Allered a chi stolle a drazai de dreene touse touse with voltage applied with 2 when testing a diede, onsure that the list verloge did not execut the diede maximum allowable verenge Circuit diagrams Half wave rectifien with filter 4- The connection of the tronsformed is me 124007 0-50 m A 12V the half wave any Filters are one without 1000WF/

# Rectifiers with filters

Aim: To determine the following parameters of halfware and follware rectifier circuits with filters.

1. ripple factor

2. Variation in % of regulation

3. To observation the olp on CRO.

### Apparatus

1. Ammeters	0.50mA -1
2. Digital multimeter	
3. Decade resistance 60	x -1
4. Decade inductance 6	
Components	in the last

# 1. Diode - 1N4007 -2

2. Capacitors - 1000 m F / 60 v - 2

3. Transformer - 230 V/12-0-12V -1
0.5mA

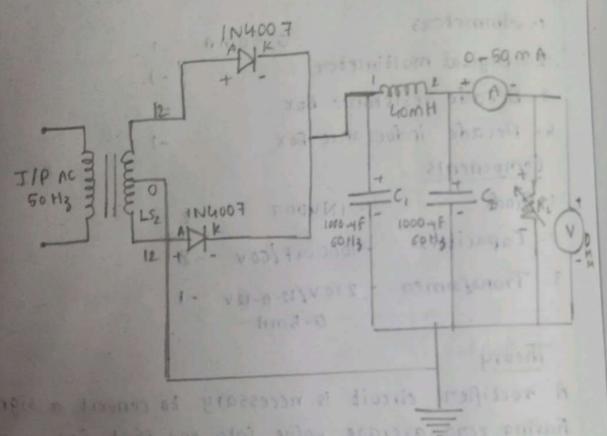
## Theory

A rectifien circuit is necessary to convert a signal having zero average value into one that has a non-zero average. A filter circuit is necessary to provide a more steady DC voltage.

The action of this system depends upon the fact that the capacitors restore energy during the conduction period and deliver this energy to the load during the non-conducting period. In this way the time during which the current passes through the load is prolonged and the ripple is considerably to be decreased.

# Full wave Rectifier with fitter

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The action of this system depinds upon the fact high the case the case the confection and deliver this energy desired the confection this energy to the confection the case of the confection the case of the confection and confection the case of the confection the case of the case of

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The diode will be forward biased when the bransformer voltage vi exceeds the capacitor voltage, then the capacitors starts changing in stepping with the applied voltage. The diode will be revenue biased when the transformer voltage v; falls below the capacitor voltage. Then the capacitor stants discharging through the load resistor.

let the capacitor is initially changed during capacitor first quanten cycle, the diode conducts and the capacitor changes with the input Voltage upto Vo = Vm - when Vi falls below vm diode is not conducting and the capacitor discharges at slower rate than input voltage. In the time constant Ric is large as compared with the period of input wave form the discharge is low. Thus only a small decrease in vo occurs between to and to. At time t, = tz vi equals the capacitor voltage. The diode again conducts between to and to soes not conduct between

to and ty. The process is repeated.

Ripple factor

The Filtered output has a DC value and some AC variations cripple). Smaller the Ac variation with respect to the OC level, the better the filter circuit operation. The fifter vostage waveform with De and ripple voltages is shown below.

5.00	41	put	Output
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# Procedure

## Half wave

- 1. Connect the circuit as shown
- 2. Give input from AC mains.
- 3. Measure the no load oc voltage using OMM.

  let this be VNL.

4. Now connect the DRB. Vary the DRB and note the values of Ioc in steps of 10mA untill the current reaches 100mA.

5. At each step measure the voc and vac calculate ripple factor '7' as the ratio of vac and voc

6. Plot the graphs of Voc Vs XIDE, Vs Jpc and 1. regulation us IDC.

#### Full wave

- 1. Connect the circuit as shown.
- 2- Give input from AC mains
- 3. Measure the no load DC voitage using DMM.

  let this be VNL.

u. Now connect the DRB. Vory the DRB and note the values of IDE in steps of 10mA until the current reaches 100mA.

- 5. At each step measure the voc and vac calculate.

  ripple factor 'r' as ratio of Vac and voc.
- 6. Plot the graphs of Voc vs Ioc, Y vs IDc and
  1. regulation vs Ioc.

Model wave forms Half wave Full wave THERE IN GOOD I GO WAS TO notes tous willow so read Vol on say section 18 18 18 MA 311 statusted when we say was the high high Theoritical calculations Half wave we was the save save saying sile ton comme de douch lough some 2 Jetersone in an and DC wings Using OP-IV. Full waves and place that said to the said to brown thousand from the s. All each step, measures the vocand was elicited you term you as side to be noted style the stay to sold of you do theory of sold a Tol as mailbugs to

1- Only the capacitor input filter is preffered to choke input filter because the DC output is much larger and ripples are less in comparaisions to those in choke input filters.

iii Series inductors and L-section fifters cannot be used with half-wave rectifiers because operation of series inductor depends upon the current through it and needs a minimum current to flow at all times.

iii) After converts pulsaking output of rectifier into a steady oc level.

is Never remove or insert a diode into a circuit with voltage applied.

in when testing a diode, ensure that test vostage did not exceed the diodes maximum allowable voltage. iii) Ensure a replacement diode into a circuit was in the correct direction

iv) The correct connection of the transformer is made sure.

# Result

wave forms of halfwave and full wave rectifiers with filters are observed on CRO.