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Year: 3rd

Stream: CSE

Section: 3I

Roll no: 23

Enrollment No: 12019009001418

Paper Name: Analog Electronic Circuits

Paper Code: ESC502

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Date: 02/09/21

Group - A

1) i) → The purpose of a voltage regulator is to keep the voltage in a circuit relatively close to a desired value. Voltage regulators are one of the most common electronic components since a power supply frequently produces more current that would otherwise damage one of the components in the circuit.

ii) → The definition of the ripple factor is the ratio of the AC component's RMS value and the DC component's RMS value within the output of the rectifier

iii) → Single phase half wave rectifier.
→ Single phase full wave bridge rectifier.
→ Single phase center tapped full wave rectifier
→ Three phase half wave diode rectifier.

iv) → To amplify or increase the input signal to produce an output signal which is much larger than that of the input.

v) A series voltage regulator uses a variable element placed in series with the load. By changing the resistance of that series element, the voltage dropped across it can be changed. And, the voltage across the load remains constant.

vi) A shunt voltage regulator works by providing a path from the supply voltage to the ground through a variable resistance.

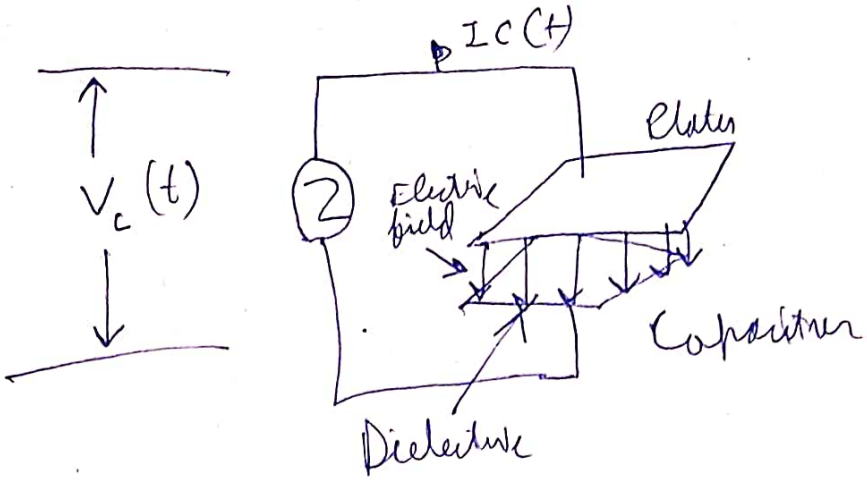
vii) The operating point of a device, also known as a bias point, quiescent point or Q-point, is the steady-state DC voltage or current at a specified terminal of an active device such as a transistor with no input signal applied.

viii) It is the ratio of output current vs input current.

ix) A resistor-inductor circuit or RL filter or RL network, is an electric circuit composed of resistor and inductor

driven by a voltage or current source.

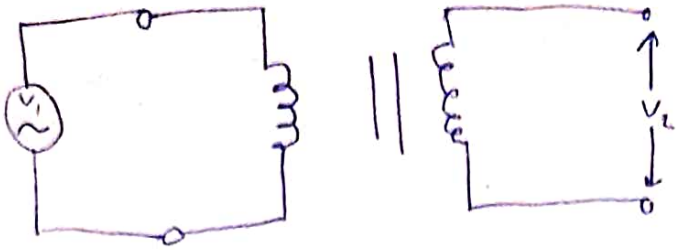
iv)



v) - Ripple (specifically ripple voltage) in electron is the residual periodic variation of the DC voltage within a power supply which has been derived from an alternating current (AC) source.

Group - B

2) i) A step-up transformer is a type of transformer that converts the low voltage and high current from primary side of transformer to the high voltage and low current value the secondary side of the transformer



$$\frac{V_2}{V_1} = \frac{T_2}{T_1}$$

$$\frac{\text{voltage in secondary coil}}{\text{voltage in primary coil}} = \frac{\text{Turns on Sc}}{\text{Turns on Pc}}$$

for O/P voltage. $V_2 = \frac{T_2}{T_1} \times V_1$

3) i)

Filters	Rectifiers
1) It allows passing the dc component of the load and blocks the ac component of the rectified o/p	1) It converts an AC to directed by allowing a current to flow through it in one direction only.
~~ii) Yes, a rectifier can convert AC~~	ii) Some important rectifiers are - half wave, full - wave, bridge rectifier
ii) some common filters are - Inductor, capacitor, LC	

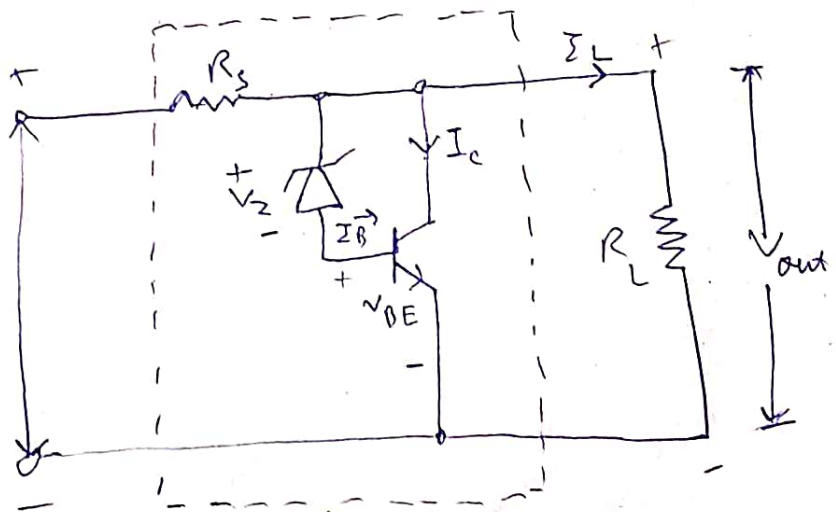
ii) Yes, A rectifier can convert AC to DC but the resulting DC is not a steady voltage. It would be more accurate to refer to it. Although the pulsating DC current always

in the same direction.

4) i) The bias point, also known as the operating point of a device, quiescent point or Q-point, is the steady-state DC voltage or current at a specified terminal of an active device such as a transistor with no input signal applied.

ii) Bias establishes the DC operating point for proper linear operation of an amplifier. If an amplifier is not biased with correct DC voltages on the input and output, it can go into saturation or cutoff when an input signal is applied.

4) A) i)

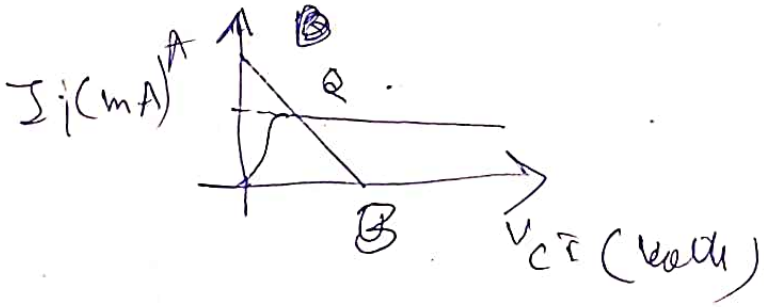


Shunt Regulator

Group - C.

6) B) The DC load line is the loading of the DC equivalent circuit, defined by reducing the ~~reactive~~ reactive components to zero. It is used to determine the correct DC operating point, often called the Q point.

There can be many such intersecting points, but the Q-point is selected in such a way that irrespective of AC signal swing, the transistor remains in active region.



Group - I

8) i) The Q point is essential to the over compound and direct functionality. It ensures that non-linear

component like diode operate at their optimal current and voltage throughout the temp range.

This also promotes increased function reliability and life cycle of your electronic circuit.

ii) Emitter Bene.

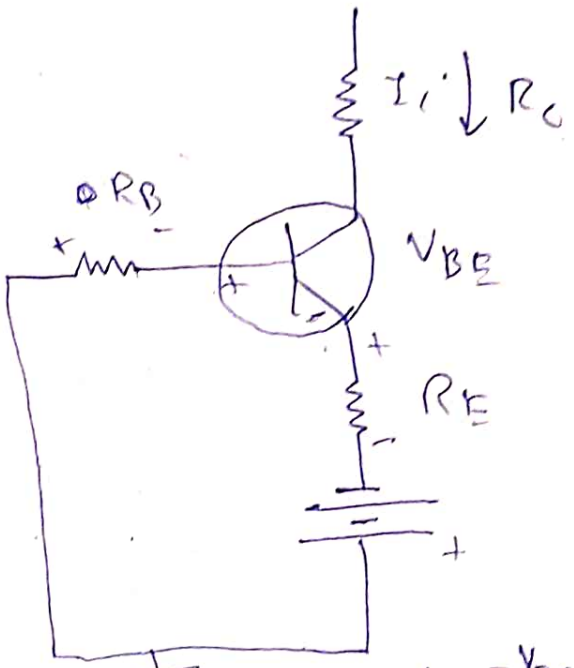
$$V_{EE} + V_{RB} + V_{BC} + V_{RE} = 0$$

ohms law

$$V_{EE} + I_B R_B + V_{BE} + I_E R_{BE} = 0$$

$$I_B = I_E / \beta_{BC}$$

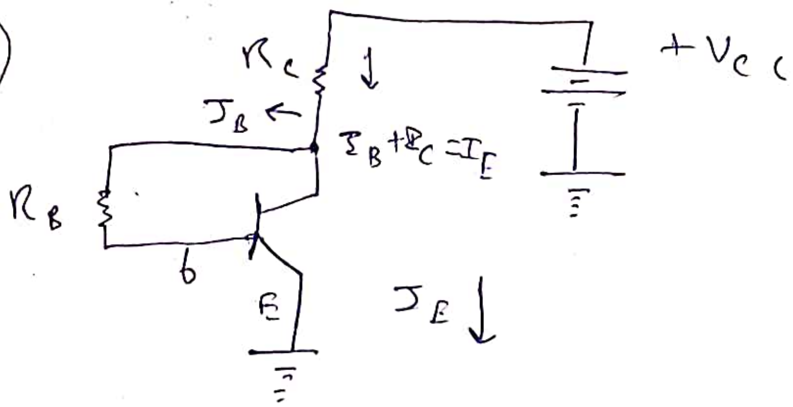
$$\left(\frac{I_C}{\beta_{AC}}\right) R_B + I_E R_E + V_{BE} = -V_{EE}$$



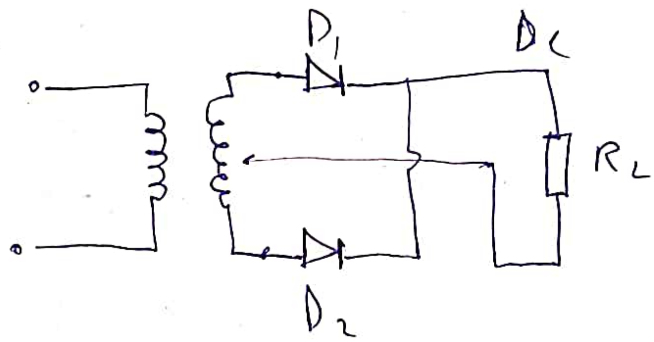
q) i) In ordinary biasing we should set the voltage but in emitter biased network it creates voltage stuff due to the effect on base current and the biasing occur with out need of explicit

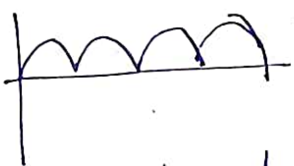
power supply.

iii)



11) A) i) ~~The full~~.



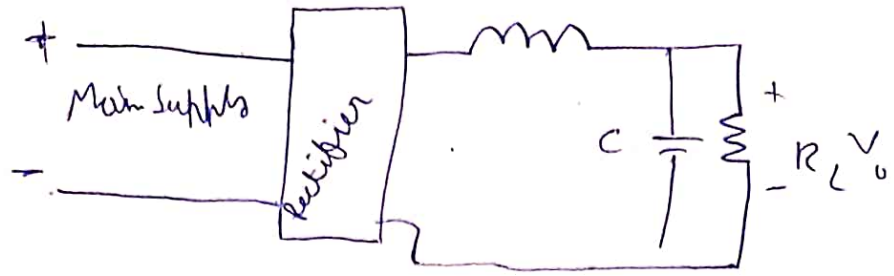


The full wave rectifier rectifies both halves of each ac input. When p-n junction is forward bias the diode offers low resistance and in reverse high resistance.

Ripple factor It measure efficiency of a ~~D~~ rectifier circuit $\frac{\text{rms value}}{\text{AC comp}}$

2) $J = \sqrt{\left(\frac{V_{rms}}{V_{DC}}\right)^2 - 1}$

12) B) i)



~~DC Source~~

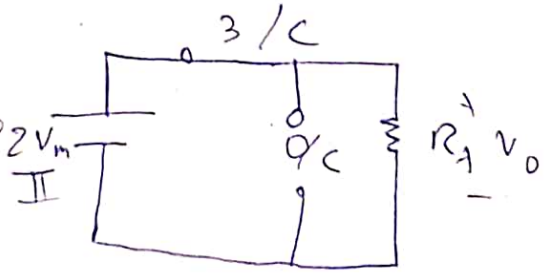
DC Source value (taking only 1 harmonic component) $= -\frac{4V_m}{3\pi} \cos 2\omega_0 t$

↑ is the 2nd harmonic

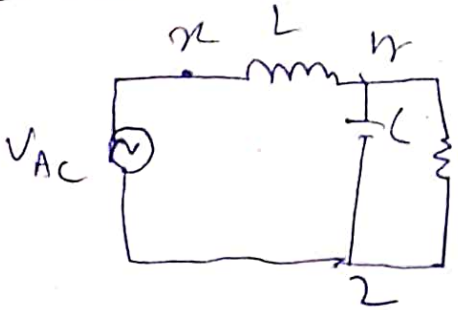
ω_0 = input main supply AC frequency or angular frequency

for DC

~~L = short circuit~~



for AC



$$V_0 = \frac{Zyz}{2my + 3yz} \times V_{AC}$$