

08 DEC 2014

Electronic Circuit Analysis & Design-I

QP Code : 14650

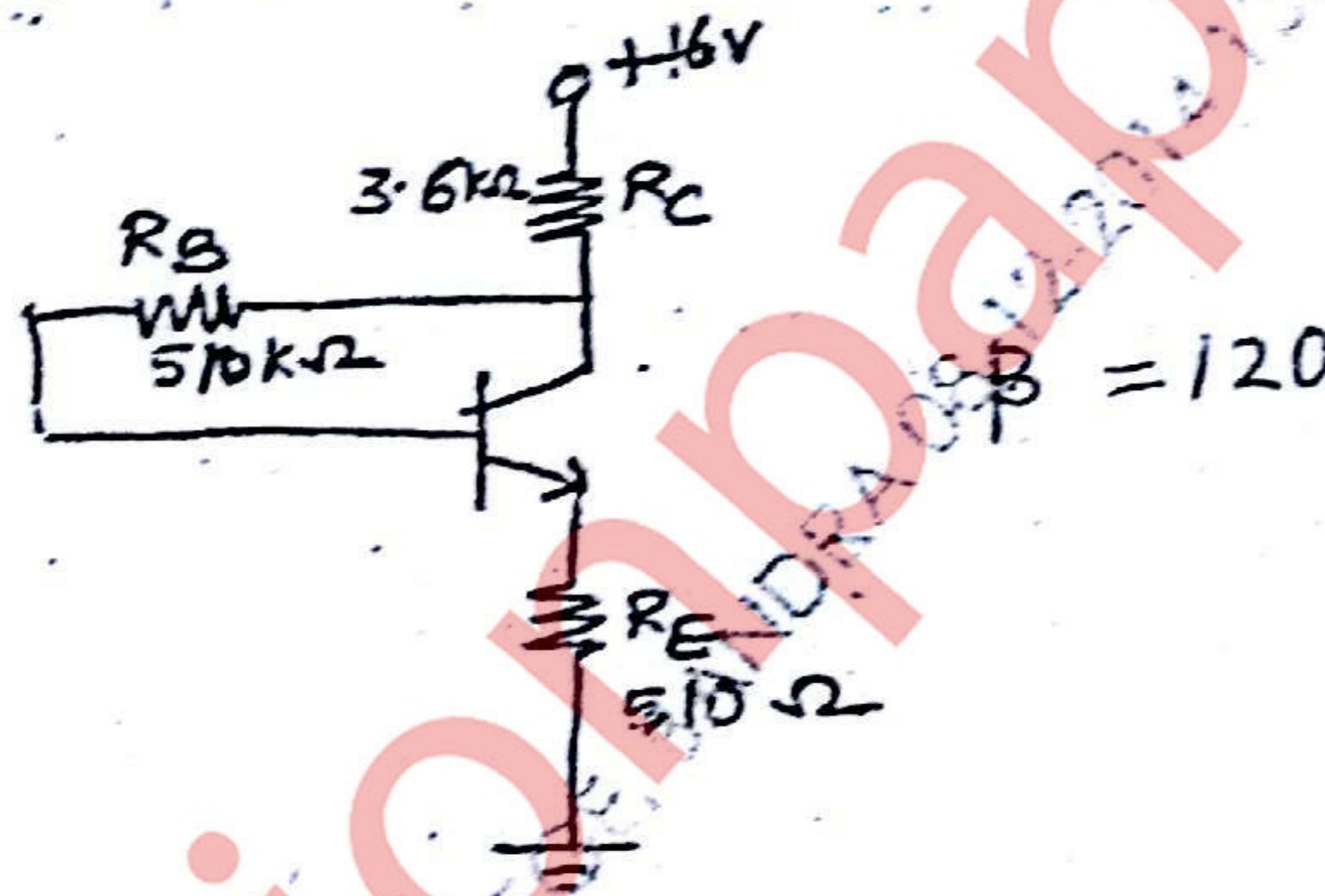
(3 Hours)

18

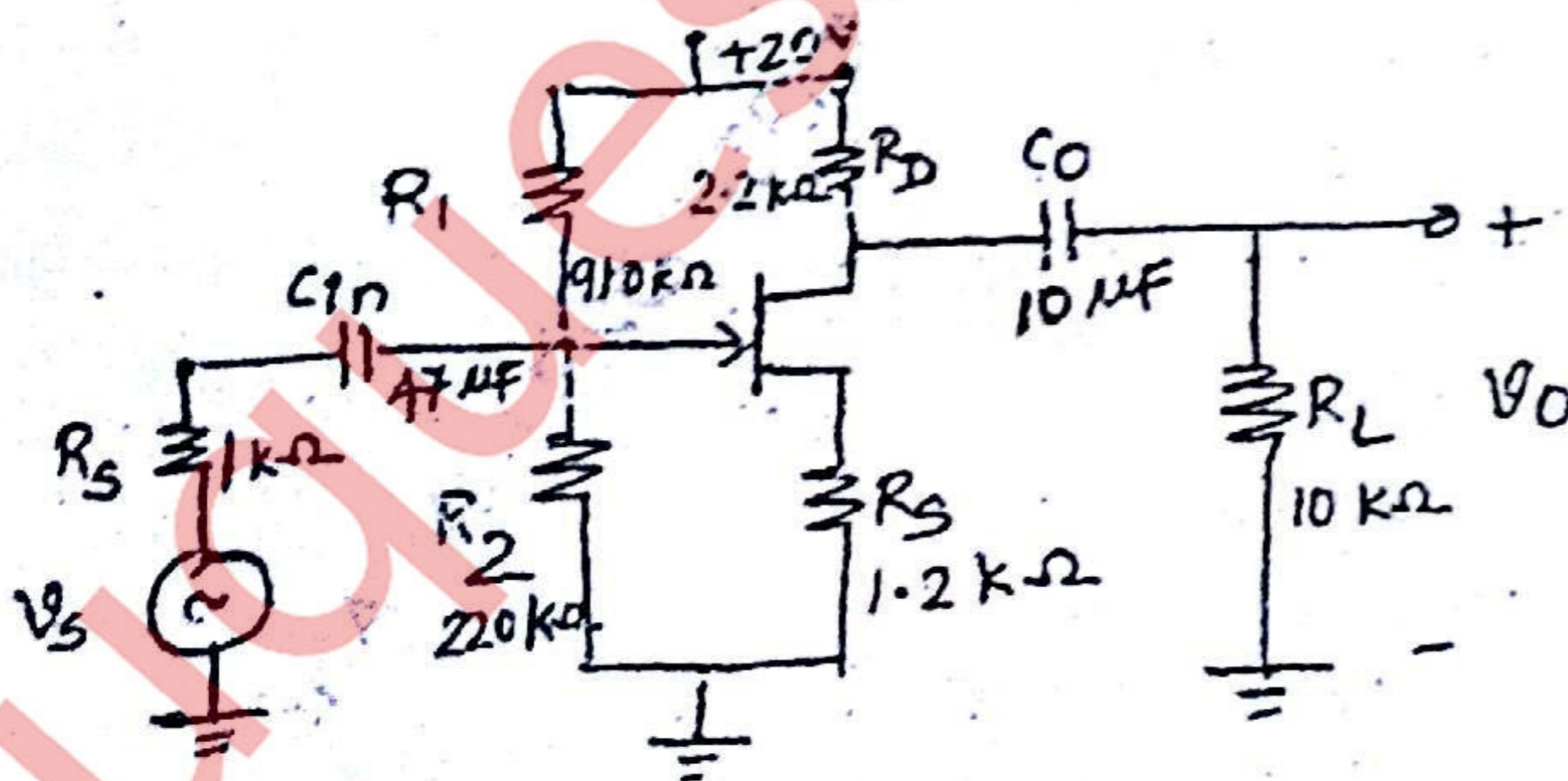
[Total Marks : 80]

- N.B : (1) Question no. 1 is compulsory.
 (2) Attempt any three questions out of remaining five questions.
 (3) Assume suitable data wherever necessary.

1. (a) Discuss zero temperature drift in FET. 5
- (b) Draw and explain input-output characteristics of BJT in CE configuration. 5
- (c) Give high frequency model of BJT and FET. 5
- (d) Explain working of enhancement type MOSFET with characteristics. 5
2. (a) Determine Q-point and stability factor of the given network. Draw dc load line. 10
 Calculate V_{BQ} , V_{CQ} and V_{EQ} .



- (b) Calculate A_v , R_m , R_o and f_L . 10

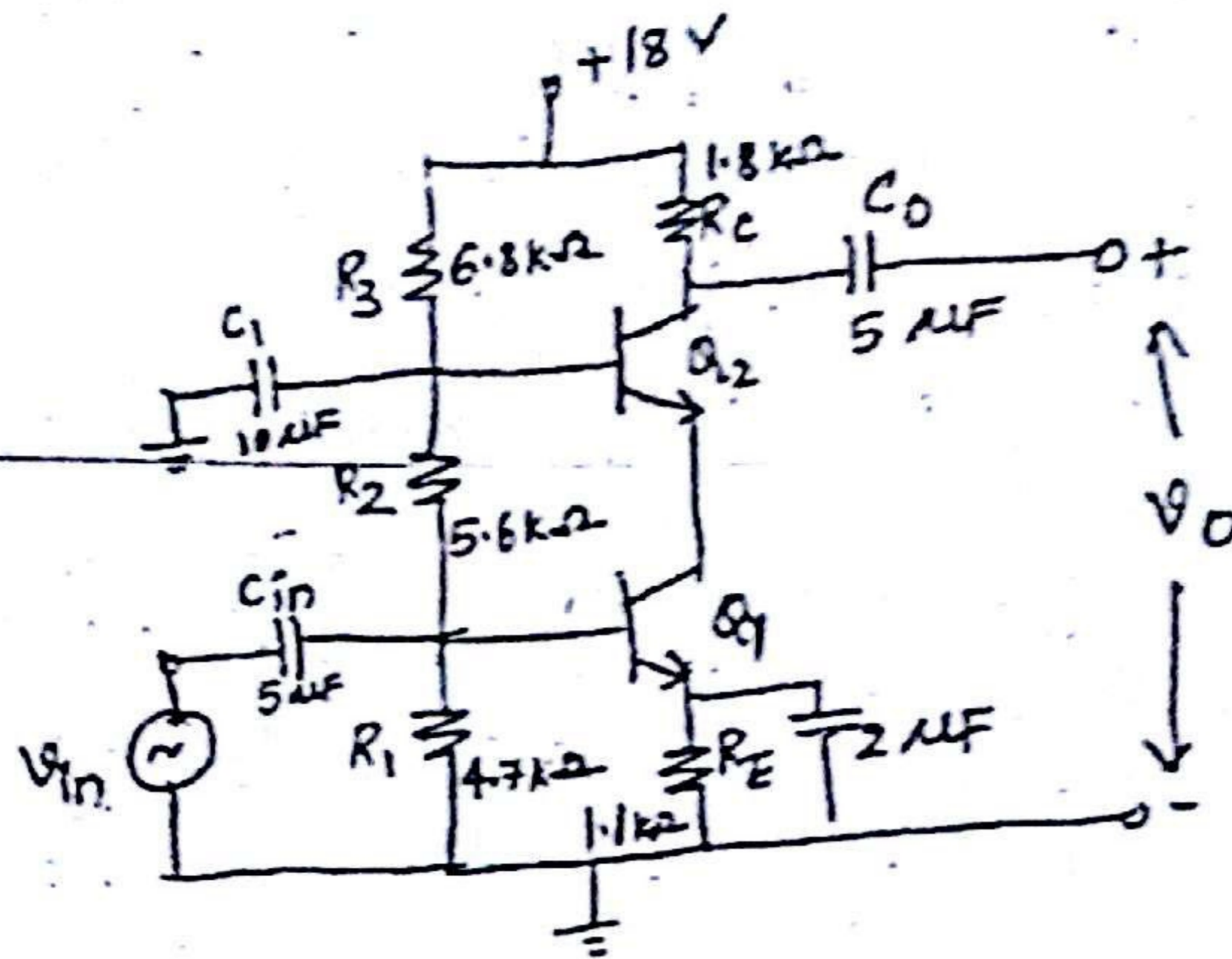


$I_{DSS} = 8\text{ mA},$ $V_p = -6\text{ V},$
 $r_d = \infty\ \Omega,$ $g_m = 5.6\text{ mS}$

NOVER

3. (a)

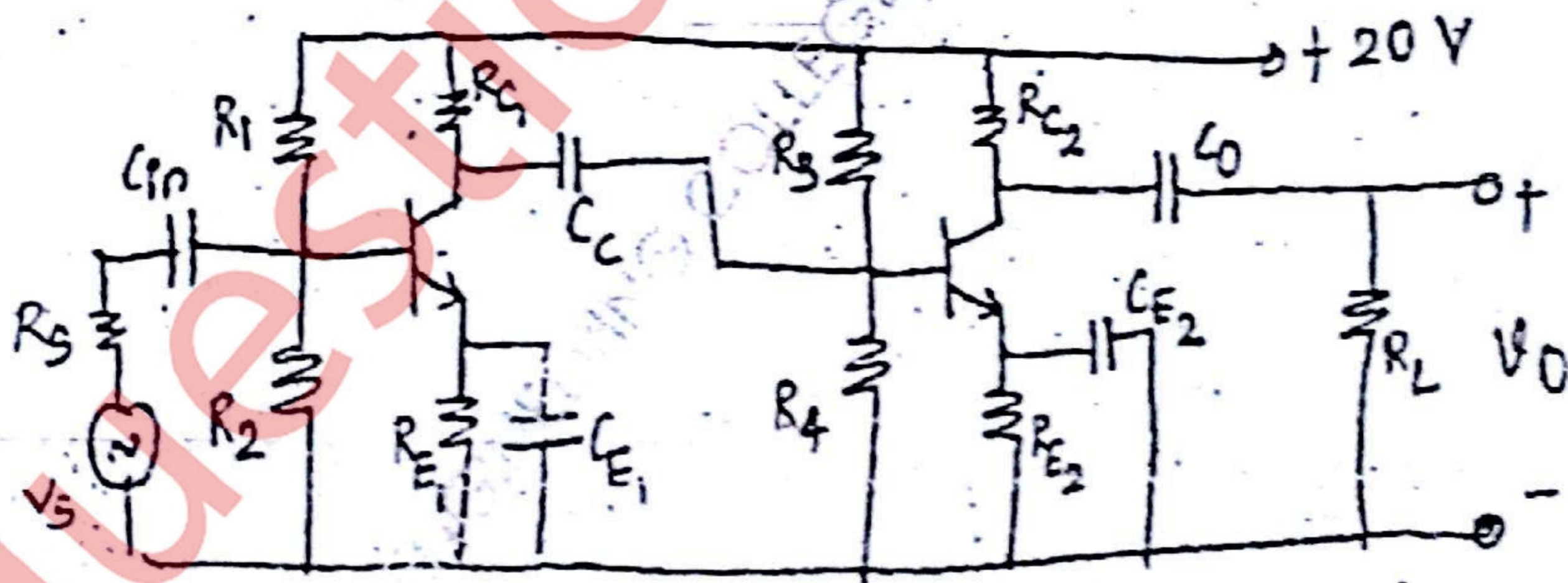
10



$h_{ie} = 1.3 k\Omega$
 $h_{fe} = 200$

Calculate A_v , R_{in} , R_o and A_i for above circuit.

- (b) Draw circuit diagram of common drain FET amplifier. Derive expression for Q-point, A_v , R_{in} and R_o . 10
4. (a) Design single stage CS amplifier for mid point biasing with $V_{o(rms)} = 3V$, $|A_v| = 7$ and $f_L = 20$ Hz 10
- (b) Discuss D.C. and A.C. analysis of Darlington amplifier with advantages and shortcoming. 10
5. (a) Find f_L for given two stage amplifier. 10



$R_1 = R_3 = 15k\Omega$, $R_2 = R_4 = 4.7k\Omega$, $R_{C1} = R_{C2} = 2.2k\Omega$
 $R_{E1} = R_{E2} = 1k\Omega$, $C_{in} = C_c = C_o = 1\mu F$, $C_{E1} = C_{E2} = 20\mu F$
 $R_s = 1k\Omega$, $R_L = 10k\Omega$, $h_{fe} = 200$, $h_{ie} = 1.3k\Omega$,

- (b) Design single stage CE amplifier for $|A_v| \geq 90$, $v_{o(rms)} = 4V$, $S \leq 10$, $f_L = 15$ Hz 10

6. Write short notes on (any two) 10
- (a) Clippers and clampers
- (b) MOSFET applications
- (c) Voltage rate FET amplifier.

[TURN

SE (Biomed) - CBSGS - Ecad - P

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DATA SHEET

Transistor type	P _{max} @ 25°C Watts	I _{cm} @ 25°C Amps	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	V _{ce} (SUS) volts d.c.	D.C. current		Signal typ.	h _{FE} max.	V _{ce} max.	θ _{JA} °C/W	Derate above 25°C W/C
													min	typ.					
2N 3055	115.5	15.0	1.1	100	60	70	90	7	200	20	30	70	15	50	120	1.8	1.5	0.7	
ECN 055	50.0	5.0	1.0	60	30	55	60	5	200	25	50	100	15	75	125	1.5	3.5	0.4	
ECN 149	30.0	4.0	1.0	50	40	—	—	8	150	30	50	110	31	60	115	1.2	4.0	0.3	
ECN 100	5.0	0.7	0.6	70	60	65	—	6	200	30	90	280	30	90	280	0.9	35	0.05	
BC147A	0.25	0.1	0.25	50	45	50	—	6	125	115	180	220	115	220	260	0.9	—	—	
2N 525 (PNP)	0.225	0.5	0.25	85	30	—	—	—	100	35	—	65	—	45	—	—	—	—	
	0.25	0.1	0.25	50	45	50	—	6	125	200	290	450	210	330	500	0.9	—	—	

BFW 11 JFET MUTUAL CHARACTERISTICS

-V _{GS} volts	I _{DS} max. mA	I _{DS} typ. mA	I _{DS} min. mA	I _{DS} max. mA	I _{DS} typ. mA	I _{DS} min. mA	I _{DS} max. mA	I _{DS} typ. mA	I _{DS} min. mA	I _{DS} max. mA	I _{DS} typ. mA	I _{DS} min. mA
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
1.0	3.0	3.3	3.6	4.0	4.2	4.4	4.8	5.2	5.4	6.0	6.5	7.0
2.0	6.0	6.4	6.8	7.2	7.6	8.0	8.8	9.2	9.6	10.5	11.5	12.5
4.0	12.0	12.8	13.6	14.4	15.2	16.0	18.0	18.8	19.6	21.5	23.5	25.5

N-Channel JFET

Type	V _{GS} max. Volts	V _{GS} min. Volts	I _{DS} max. mA	I _{DS} typ. mA	I _{DS} min. mA	r _{DS} (typical) Ω	-V _{GS} Volts	r _{DS}	Derate above 25°C	θ _{JA}
2N3822	50	50	300 mW	175°C	7 mA	3000 μΩ	6	50 KΩ	2 mW/C	0.59°C/mW
BFW 11 (typical)	30	30	300 mW	200°C	7 mA	5600 μΩ	2.5	50 KΩ	—	0.59°C/mW