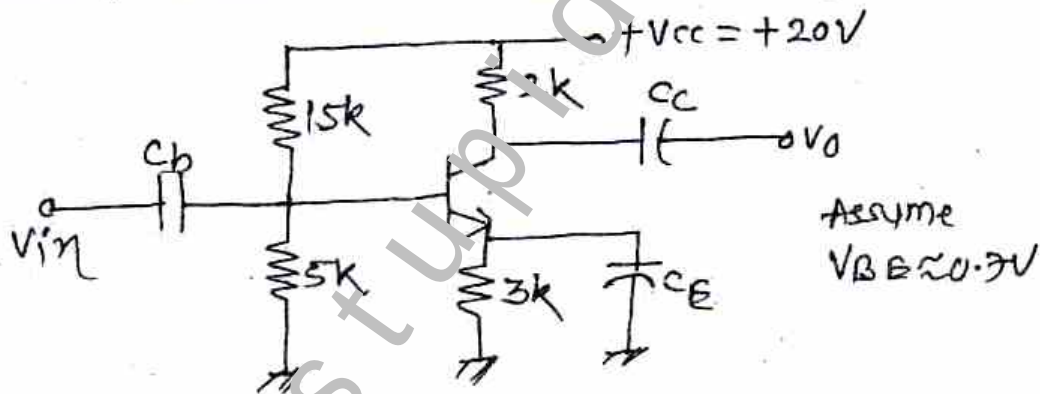
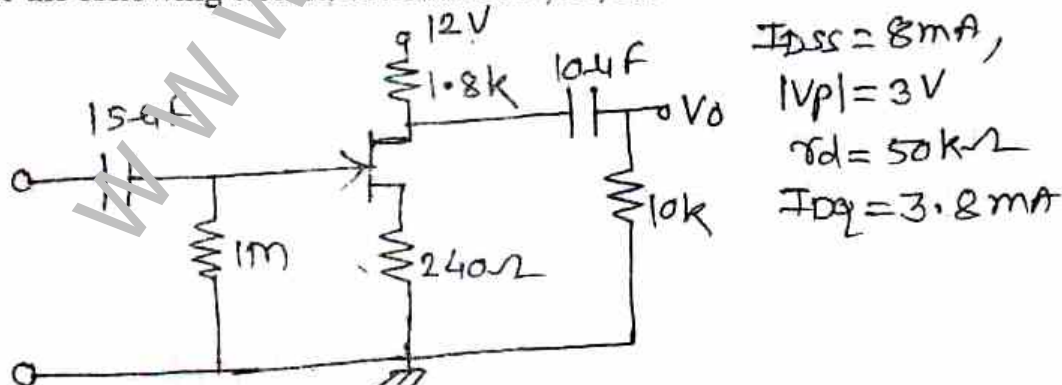


1. A full wave rectifier using a centre tapped transformer with two diodes gives output voltage of 250 V to a resistive load, the current being $75 \pm 25 \text{ mA}$. If the ripple factor is 0.001, calculate the specification of the devices and components required if the filter used are – 20
 - i) L section (LC) filter, ii) π - Filter and iii) C filter. Draw complete circuit diagrams each case.
2. a) Design a Single stage RC coupled amplifier using FET BFW-11 biased to provide 3.5 mA to achieve voltage gain of 10, lower cutoff frequency of 20 Hz and to provide $V_o = 2.5 \text{ V}$. 15
 - b) For the designed amplifier find A_v , R_i , R_o . 05
3. a) Determine the values of the biasing components for a CE configuration if $V_{CC} = 12 \text{ V}$, $V_{CE} = 6 \text{ V}$, $R_C = 1 \text{ k}$, $V_{BE} = 0.6 \text{ V}$, $h_{FE} = 180$ for the following circuits- 10
 - (i) Fixed bias without R_E .
 - (ii) Voltage divider biasing with $V_{RE} = 1 \text{ V}$.
 - b) Determine Q Point and draw the dc load line for the following circuit. 10

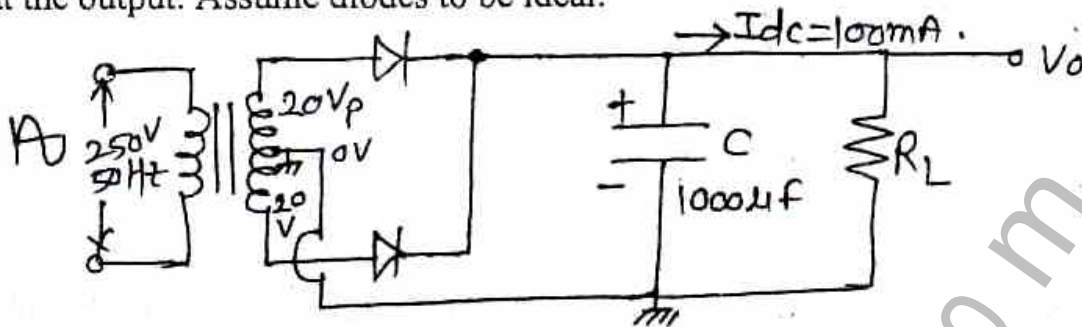


4. a) For the following circuit, determine A_v , R_i , R_o . 10

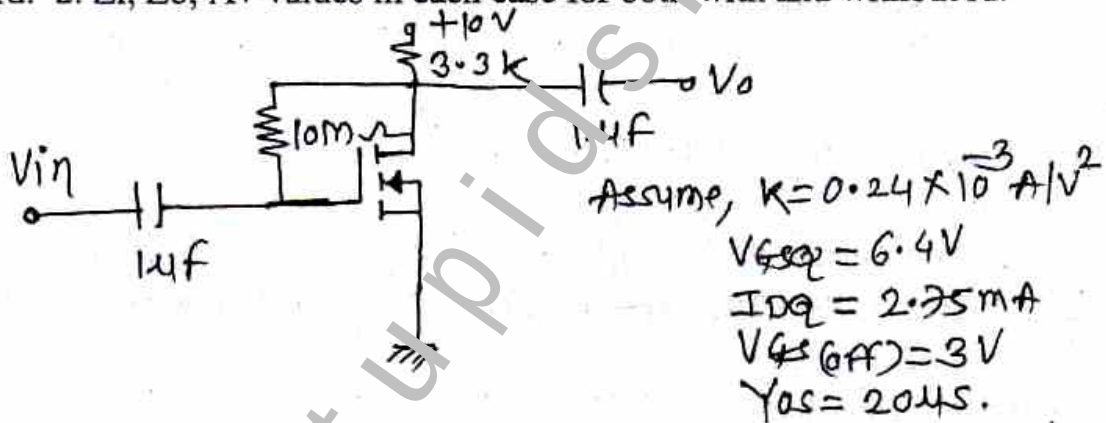


- b) For a CE amplifier derive the expressions for A_v , A_i , Z_i and Z_o .

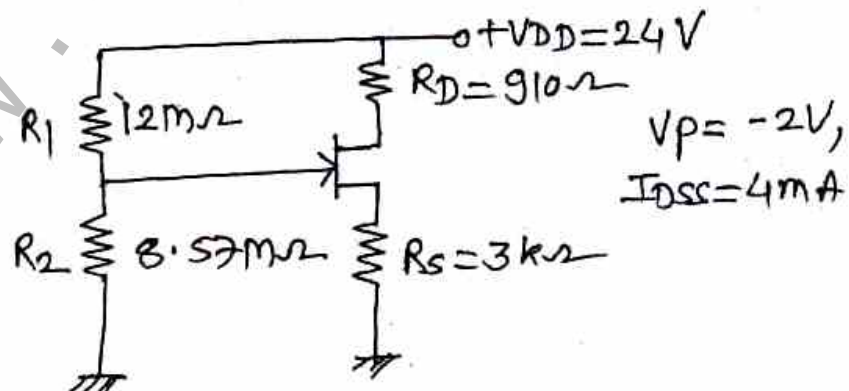
5. a) For the following circuit determine d.c. output voltage, ripple factor and ripple at the output. Assume diodes to be ideal. 10



- b) What are the causes of instability of operating point of a BJT amplifier? Derive the expression for stability factor S_{ICO} for voltage divider bias circuit. 10
6. a) For the amplifier shown in following figure, determine- 10
1. G_m , r_d . 2. Z_i , Z_o , A_v values in each case for both with and without r_d .



- b) For the following circuit, determine I_{DQ} and verify if the FET will operate in pinch-off region. 10



7. Write short notes on any three of the followings- 20

- i) Power Mosfet- Characteristics, ratings and application.
- ii) Schottkey diode- Characteristics, ratings and application.
- iii) UJT- Characteristics, ratings and application.
- iv) IGBT- Characteristics, ratings and application.

DATA SHEET

Transistor type	Pdmax @ 25°C Watts	Icmax @ 25°C Amps	Vce(sat) volts d.c.	Vceo volts d.c.	Vceo (Sus) volts d.c.	Vces (Sus) volts d.c.	Vces volts d.c.	Vbes volts d.c.	Tj max °C	D.C. current		gain		Small Signal		hfe max.	VBE max.	O1 °C/W	Derate above 25°C W/°C
										min	typ.	max.	min.	typ.	max.				
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	20	50	100	25	75	125	1.5	3.5	0.4	
ECN 149	30.0	4.0	1.0	50	40	—	—	8	150	30	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	—	—	—	100	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	h _{ie}	h _{oe}	h _{re}	θ _{ja}
BC 147A	2.7 K Ω	18 μ Ω	1.5 × 10 ⁻⁴	0.4°C/mw
2N 525 (PNP)	1.4 K Ω	25 μ Ω	3.2 × 10 ⁻⁴	—
BC 147B	4.5 K Ω	30 μ Ω	2 × 10 ⁻⁴	0.4°C/mw
ECN 100	50 Ω	—	—	—
ECN 149	15 Ω	—	—	—
ECN 055	12 Ω	—	—	—
2N 3055	6 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. Volts	V _{GS} max. Volts	V _{CS} max. Volts	P _d max. @25°C	T _j max.	I _{DS}	g _m (typical)	-V _p Volts	r _d	Derate above 25°C	θ _{ja}
2N3822	50	50	50	300 mW	175°C	2 mA	3000 μ Ω	6	50 KΩ	2 mW/°C	0.59°C/mW
BFW 11 (typical)	30	30	30	300 mW	200°C	7 mA	5600 μ Ω	2.5	50 KΩ	—	0.59°C/mW