram different topologies of negative feedback amplifier. What is improvement in Av, Ai ? **10**

(b) Determine value of Rf necessary for the following circuit to operate as an oscillator. Determine frequency of oscillation. **10**

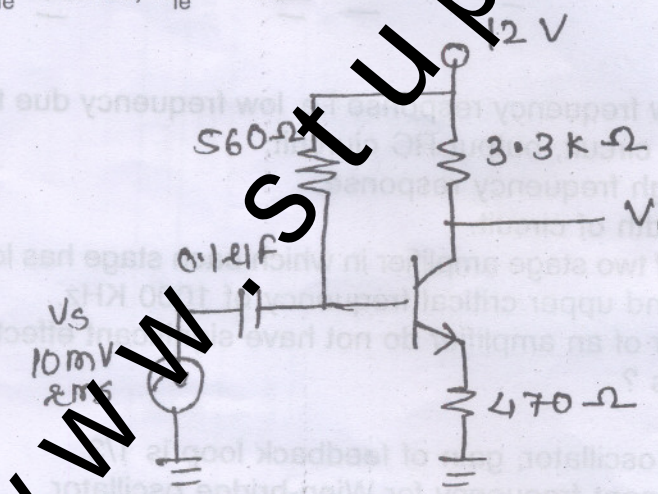


5. (a) Design large signal class B power amplifier to provide 8 W output to the 4 Ω load. **10**

(b) How does following parameters change due to negative feedback ? Gain selectivity, bandwith extention, noise sensitivity, nonlinear distortion, impedance level, circuit gain, stability. **10**

6. (a) State the type of feedback used in following diagram. Calculate voltage gain for the same. What will be voltage gain without feedback ? **10**

h_{ie} = 1K Ω, h_{fe} = 100



(b) Explain working of monostable multivibrator created by modifying Schmitt trigger. Draw the waveforms of input trigger pulse, capacitor voltage and output pulse. **10**

7. (a) Explain working of transformerless push-pull amplifier. **10**

(b) (i) Draw the diagram of Darlington pair. Explain working. **5**

(ii) Briefly explain selection criteria of heat sink for large signal amplifier. **5**

DATA SHEET

Transistor 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
2N 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
ECN 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
ECN 149	30·0	4·0	1·0	50	40	—	—	8	150	40	50	110	33	60	115	1·2	4·0	0·3
ECN 100	5·0	0·7	0·6	70	60	65	—	6	200	50	90	280	50	90	280	0·9	35	0·05
BC147A	0·25	0·1	0·25	50	45	50	—	6	125	115	180	220	125	220	260	0·9	—	—
2N 525(PNP)	0·225	0·5	0·25	85	30	—	—	—	150	35	—	65	—	45	—	—	—	—
BC147B	0·25	0·1	0·25	50	45	50	—	6	125	200	290	450	240	330	500	0·9	—	—

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

N-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}
2N3822	50	50	50	300 mW	175°C	2 mA	3000 μ ℧	6	50 KΩ	2 mW/°C	0·59°C/mW
BFW 11 (typical)	30	30	30	300 mW	200°C	7 mA	5600 μ ℧	2·5	50 KΩ	——	0·59° C/mW