MAT JOURNALS
Journal of Electronic Design Engineering
Volume 4 Issue 1

Shortwave Diathermy Machine

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Abstract
In this paper, Diathermy is a most generally prescribed for muscle and joint conditions. It uses a high-frequency electric contemporary to stimulate warmth technology inside frame tissues. Shortwave diathermy makes use of excessive frequency electromagnetic power to generate heat. Diathermy uses high-frequency electric present day to supply warmth deep inner a centered tissue. it can attain regions as deep as two inches underneath the skins surface.

Keywords:*Diathermy machine,setuptransformer,oscillator,magnetron tube*

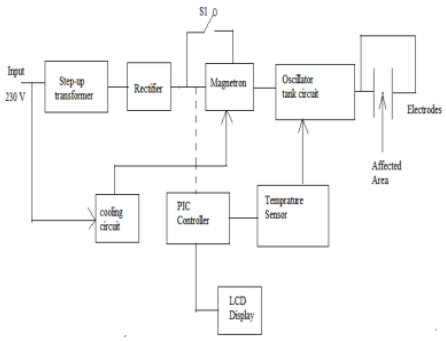
INTRODUCTION

The term 'diathermy' means 'through heating' or generating deep heating at once within the tissues of the body .Externally applied assets of heat infrared lamps and electric heating pads often produce soreness and pores and skin burns long earlier than adequate warmness has penetrated to the deeper tissues. The diathermy technique, the subject's body becomes a part of the electrical circuit. Heat is produced within the body and not transferred through the skin .The heating of the tissues is carried out by high frequency alternating current which generally has a frequency of 27.12Mhz and wavelength of 11m.The RF energy heats the tissues and promotes of injured tissues and inflammations.

The two most common forms of application:
1. The capacitive plate method
2. The inductive plate method

The method consist in applying the output of the radio frequency(RF) oscillator to a pair of electrodes which are positioned on the body over the region to be treated. The shortwave diathermy therapy: the pattern of tissues is greatly affected by the shortwave diathermy delivery.

BLOCK DIAGRAM



Hardware Design:

Step up Transformer:

A transformer in which the output (secondary) voltage is greater than its enter (primary) voltage is known as a step-up transformer. The step-up transformer decreases the output cutting-edge for maintaining the input and output power of the system equal.

Considered a step-up transformer shown in the figure below .The E_1 and E_2 are the voltages, and T_1 and T_2 are the number of turns on the primary and secondary winding of the transformer.

The number of turns on the secondary of the transformer is greater than that of the primary, i.e., $T_2 > T_1$.Thus the voltage turn

ratio of the step-up transformer is 1:2. The primary winding of the step-up transformer is made up of thick insulated copper wire because the low magnitude current flows through it.

Magnetron

The Magnetron is a vacuum tube which is used in the generation of microwaves of high power. Its working *principle* is based on the interaction between electron stream and magnetic field.

The cavities of a ***Magnetron Tube*** consist of hot cathode in which high negative capability is created with high voltage DC energy. While Cathode emits electrons, they start traveling in vacuum. Their path depends on the electricity and path of the Magnetic area and electric powered area. The magnetic discipline reasons the electrons to get attracted toward fine anode and starts to circular path. Then they sweep past the openings of the cavities which are open along their length. Then these electrons induce high frequency radio field in the cavity due to which electrons got bunched into groups. Then this field goes into output coupling loop which in turns connected to wave guide or antenna depending on the output requirement.

Oscillator

An oscillator is a circuit which produces a continuous, repeated, alternating waveform with none enter. Oscillators basically convert unidirectional modern-day float from a DC source into an alternating waveform that's of the favored frequency, as decided by means of its circuit additives. The simple principle behind the operating of oscillators may be understood by means of analyzing the behavior of a LC tank circuit proven by way of figure 1, which employs an inductor L and a totally pre-charged capacitor C as its components. here, in the beginning, the capacitor starts to discharge via the inductor, which ends up within the conversion of its electric strength into the electromagnetic discipline, which may be stored inside the inductor. as soon as the capacitor discharges completely, there will be no modern-day waft in the circuit. however, with the aid of then, the stored electromagnetic area could have generated back-emf which results in the flow of current through the circuit in the same direction as that of before.

PIC Controller

PIC microcontrollers (Programmable Interface Controllers) are electronic circuits that may be programmed to perform a massive range of tasks. They may be programmed to be timers or to manipulate a production line and lots more. They may be found in most electronic devices along with alarm structures, laptop manipulate systems, telephones, in fact almost any electronic tool. Many styles of percent microcontrollers exist, although the pleasant are possibly observed in the GENIE variety of programmable microcontrollers. These are programmed and simulated through Circuit Wizard software program.

PIC Microcontrollers are pretty cheap and can be offered as pre-built circuits or as kits that can be assembled by using the consumer.

LCD Display

LCD (Liquid Crystal Display) is an electronic show module and discover a huge range of applications. A 16×2 liquid crystal display show may be very basic module and could be very normally used in numerous devices and circuits. these modules are favored over seven segments and other multi segment LEDs. The reasons being: LCDs are within your means; without problems programmable; don't have any dilemma of showing unique and even custom characters (in contrast to in seven segments), animations and so on.

Result

Short wave diathermy is widely available, yet a comprehensive examination of current clinical practice remains absent from the literature. the present paper aim to access clinical and safety issues in short wave diathermy application and subsequently indicate areas for future research.

The response rate to study was 75% .analysis found that SWD was the prefered mod of treatment with 27% of respondent using it more than once daily.
The shortwave diathermy therapy is based upon medical field.
Depending on the amount of heat generated, diathermy may be used to simply heat or to break tissue. in the first example, it is precise beneficial in relieving muscle discomfort and sprain. Within the second, as an adjunct to surgical operation, diathermy is used to coagulate, save you immoderate bleeding, and seal off traumatized tissues. It's miles mainly powerful in eye surgical operation and neurosurgery. Diathermy therapy is also used correctly to deal with lower back ache, to get rid of warts and moles, and to wreck or localize bacterial contamination of tissues.

ADVANTAGES

- Shortwave diathermy machine can heat deeper than hot packs.
- Shortwave diathermy machine heats a larger area than ultrasound.
- Shortwave diathermy machine is not reflected by bones so no risk of periosteal burns.
- Shortwave diathermy machine heat delivered provides pain relief and better flexibility.
- SWD machine can reduces inflammation.
- Improve circulation.

APPLICATIONS

In clinics:
Medical diathermy is a production of heat in the body tissues for therapeutic purposes by high frequency current to produce temperatures high enough to heat the tissues.
In physiotherapy

CONCLUSION

Thus this paper successfully show a novel method of Shortwave Diathermy machine which heats the muscle tissues of our body and reduces the pain of patient.

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