ELECTROTHERAPY — HIGH FREQUENCY

Examinations at the end of 2nd Year **** Instruction hours: - 200***

I. 1. Theory internal — 20 Marks
2. Theory examination — 80 marks
II. 1. Practical internal - 20 Marks
2. Practical examination — 60 Marks
3. Orals - 20 Marks

PART — I

BASIC PHYSICS: [1 hour]

A. Define electricity : Discuss its properties briefly.

1. Describe the 2 types of electricity — static, current.
2. Cell battery, electrical energy and power

B. Magnetism; Discuss briefly : [2 hours]

1. Nature-molecular theory
2. Magnetic effect of an electric current
3. Properties

C. Define electromagnetic induction. Discuss: [2 hours]

1. EMF
2. Principles of Dynamo
3. Principles, construction & types of transformers
4. Choke coil.

D. Condensers. Define and discuss: [2 hours]

1. Principles
2. Measurement
3. Factors determining capacity
4. Construction
5. Field between condensers
6. Charging and discharging
7. Discharge through inductance & capacitive resistance.

E. Rectifiers [2 hours]

1. Types of rectifiers
   - Valve rectifiers - diode valve, triode valve — construction, function
   - Metal rectifiers — construction & function of rectifiers
2. Types of rectification — half wave & full wave rectification
3. Smoothening circuit

F. Explain with diagram the working and use of the fuse and grid, switch and reversal switch [2 hours]

G. Discuss the various devices used in regulating intensity of current. — rheostat and potential divider [1 hour]

H. Define oscillation. What is "capacitance" and "inductance" ? [1 hour]

Give an example of an oscillating system:

1. What is the frequency of oscillation and how is it calculated in brief?
2. What do you mean by damping of oscillation?
3. How does transfer of energy between 2 circuits take place?

I. Physics of heat & Radiation [2 hours]

1. Heat & temperature
2. Physical effects of heat
3. Transmission of heat
4. Radiant energy
5. Electromagnetic spectrum
6. Laws governing radiations
7. Reflectors
8. Inverse square law

PART — II

HIGH FREQUENCY:

I. SHORT WAVE DIATHERMY: [30 hours]

A. PROPERTIES OF H.F. CURRENTS

1. Sustained and unsustained.
2. Damped and undamped
3. Impedance
4. Define Nodes and Antinodes. Explain, with examples, the fields set up etc.
5. Define wavelength.

B. TYPES OF HIGH FREQUENCY CURRENTS (IN BRIEF)

C. PRODUCTION OF H.F. CURRENTS ;

1. Principles
2. Construction of apparatus with diagram.
3. Tuning of machine.
4. Regulation of current.

D. METHODS:

1. Condenser field
2. Cable method.
3. Effects of 2 fields.

E. PHYSIOLOGICAL AND THERAPEUTIC EFFECTS OF S.W.D.

F. TECHNIQUE OF APPLICATION :

1. Testing machine.
2. Preparation of patient.
3. Types of electrodes
4. Position and size of electrodes
5. Selection of electrode - electro static field & electro magnetic field
6. Electro static field — spacing need & types

   Apposition

   Size of electrode

   Application

7. Electro magnetic field — Cable method of applications
8. Dosage

G. PULSED ELECTROMAGNETIC ENERGY [1 hour]

H. DANGERS AND PRECAUTIONS.

I. INDICATIONS AND CONTRA-INDICATIONS.

II. MICROWAVE DIATHERAMY (M.W.): [10 hours]

A. 1. PRODUCTION — EXPLAIN WITH DIAGRAM

2. Explain how the magnetron works within.
3. Application of M.W.
4. Physiological effects
5. Therapeutic effects.

B. TECHNIQUE OF APPLICATION — DOSAGE (IN DETAIL)

C. INDICATIONS & CONTRA — INDICATIONS.

D. DANGERS.

PART — III

ACTINOTHERAPY

I. INFRA RED RAYS: [15 hours]

A. 1. I.R. WAVE LENGTH AND FREQUENCY.

2. Types of generators and their working.
3. Physiological effects.
4. Therapeutic effects and uses.

B. TECHNIQUE OF IRRADIATION.

1. Choice of apparatus
2. Preparation of patient
3. Arrangement of lamp
4. Application of treatment
5. Duration and frequency.

C. BRIEFLY DISCUSS DANGERS

D. INDICATIONS & CONTRA — INDICATIONS.

E. THERAPEUTIC USES — ITS PHYSIOLOGICAL EFFECTS.

II. ULTRA VIOLET RADIATION: [30 hours]

A. PHYSICS

1. Electric arc
2. Process of ionization.
3. Transmission of current through gases.
4. Types of lamps

B CONSTRUCTION OF LAMPS

1. High pressure mercury vapour lamps
2. Kromayer lamp
3. Tridymite formation.
4. Cooling
5. Spectrum — mercury vapour lamp (in brief)
6. Fluorescent tube for U.V. Production.
7. PUVA apparatus
8. Care of lamp

C. PHYSIOLOGICAL AND THERAPEUTIC EFFECTS — IN DETAIL; PHOTO-SENSITIZATION — IN BRIEF

D INDICATION, CONTRA INDICATION AND DANGERS.

E. TECHNIQUE OF APPLICATION ;

1. Test dose
2. Local treatment

3. General irradiation
4. Treatment

F. CONDITIONS (COMMON) IN WHICH ABOVE TREATMENT IS GIVEN

G. SENSITISERS (IN BRIEF)

H. FILTERS

I. COMPARISON BETWEEN I.R. & U.V.

III. LASER: [10 hours]

1. Introduction
2. Characters
3. Production
4. Types
5. Classification
6. Physiological effects
7. Therapeutic effects
8. Principles and techniques of applications
9. Dosage
10. Indications
11. Contraindications

PART — IV

HEAT & COLD THERAPY [20 hours]

A) THERAPEUTIC CONDUCTION HEATING

1. General principles
2. Thermal regulatory mechanism
3. Physiological regulation
4. Physiological effects of local tissue heating
5. Sites of tissue heating
6. Burns
7. Paraffin wax bath
8. Hydrocollator packs
9. Hydrotherapy
10. Heated air treatment
11. Fluido therapy

12. Electric heating pads
13. Physiological & therapeutic effects of superficial heating
14. Indications / contra indications

B) CRYOTHERAPY [20 hours]

1. Physiological changes due to cooling of the skin
2. Therapeutic uses of cold
3. Methods of application
4. Contrasting heat & cold treatment
5. Vapocoolant sprays — cryokinetics & cryostretch
6. Dangers & contra indications

PART — V

ULTRASONIC THERAPY [40 hours]

A. What is U.S. Therapy
B. Explain with the aid of diagram the production of U.S.Waves and Piezo Electric Effect.
C. Three Properties of U.S.Waves in detail
   1) Reflection
   2) Transmission and
   3) Absorption
D. Properties of ultrasonic field / depth of penetration in relation to (a) intensity and (b) frequency.
E. Effects on tissues:
   1 Thermal
   2 Mechanical
   3 Chemical and biological
   4 Effects of ultra sound on inflammation & repair process
F Coupling Media
G. Mode of U.S — pulsed and continuous mode.
H. Therapeutic uses of U.S
I. Techniques of application:
   1 Method
      i. Direct contact
      ii Water bath

iii Water bag

2. Dosage in acute and chronic conditions

3. Testing of apparatus.

J. Dangers

K. Indications & contra — indications.

L. Phonophoresis, drugs used in phonophoresis & its application

PART — VI

TRACTION [10 hours]

1. Effects of spinal traction
2. Types
3. Application techniques
4. Indications
5. Adverse effects of spinal traction
6. Contraindications
7. Precautions

References: -

1. Electrotherapy Explained — Joseph Kahn.
2. Claytons Electrotherapy.
3. Eletrotherapy Explained - Low and Reed.
4. Basics of Electrotherapy - Subhash Khatri.
5. Electrotherapy - S. Kitchen.
6. Physical Agents in Rehabilitation - Michelle Cameroon.