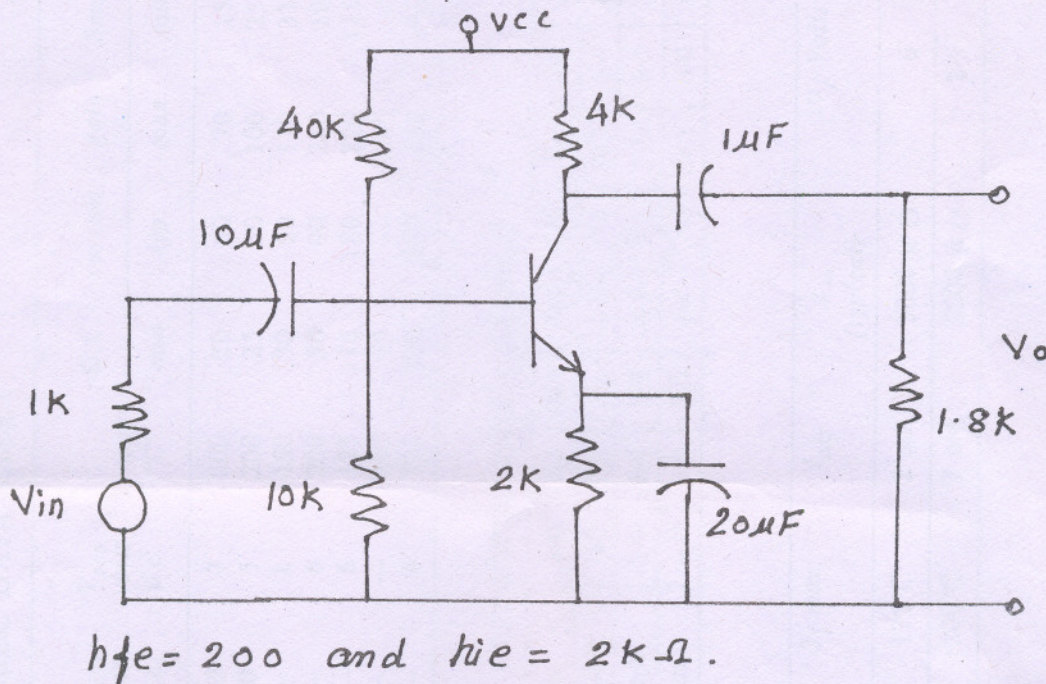
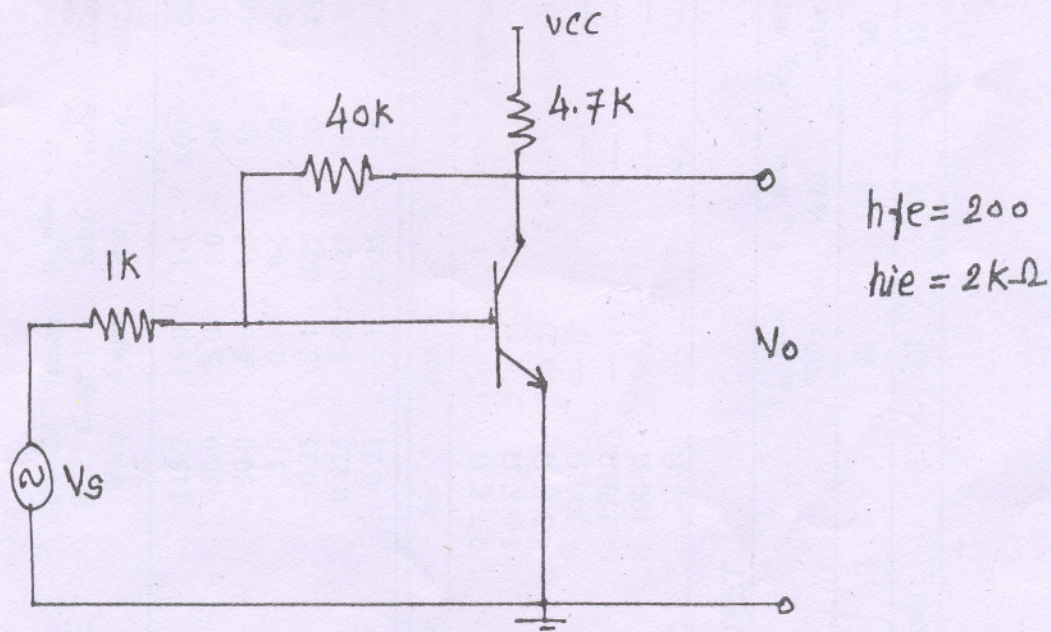


- N.B. (1) Question No.1 is compulsory:
 (2) Answer any **four** out of remaining **six** questions.
 (3) Assumption made should be **clearly** stated.

1. Design a two stage RC coupled BJT amplifier to meet the following specifications :— 20
 $A_v \geq 5000$, $S_{ICQ} \leq 10$, $f_L = 20$ Hz, $v_o = 2$ V and $V_{CC} = 15$ V.
 (a) Calculate A_v , R_i and R_o of the designed circuit.
 (b) What would be the voltage gain of the designed circuit if both bypass capacitors are removed ?
2. (a) Draw the equivalent circuit of FET amplifier at high frequency. Derive the expression for upper cutoff frequency. 10
 (b) Find the lower cutoff frequency for the given amplifier and hence draw low frequency response plot. 10



3. (a) Explain working and analysis of transformer coupled Class A Power Amplifier. 10
 (b) Design a large signal class B power amplifier to provide 5 W output to the 4 ohm load. 10
4. (a) For the following circuit, calculate A_{vf} , R_{if} and R_{of} and also identify the type of feedback :— 10



- (b) Using suitable block diagrams explain various types of negative feedback circuits. 10

5. (a) Derive the expression for frequency of RC phase shift oscillator using BJT. 10
(b) Design Op-amp based Wein-bridge oscillator which generates 10 KHz frequency. 10
6. (a) Derive an expression for the Differential voltage gain and differential input resistance of a dual input balanced output differential amplifier. 10
(b) Draw circuit diagram using op-amps to realize $V_o = 5V_1 + 7V_2 - 3V_3$. 10
7. Write short notes on any **four** :— 20
(a) Cascode Amplifier
(b) Ideal characteristics of Opamp
(c) Role of Level shifter circuit in Opamp
(d) Crystal oscillator
(e) Opamp as a Integrator.
-

DBEC DATA SHEET

Transistor type	P_{dmax}	I_{cmax}	$V_{CE}^{(sat)}$	V_{CBO}	V_{CEO}	V_{CER}	V_{CEX}	V_{BEO}	T_j max	D.C.	current	gain	Small	Signal	h_{fe}	V_{BE}	θ_{jc}	Derate
	@ 25°C	@ 25°C	volts	volts	(SUS)	(SUS)	volts	volts										
	Watts	Amps	d.c.	d.c.	volts d.c.	volts d.c.	d.c.	d.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
2N 3055	50.0	5.0	1.0	60	50	55	60	5	200	25	50	100	25	75	125	1.5	3.5	0.4
2N 3055	30.0	4.0	1.0	50	40	—	—	8	150	30	50	110	33	60	115	1.2	4.0	0.3
2N 3055	5.0	0.7	0.6	70	60	65	—	6	200	50	90	280	50	90	280	0.9	35	0.05
2N 3055	0.25	0.1	0.25	50	45	50	—	6	125	115	180	220	125	220	260	0.9	—	—
2N 3055 (PNP)	0.225	0.5	0.25	85	30	—	—	—	100	35	—	65	—	45	—	—	—	—
2N 3055	0.25	0.1	0.25	50	45	50	—	6	125	200	290	450	240	330	500	0.9	—	—

Transistor type	h_{ie}	h_{oe}	h_{re}	θ_{ja}
2N 3055	2.7 K Ω	18 μ \bar{v}	1.5×10^{-4}	0.4°C/mw
2N 3055 (PNP)	1.4 K Ω	25 μ \bar{v}	3.2×10^{-4}	—
2N 3055	4.5 K Ω	30 μ \bar{v}	2×10^{-4}	0.4°C/mw
2N 3055	500 Ω	—	—	—
2N 3055	250 Ω	—	—	—
2N 3055	100 Ω	—	—	—
2N 3055	25 Ω	—	—	—

BFW 11—JFET MUTUAL CHARACTERISTICS

-V _{gs} 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
I _{ds} 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
I _{ds} 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
I _{ds} 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.	V_{DG} max.	V_{GS} max.	P_d max.	T_j max.	I_{DSS}	g_{mo}	$-V_p$ Volts	r_d	Derate	θ_{ja}
	Volts	Volts	Volts	@25°C	°C		(typical)			above 25°C	
2N3822	50	50	50	300 mW	175°C	2 mA	3000 μ \bar{v}	6	50 K Ω	2 mW/°C	0.59°C/mW
BFW 11 (typical)	30	30	30	300 mW	200°C	7 mA	5600 μ \bar{v}	2.5	50 K Ω	—	0.59°C/mW