Name of faculty :→ Er. Vijay Kr. Ram
Subject :— Analog circuit
(EC- 2nd yr, 4th sem.)

Query Time :→ 03:00pm— 04:00pm.

Amplifier Working

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An amplifier is an electronic device that can increase the power of a signal (a time-varing voltage or current). it is a two-port electronic circuit that uses electronic power from a power supply to increase the amplitude of a signal applied to its input terminal, producing a proportionally greater amplitude signal at its output.

    The amount of amplification provided by an amplifier is measured by its gain: the ratio of output voltage, current, or power to input. An amplifier is a circuit that has a power gain greater than one.

Classification of Power Amplifier.
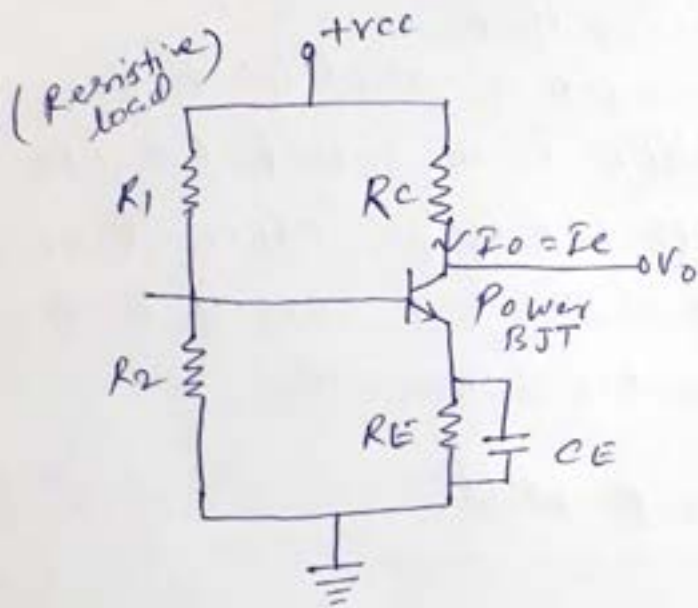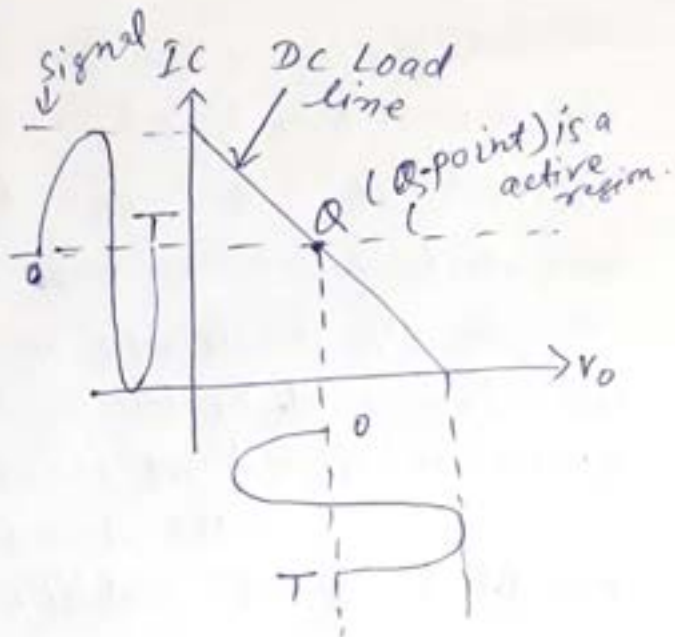
—✗——————✕.——————✗—

Based on conduction Angle and efficiency of power amplifier.

1. Class A

2. class B

3. class AB

4. class C
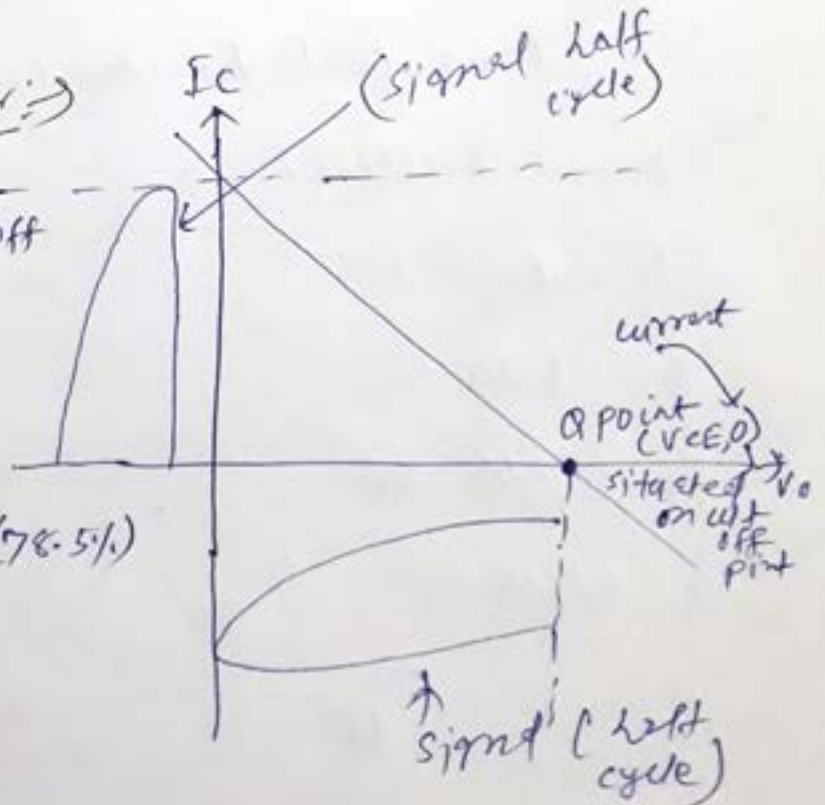
⇓

⇒ **Class A amplifier :→**

→ conduction angle is
 $0 - 2\pi$

→ Less efficiency
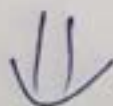
→ Distortion is more

→ ckt is simple.

signal IC   DC Load line

Q (Q-point) is a active region

→ Vo

0

T

The class A amplifier is acting in active region at Q point.

(First step is a A class amplifier).

(Resistive load)

+Vcc

R₁   Rc

$I_0 = I_e$ ∘Vo

Power BJT

R₂

RE   CE

⇒ **Class B Amplifier :→**

→ Q point on cut-off region

→ Conduction angle
 $0 - 180°$

→ High efficiency (78.5%)

Exp:- ckt.

IC   (signal half cycle)

current

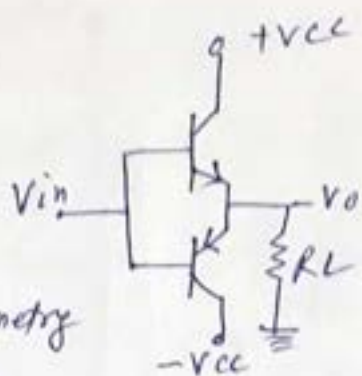Q point (VᵥcE,0) situated Vo on cut off pint

signal (half cycle)

this is called complete

Exp:- ckt

This is called complementary symmetry power amplifier.
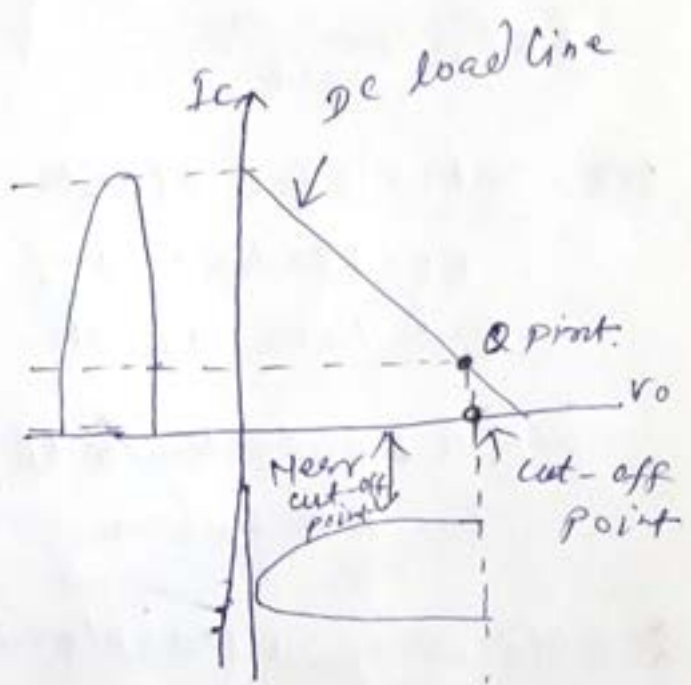

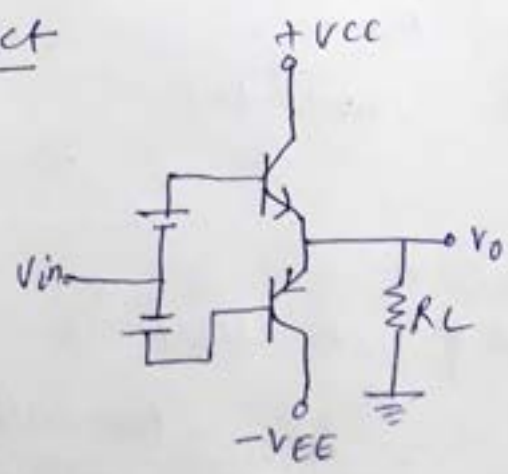+Vcc

Vin

Vo

RL

-Vcc

(Two transistor npn & pnp)

Use:→ Used in o/p stages of class audio system amplifier.

⇒ **Class AB Amplifier:→**

→ Q point is just above cut-off & JUst below Active region.

→ Conduction angle $180° - 360°$

→ crossover distortion

Ic DC load line

Q point

Vo

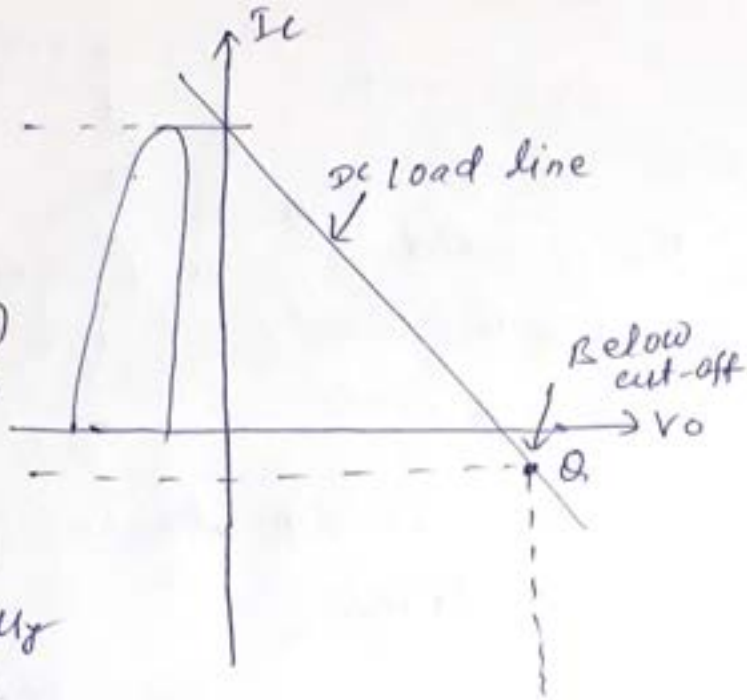Near cut-off point

cut-off Point

Exp:- ckt

+Vcc

Vin

Vo

RL

-VEE

Use:→ output (o/p) stage of audio power amplifier.

⇒ **Class-C :→**

→ Q point below cut-off region
→ Increase in efficiency (>90%)
→ Distortion is high
→ less conduction
   < 180°, (< 100°)
   [60°] ∈ generally used.

DC load line

Below cut-off

→ Vo

Q

🔲:- Ckt:→ is formed with
   RFC (Radio frequency chock)
   and Tank circuit.

Use:→ RF System output stage
   RF System.

✱ **Efficiency :→** (Applied DC power).

$$\boxed{Efficiency = \frac{Pac}{Pdc} = \frac{Power \ ac}{Power \ dc}}$$

Viva Que:→

   amplifier
   Power efficiency gives efficiency   side
   $$= \frac{Po \ ac}{Pin \ dc} = \frac{Power \ o/p \ ac}{Pin \ dc}$$
   side

   $$\boxed{Power \ eff < 100\%}$$