- Paper Solution -

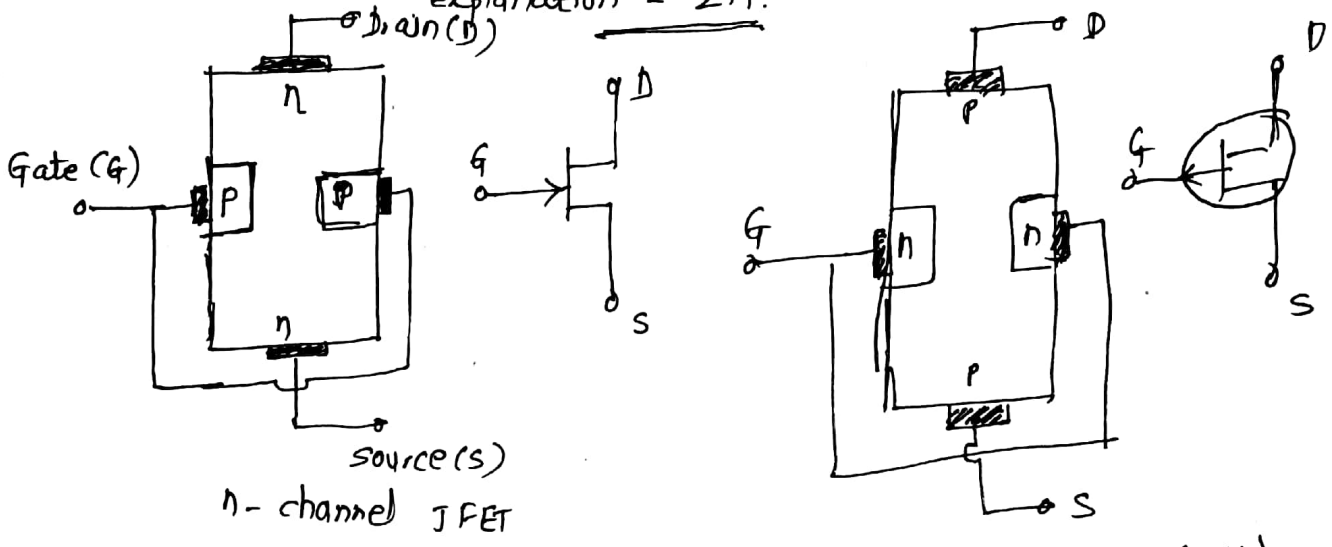
Subject - EDC (5E/electrical/SEM-III/DEC-17)

Q.P. Code - 23921.

Q.1. (a) Construction of JFET. (5M)

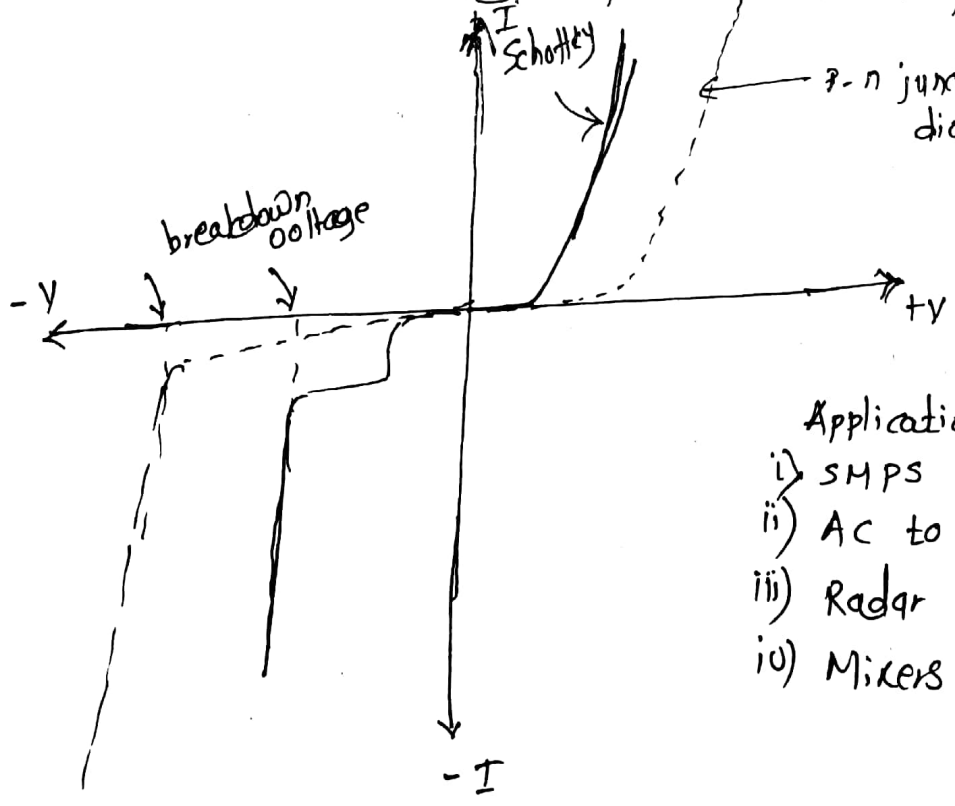
Constructional circuit diag of n & p channel JFET with symbols - 3M.

Explanation - 2M.



(b) V-I ch^s:- 2M (5M)

Explanation - 1M & applications - 2M.

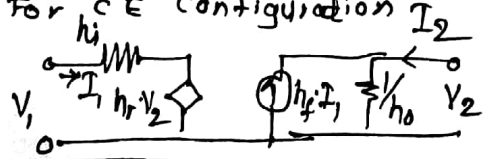


Applications:-

i) SMPS
ii) AC to DC converters.
iii) Radar systems.
iv) Mixers & detectors in comm^n sys.

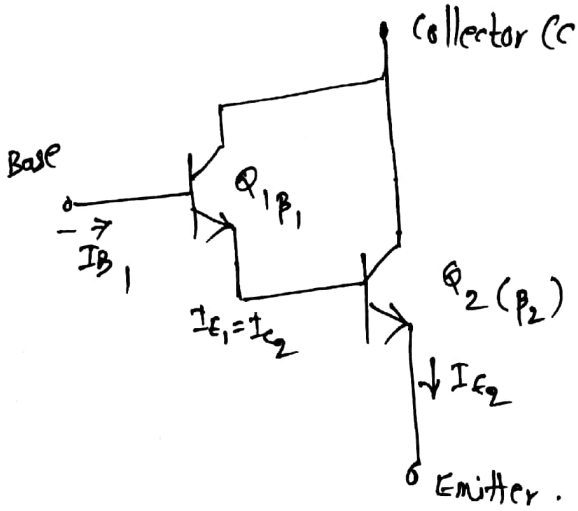
(c) h-parameter Model of BJT. (5M)

For CE configuration

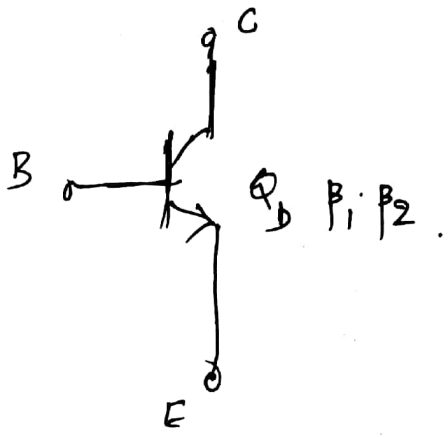


- diag. - 2M.
- defining parameters - 2M
- explanation - 1M.

(d) Darlington pair configuration



Darlington connection



Equivalent darlington transistor.

Dieg. – 2M. Explanation – 1M.

Why to use in BJT – 2M.

(e) Hartley Oscillator. (5M)

Given :- $L_1 = 0.5\,mH$, $L_2 = 0.5\,mH$, $C = 100\,pF$.

$$f_o = \frac{1}{2\pi \sqrt{L_{eq} \cdot C}} \quad \text{where } L_{eq} = L_1 + L_2$$

$$\therefore f_o = \frac{1}{2\pi \sqrt{1 \times 10^{-3} \times 100 \times 10^{-12}}}$$

$$= \underline{503.292\ KHz}.$$

Correct solution 5M.

(f) Advantages of -ve f/b. (5M)

– Any 5 advantages with mathematical expression

E.g. B.W. Increases then

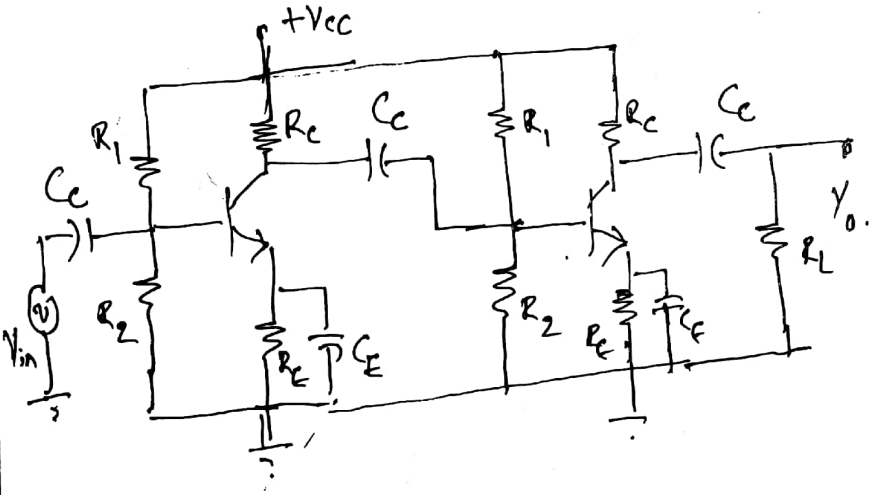
~~$\frac{A_V}{f} = \frac{A_V}{(1+A_V)}$~~ $BW_f = BW \times (1 + A \cdot \beta)$.

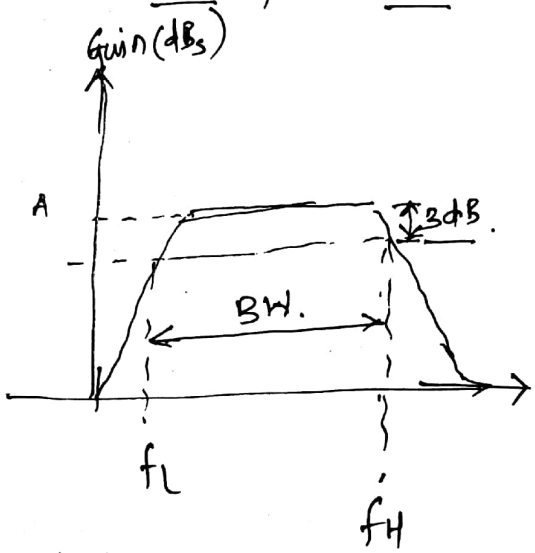
Que.2 (a) Various types of -ve f/b amplifiers (10M) (5)

Parameter	i) Voltage Series	ii) Current series	iii) Voltage shunt	iv) Current shunt
I] Block Diagram - 2M.				
II] Feedback gain - 2M.				
III] Bandwidth - 2M.				
IV) Noise - 1M				
v) Freqn distortion - 1M.				
vi) stability - 1M				
vii) Amplifier type - 1M.				

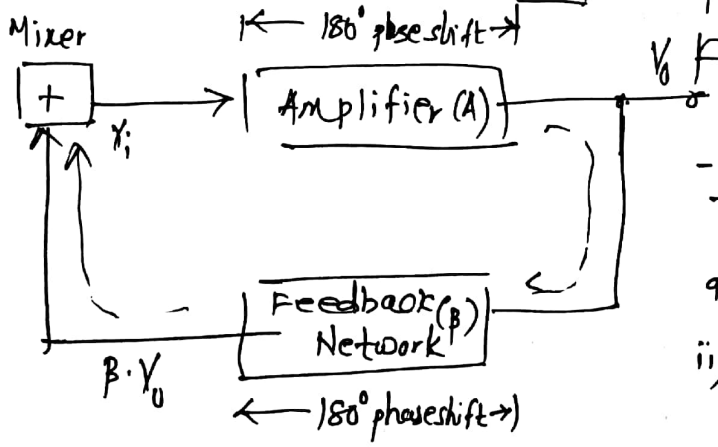
(b) Multistage RC coupled transistor Amplifier. (10M)

- Diag. - 3M, Explanation - 3M Freqn Response diag. 2M explanation 2M.





Que.3 (a) Barkhausen's criteria - 4M RC-phase shift oscillator - 6M.



- 2 conditions

i) Total phase shift around loop either 0° or 360°

ii) $|A \cdot \beta| \geq 1$

R-C phase shift oscillator either using BJT or FET.

(b). Comparision bet^n C, LC & CLC filters. (10M) (4)

Parameters - Diag. - 2M.

Expression for ripple factor 2M.

Surge current thro' diode - 2M.

suitable for - 1M.

Voltage regulation - 1M.

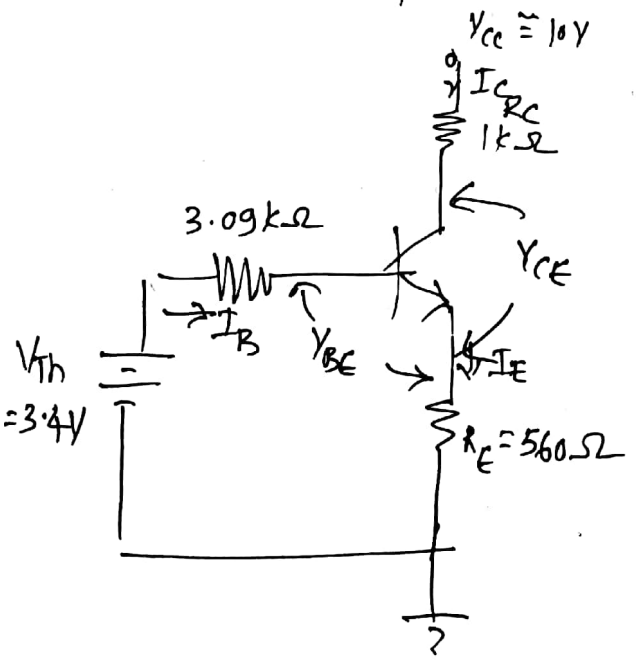
Place of filter - 1M.

Appln - 1M or any other suitable point

Que.(4) - (a) Various baising techniques used in BJT.

i) Fixed Bias ii) Emitter to Base bais & iii) Voltage divider or potential divider or self bias. - 2M.

Thevenin's equivalent ckt. with $R_{Th} = 3.09k\Omega$ & $V_{Th} = 3.4V$ - 3M.



$I_{B_Q} = 45.35\,\mu A$

$I_{C_Q} = 4.53\,mA$

$I_{E_Q} = 4.575\,mA$

$V_{CEQ} = 2.9V$

} 5M.

(b) D-Type MOSFET. (10M)

Const^n diagg. - 2M. Explanation - 1M.

Working with explanation and i/p & o/p cbs - 7M.

Q.5. (a) complete AC analysis using either h-parameter or r_e Model — 10M. (10M) (5)

Expressions for. A_I, A_{IS}, R_i, R_i', R_o, R_o', A_V, A_{V_S}

(b) Differentiate JFET & MOSFET

Parameters - symbol - 1M.
Const^n - 2M.
I/p Impedance - 2M.
baising Methods used - 2M.
I/p & o/p cb^s - 3M. or any other suitable point.

Que. 6 (a) UJT Relaxation oscillator.

ckt. diag. & Waveforms - 5M.
Explanation - 5M.

(b) Thermal stabilization - 5M, Compensation techniques - 5M.

(c) Concept of DC Load line.

Mathematical expression for CE configuration - 5M.
Diagram - 2M.
Explanation - 3M.