

Government of Karnataka



PARA MEDICAL BOARD

Revised Syllabus

of

**II & III Year Diploma in Operation
Theater & Anaesthesia Technology**

(Previously first/second year certificate course/

I year DOTT/II DOTT)

2017

Second Year Diploma in Operation Theater and Anaesthesia Technology

Q P CODE: 5131

FUNDAMANTALS OF O.T. TECHNIQUE & BASIC CONCEPT IN SURGERY

1. Introduction to Learners .

Modern Surgery, Professional Nursing, Technical Nursing, correction of theory & practice. The Learners, objectives of learning, the chemical instructor, expected behaviour of or Nursing personnel, Necessity for standardized procedures & Techniques Credentially .

2. Health care Team

Team concept Dependence of patient on or Team, sterile team members, unscrubbed team members, Direct patients care team is part of department , Nursing administrative personnel , staff nursery personnel Team work.

3. The patient

Patient centered care, the patient basic needs, patient reaction to illness, Patient regrets, patient physician relationship, acceptance of operation, patients with special needs, preparation of all patients for surgery, teamwork.

4. Pre-operative Nursing

Pre-operative role, standards of pre-operative nursing practice, pre-operative assessment, pre-operative planning, pre and intra operative implementation, intra and post operative evaluation.

5. Physical facilities at operation theatre

Physical layout or exchange areas, peripheral support areas or room.

6. Asepsis, infection control & principles of sterile technique.

Historical introduction, surgical conscience, definition, infection, source of contamination, infection control, environmental control need for sterile technique, principles of sterile technique and illustrations of application recommended practicals, prevention of infection.

7. Sterilization and disinfection

Bioburden, Microbiological safety, parameters of sterilization, Methods of sterilization, control measures like Disinfection, Concept of Central Sterile Supply Department (CSSD)

8. Surgical Scrubs, gowning and gloving

Historical introduction of asepsis, the surgical scrubs, gowning and gloving.

9. Division of Duties, set up , procedure clean up.

Preliminary preparation , diversion of duties, scrub nurse, circulating nurse, sponge, sharp instruments counts, Room clean up procedure after surgery – Daily cleaning after schedule is completed – Weekly/ monthly Cleaning.

10 Economy , work simplification & Safety.

Efficiency of or staff , time and motion economy, Economical use of supplies and equipment . pros & cons of disposables, Care and handling of instruments, Electrical hazards and safeguards , Radiation hazards and safeguards

11. Manifold room concept, Supply of gases, Vacuum suction, Scavenging gases

12 Various types of cautery and precautions in using cautery, Harmonic scalpel.

13 Preservation of specimens to be sent for Histopathology, Microbiology.

14 Ambulatory Surgery

Ambulatory surgical care facility , the ambulatory surgical patient, Patient nurse relationship intra operative care Recovery, Discharge and follow up Advantages of ambulatory surgery.

15.Pre operative care.

Introduction pre operative room, receiving patients & identification , Care of pre –operative patient, Check list

16.Patient Monitoring potential complications and CPR

Monitoring of vital function`s complication of operations, CPR

17. Positions

Preliminary consideration. Criteria positing. Equipment for position, operative positions. Patient as individual Awareness of risks Involved in various positions

18.Preparation of operative site and draping

Preparation of patient prior to surgery Nasogastric intubation urinary Tract catheterization, skin preparation. Patients skin preparation on O R table Draping Plastic isolation.

19.Wound management and methods of haemostasis

20. History of wound management mechanism of wound healing, Factors influencing wound mechanism of haemostasis Methods of haemostasis.

21. Wound care material.

Sutures, surgical needles common suturing techniques, Surgeon's Choice of sutures and needles, packing and preparing surgical staples tissue adhesives tissue repair materials, tissue replacement materials, skin closure drug and medical advice, legislation.

22. State of Art technology

Specialised surgical tools Electro surgery Laser surgery, Endoscopy microsurgery.

23. Diagnostic procedures

Radiology, Ultrasonography, Endoscopy Plethsmography, Sensory Evoked potential MIR

24. Concepts of Laparoscopic surgery

PRACTICALS

1. Techniques of scrubbing, Wearing sterile gown & Gloves
2. Techniques of draping
3. Techniques of O R Cleaning Sterilization.
4. Sterilization of O R instruments and equipments
5. Packing linen instruments For Sterilization.
6. Flash Sterilization.

SECTION A**Q P CODE: 5133**

Unit I. Acids, bases, salts and indicators

Acids and Bases – Definition, physical and chemical properties with examples. Arrhenius concept of acids and bases, Lowry – Bronsted theory of acids and bases classification of acids and bases. Concepts of acid base reaction, hydrogen ion concentration, Ionization of water, buffer, pH value of a solution.

Salts – Definition, classification, water of crystallization – definition and different types, deliquescent and hygroscopic salts.

Acid-base indicators: Definition, concept, commonly used indicators, and their pH range, suitable pH indicators used in different titrations, universal indicators.

In brief about acid base disorders.

Arterial blood gases

Unit II : Basic Biochemistry

Carbohydrates:

Classification, Definition & properties of monosaccharides, disaccharides, and polysaccharides.

Proteins:

Proteins – Definition, classification, properties.

Amino acids - Definition, classification, essential & non essential amino acids. Reactions of amino acids.

Plasma proteins – Definition, classification and reference values.

Lipids

Definition, classification and properties of lipids and lipoproteins.

Nucleic acid chemistry

Definitions of DNA, RNA, purines and pyrimidines, nucleosides and nucleotides.

Enzymes- Definition, classification and factors affecting enzyme activity. Isoenzymes – Definition, classification and significance.

Vitamins and Minerals: in brief about reference values in blood.

Normal and Abnormal Constituents of Urine.

Unit III. Liver Functions & their Assessment

Tests for 1) Carbohydrate metabolism 2) Protein metabolism 3) Lipid metabolism 4) Measurements of serum enzyme levels, Bile pigment metabolism, Jaundice, its types and their biochemical findings.

Unit IV. Different methods of Glucose Estimation-

Principle advantage and disadvantage of different methods

Unit VI. Renal Function Tests-

GFR & Clearance tests, Various Tests in detail.

Unit VII. Cardiac Profile -

In brief Hypertension, Angina, Myocardial Infarction, Pattern of Cardiac Enzymes in heart diseases

Different methods of Cholesterol Estimation- Principle, advantage and disadvantage of different methods. Lipid profile.

Unit VIII. Electrolytes, Blood Gases and pH

pH Regulation,

Disturbance in acid Base Balance, Metabolic acidosis & alkalosis, Respiratory acidosis & alkalosis.

Basic Principles and estimation of Blood Gases and pH,

Basic principles and estimation of Electrolytes

No practical examination

SECTION B

Q P CODE: 5134

Syllabus

Total teaching - 35hrs

1. Introduction
 - a. Definition and terminology
Pharmacology, Drug (WHO Definition),
Pharmacokinetics, pharmacodynamics,
Pharmacotherapeutics, chemotherapy, chemoprophylaxis,
Clinical pharmacology, Toxicology and Pharmacopeias.
 - b. Drug nomenclature, prototype drug.
 - c. Concept of essential Medicines list
 - d. Sources of drugs.
2. Dosage forms of drugs—types with examples
3. Routes of drug administration in general and emphasis on intravenous (IV), IM and inhalational route of administration of drugs
4. Adverse drug reactions (ADR) , Definition and types, with emphasis on side effects, hypersensitivity reactions and their management.
5. Analgesics – Definition and types,
Commonly used NSAIDS- their uses, adverse effects & precautions
Aspirin, Ibuprofen, Diclofenac, Aceclofenac, ketorolac,
paracetamol
Opioids – Morphine, Pethidine, Pentazocine, Fentanyl
Alfentanil, Sufentanil and Ramifentanil
Uses, adverse effects, precautions & contraindications.
6. Sedatives hypnotics- Definition, uses, adverse effects of diazepam, lorazepam and midazolam.
7. Local anesthetics - Definition, classification and in detail of commonly used drugs like Lignocaine, bupivacaine, eutectic mixture,
Techniques of LA
8. General anaesthetics
Halothane, Isoflurane, Sevoflurane, Thiopentone sodium, Propofol,
Ketamine and pre- anaesthetic medication
9. Corticosteroids- definition, classification, uses, adverse effects and contraindications and emphasis on hydrocortisone
10. Antiseptics and disinfectants -commonly used drugs in OT, OT fumigation

11. Skeletal muscle relaxants-- uses, adverse effects and contraindications of succinylcholine, Pancuronium, Vecuronium, Rocuronium and Mivacurium

12. Anti-emetics metoclopramide, ondansetron

13. Intravenous fluids -- crystalloids and colloids

14. Emergency drugs used in OT

- Atropine
- Adrenaline
- Nor-adrenaline
- Dopamine & Dobutamine
- Chlorpheniramine maleate
- Promethazine
- Vasopressin
- Deriphyllin & Aminophylline
- Frusemide and Mannitol
- Sodium bicarbonate
- Hydrocortisone & dexamethasone
- Mephenteramine
- Esmolol, labetalol
- Verapamil, amiodarone, lignocaine
- Diazepam, lorazepam
- Sodium nitroprusside, nitroglycerine
- Anti-fibrinolytics
- Styptics
- Emphasis on management of Medical/ surgical emergencies—anaphylactic shock, hypotension, seizures, acute adrenal crisis, acute asthma, haemorrhage & hypovolemia, arrhythmias, hypoglycemia, hypertensive crisis

15. Drugs used in acid peptic disorders -ranitidine and pantoprazole

16. Drugs used in management of hypertension-commonly used drugs

18. Drugs used in management of Diabetes mellitus- Insulin – Uses & Adverse effects and Precautions during use.

19. Antimicrobial drugs - General considerations, Beta-Lactam antibiotics

Fluoroquinolones and aminoglycosides

Metronidazole

Antiretroviral drugs used in post exposure prophylaxis

MICROBIOLOGY**20 Hrs****SECTION C****Q P CODE: 5135**

Introduction and History of Microbiology Lewis Pasteur, Robert Koch, Lister, Edward Jenner, Normal Flora of skin / body	5 marks
Sterilization and disinfection: Dry and moist heat of sterilization Sterilization of mask, endotracheal tube Respirator / OT sterilization / Other equipment	10 marks
Bacteriology – Classification, Morphology of Bacteria Immunity – Active, Passive, Hypersensitivity (Immunisation) Reaction of the body – local, specific effects to certain organism	5 marks
Common diseases caused by different types of organisms Staph, Strepto, C. tetanus, and welchii, Mycobacterium tuberculosis, E. coli, Pseudomonas (Candida cryptococcus) Virology – Hepatitis (HBV, HCV), HIV, etc. Nosocomial infections & infection control measures Universal precautions Bio Medical Waste Disposal	10 marks

NO PRACTICAL EXAMINATION IN MICROBIOLOGY

SECTION A**Q P CODE: 5136**

“Must know”

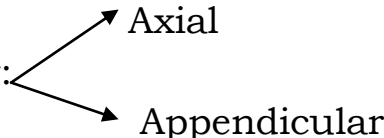
General Anatomy:

1. Introduction to Anatomy

a. Definition of Anatomy

b. Anatomical position

- Supine, prone, lithotomy → positions

c. Different parts of human body:

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graph LR; A[Different parts of human body] --> B[Axial]; A --> C[Appendicular]
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→Head and neck, Thorax and abdomen, pelvis and perineum, upper and lower limbs.

d. Anatomical planes and sections: Median, sagittal, coronal, transverse, longitudinal, horizontal, oblique.

e. Anatomical terms:

Anterior, posterior, superior, inferior, medial, lateral, proximal, distal, superficial, deep, ventral, dorsal, cephalic, caudal, interior, exterior, invagination, evagination, ipsilateral, contralateral.

f. Terms for describing muscles:

Origin, insertion, Belly, tendon, aponeurosis, raphe.

g. Anatomical movements:

Flexion, extension, adduction, abduction, Medial rotation, lateral rotation, circumduction, pronation, supination, protraction, retraction, elevation, depression.

2. Basic tissues: Definitions of

Epithelium, connective tissue (including cartilage and bone), muscle, nerve.

3. Skeletal System:

Types and number of bones: Identification of each bone with its major features (ex: Femur with its upper end, lower end, shaft, trochanters, condyles, linea aspera etc)

Arthrology and Kinesiology in general:

Classification of Joints

Each joint to be understood under participating bones and movements.

4. Systemic Anatomy:

The student should be able to identify and understand the anatomical components of each system with functional correlation. (Diagrams, models, specimens from the dissected cadavers and colour photographs, 2D and 3D animation techniques can be used to teach.)

All systems are to be studied under the following:

- a. Parts
- b. Positions of each part
- c. Surface anatomy
- d. Functional and surgical correlations in terms of terminology.

Gastro intestinal system, cardiovascular system, lymphatic system, Endocrine system, urinary system, Reproductive system (both male and female), Respiratory system, Central and peripheral nervous system, Integumentary system including mammary gland, Mediastinum and diaphragm and organs of special senses.

→ Identification with knowledge about functional significance is a must.

- e. The student should understand all the above and importance must be given for the following topics, to make the student more competent in the field of anaesthesia technology.

- i) Anatomy for regional anaesthesia

→ Dermatomes, cutaneous innervations all over the body, Nerve plexuses like cervical, brachial,

lumbosacral plexuses, Axilla, First rib, intercostal spaces.

- ii) Diaphragm, Larynx, upper and lower airway.
- iii) All cranial nerves → identification, functional importance.
- iv) Arterial and venous systems, especially superficial veins all over the body.
- v) Orbit, Base of skull, vertebral column, spinal cord, meninges.

SECTION B**Q P CODE: 5137****Introduction:-**

Physiology - Homeostasis

Structure of a Cell, Intracellular Organelles, Cell Junctions, Stem Cells, Cell Aging & Death

Transport across cell membranes:-

Mechanisms of Transport across Cell Membrane

Body Fluids:-

Compartments of Body Fluid, And Measurement of Body Fluids.

BLOOD (Duration of Teaching - 7 Hrs)**Composition & Functions of Blood****Plasma:-**

Composition and Functions of Plasma Proteins

Cellular Components of Blood:-

(RBC, WBC, PLATELETS) Morphology, Physiological Values, Functions, Formation Of Hemopoietic Cells, Life Span & Applied Aspects

Hemoglobin:-

Formation, Functions, Physiological Values, Destruction Of RBC, Applied Aspects

ESR, PCV, Blood Indices & Anemia**Blood Groups:-**

ABO Blood Grouping, Rh Typing, Landsteiner's Law, Cross Matching, Storage Of Blood, Indications And Contraindications Of Blood Transfusion.

Hemostasis:-

Clotting Factors, Mechanisms Of Clotting, Anticoagulants, Applied Aspects

NERVE MUSCLE PHYSIOLOGY(Duration of Teaching - 5 Hrs)**Nerve:-**

Structure, Types of Neuralgia Cells, Functions Of Nerves

Receptors:-

Definition, Types of Sensory Receptors.

Reflex:-

Arc, Action & Reflexes.

Autonomic Nervous System:-

Organization and Functions

Synapse & Neuromuscular Junction**Muscle:-**

Types of Muscle, Muscle Spindle, Physiology Of Muscle Contraction. Applied Aspects

GASTROINTESTINAL PHYSIOLOGY(Duration of Teaching - 3 Hrs)

Structural Overview Of Gastrointestinal Tract

Movements of GIT

Salivary Glands- Its Secretions and Functions,

Hepatobiliary System - Secretions and Its Functions

Pancreatic - Secretions and Its Functions

Intestinal- Secretions and functions

Applied Aspects In GIT : Defecation

THE CARDIOVASCULAR SYSTEM(Duration of Teaching - 4 Hrs)

Anatomy Of The Heart, Structure And Function Of Cardiac Muscle, Conducting System Of Heart, Systemic And Pulmonary Circulation, Over View -Heart Rate, Stroke Volume, Cardiac Output, Heart Sounds, Pulse, BP & ECG And Recording Of ECG. CPR, Oxymetry, Shock, Intracranial pressure and cerebral blood flow

RESPIRATORY SYSTEM(Duration of Teaching - 3 Hrs)

An Overview of respiratory system: air way anatomy, muscles of ventilation, Regulation of respiration.

Functions of respiratory system, ventilation : exchange & transport of respiratory gases, compliance, surfactant.

Spirometry: dynamic and static volumes and capacities

Applied aspects: artificial respiration, hypoxia, Cyanosis, abnormal patterns of breathing.

RENAL SYSTEM(Duration of Teaching - 4 Hrs)

Overview of Anatomy of kidneys, renal blood flow, structure of Nephrons.

Renal and non renal functions of kidney

General principles of formation of urine, GFR, auto regulation of GFR and Renal blood flow, estimation of GFR

Fluid and electrolyte balance , Acid base balance

ENDOCRINE SYSTEM(Duration of Teaching - 4 Hrs)

Over view of endocrine system; hypothalamic hormones, Functions and applied aspects, hormonal regulation by positive and negative feedback mechanism of **Anterior & Posterior Pituitary Hormones, Thyroid Hormones, Parathyroid Hormones, Pancreatic Hormones, Adrenal Cortical Hormones.**

Temperature regulation and stress response

REPRODUCTIVE SYSTEM(Duration of Teaching - 3 Hrs)

Over view: Male And Female Reproductive System Functions of Male and Female Gonads, Menstrual Cycle

Changes during pregnancy, Pregnancy Tests And Contraceptive Methods In Male And Females.

CNS (Duration of Teaching - 2 Hrs)

Functional Organization Of Brain, Spinal Cord & Its Functions, Cranial And Spinal Nerves.

CSF Composition And Functions,

Applied aspects , CSF , Tapping & drainage, theories of mechanism of production of anesthesia

PEDIATRICS AND GERIATRIC PHYSIOLOGY (Duration of Teaching - 2 Hrs)

Paper	Subject	Section	Q P Code	Marks	No. of Teaching Hour
Paper 1	Fundamental of OT and Basic Concept in Surgery		5131	100	100
	Fundamental of OT and Basic Concept in Surgery Practical			100	80
Paper 2	Biochemistry	Section A	5133	40	40
	Applied Pharmacology	Section B	5134	30	35
	Microbiology	Section C	5135	30	20
Paper 3	Anatomy	Section A	5136	50	30
	Physiology	Section B	5137	50	40

COURSE CONTENT:(Anaesthesia Technician)

In general, it aims to impart: -

A knowledge of anesthetic drugs and adjuncts.

- Knowledge of cardiovascular, respiratory, neurological, hepatobiliary, renal physiology and endocrine homeostasis and related drugs as relevant to patients undergoing anesthesia. Relevant anatomy, physiology, biochemistry, pharmacology and physics.
- A basic idea of the relevant physical principles involved in the construction and functioning of equipment used in anesthesia and monitoring.
- Knowledge to assist in the commonly used techniques in general,
- Regional and local anesthesia, and their applications for routine and emergency anesthesia.
- Relevant knowledge to manage patients in intensive care unit.
- Relevant knowledge of record maintenance.
- Knowledge of cardiopulmonary resuscitation i.e. both BLS & ACLS.

DRUGS, EQUIPMENTS AND CLINICAL ANAESTHESIA
(including CPR) **DRUGS-30 Hours**

ANAESTHETIC DRUGS:

Induction agents-

Intravenous (Thiopentone, Propofol, Ketamine, Etomidate)

Inhalational (Halothane, Isoflurane, Sevoflurane, Desflurane)

Benzodiazepines (Diazepam, Lorazepam, Midazolam)

Opioids (Morphine, Pethidine, Fentanyl)

Dexmedetomidine

Muscle Relaxants: Depolarising (Succinylcholine) Nondepolarizing (Vecuronium, Atracurium, Rocuronium) Reversal agents (Neostigmine)

Local Anaesthetics: Lidocaine, Bupivacaine, Ropivacaine, Levo Bupivacaine

Premedicants and adjuncts:

Antisialogogues (Atropine, Glycopyrrolate), Antiemetics (Metoclopramide, Ondansetron), Steroids, Bronchodilators, Antihistamines, Vasopressors, Vasodilators

Fluids: Crystalloids, Colloids, Blood transfusion

DETAILED SYLLABUS OF DRUGS:

ANAESTHETIC DRUGS

IV Agents

1. THIOPENONE (Physical form, Dilution dosage, actions, side effects)
2. PROPOFOL (Physical form, contents, dosage, actions, adverse effects, uses)
3. KETAMINE (Physical form, dosage, actions, adverse effects, uses)
4. ETOMIDATE (Physical form, dosage, actions, adverse effects & uses)

Inhalational Agents – Classification

1. Halothane – MAC, Color coding, actions, uses, side effect
2. ISOFLURANE - MAC, Color coding, actions, uses, side effect
3. SEVOFLURANE - MAC, Color coding, actions, uses, side effect
4. DESFLURANE - MAC, Color coding, actions, uses, side effect

BENZODIAZEPINES

1. DIAZEPAM – MOA, formulation & dosage, uses, side effects
2. LORAZEPAM - MOA, formulation & dosage, uses, side effects
3. MIDAZOLAM - MOA, formulation & dosage, uses, side effects

OPIOIDS – Classification

1. MORPHINE – MOA, Formulation & dosage, uses, adverse effects & antagonists
2. PETHIDINE - MOA, Formulation & dosage, uses, adverse effects & antagonists
3. FENTANYL - MOA, Formulation & dosage, uses, adverse effects & antagonists

Alfa2 agonists :

DEXMEDETOMIDINE

- MOA, Formulation & dosage, dilution, actions, uses, adverse effects.

MUSCLE RELAXANTS – Classification

DEPOLARISING

- Succinyl choline – formulation & dosage, action, uses, adverse effects

NON – DEPOLARISING

- Vecuronium – formulation & dosage, metabolism, action, uses, reversal, adverse effects.
- Atracurium - formulation & dosage, metabolism, action, uses, reversal, adverse effects
- Rocuronium - formulation & dosage, metabolism, action, uses, reversal, adverse effects

REVERSAL AGENTS

- NEOSTIGMINE - formulation & dosage, metabolism, action, uses, reversal, adverse effects

VASODILATORS – Preparations

NITROGLYCERINE – formulation & dosage dilution & infusion dose, uses, Adverse effects, monitoring

SODIUM NITROPRUSSIDE – formulation & dosage dilution & infusion dose, uses, adverse effects, monitoring.

FLUIDS

CRYSTALLOIDS – Types available. Contents

(DNS, NS, RL, EP) – uses

COLLOIDS

- Types, Specific indication, adverse effects

BLOOD TRANSFUSION

Types of blood products available, storage, indications & dosage, checking of blood, complications, monitoring & treatment.

LOCAL ANAESTHETICS – Classification

LIDOCAINE – Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

BUPIVACAINE - Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

ROPIVACAINE - Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

LEVO BUPIVACAINE - Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

PREMEDICANTS AND ADJUNCTS

ANTI SIALOGUES

ATROPINE – formulation & dosage, actions, uses, adverse effects

GLYCOPYPROLATE - formulation & dosage, actions, uses, adverse effects

ANTEMETICS

METOCLORRAMIPE - formulation & dosage, actions, uses, adverse effects

ONDANSETRON - formulation & dosage, actions, uses, adverse effects

STEROIDS – Preparations, formulation & dosage, actions, uses, adverse effects

BRONCHO DILATORS – Contents, formulation & dosage, actions, uses, adverse effects

ANTIHISTAMINES – Types, formulation & dosage, actions, uses, adverse effects

VASOPRESSORS – commonly used drugs:

DOPAMINE, DOBUTAMINE, NORADRENALIN,

ADRENALIN

Formulation, dosage, dilution, infusion dose, uses, actions, and adverse effects.

Anaesthesia Work Station: Oxygen delivery systems, Principles of Anaesthesia machine, Cylinders, Piped Medical Gases, Flow meters, Vaporisers, Checklist for Anaesthesia Machine, O₂ flush, Safety features of Anaesthesia machine, Alarms Pre operative preparation of equipment (Cockpit Drill)-Check List

Breathing Systems-Open and Closed, Mapleson's, Uses, Daily checking
Carbon Dioxide absorbers
Face masks, Airways, Supraglottic airway devices, Combitube, Laryngoscopes and blades, Endotracheal tubes
Airway adjuncts-Stylets, Bougie, Light wand, Tube exchanger etc
Care and sterilization of Anaesthetic equipment
Spinal and Epidural needles, epidural catheters, Peripheral Nerve Locator, Pneumatic tourniquets
Other equipments: Suction apparatus, Suction catheters
Electrical hazards in the Operating Room
Occupational hazards to OT personnel-Universal Precautions
Inventory management

O₂ delivery systems – Types : venti-mask, nasal prongs, ambu bag, O₂ HOOD, Mechanical ventilation, O₂ flow for each & indications.

DETAILED SYLLABUS OF EQUIPMENT:

ANAESTHESIA: A WORK STATION:

PRINCIPLES OF ANAESTHESIA MACHINE

Components, assembly arrangements, uses, advantages, disadvantages, safety features

CYLINDERS – Types, sizes, color coding, safety features, pin index.

FLOW METRES – components, description, color coding, safety features.

PIPED MEDICAL GASES – pressure regulators, color coding safety features.

VAPOTISERS – Types, safety features with color coding, MAC, filling mechanism with color coding of fillers

CHECK LIST FOR ANAESTHESIA MACHINE

O₂ flush – why, when and how to use

O₂ delivery

SAFETY FEATURES OF ANAESTHESIA MACHINE and ALARMS

PRE OPERATIVE PRE PARATION OF EQUIPMENT (COCKPIT DRILL) – CHECK LIST

BREATHING SYSTEMS OPEN & CLOSED – types & assembly, components,

advantages & disadvantages

MAPLESON'S – Types (A, B, C, D, E, F)

Details of Bain's & J R circuit with functional analysis

Assembly, functions of each components (outer tube, uses of inner tube, APL valve, reservoir bag)

Uses

Checking of circuit with pathik's test.

CO₂ ABSORBERS

FACE MASKS – Sizes, triple manure

AIR WAYS – Sizes, types, uses

SUPRAGLOTTIC AIRWAY – types, sizes, placement, amount of air to be injected, depending on size

- uses

- complications

COMBITUBE – Uses, sizes, advantages & disadvantages

LARYNGOSCOPES & BLADES – types of laryngoscopes, identification and uses

ENDOTRACHEAL TUBE – Sizes, types, volume of air to inflated, fixing of ETT

AIRWAY ADJUNCTS

Styllets, bougie, light wand, tube exchanger – identification, uses

Care & sterilization of anaesthetic equipment – identification, uses

Spinal & epidural needles, epidural catheters – identification, uses

PERIPHERAL NERVE LOCATOR – Uses, working principles

PNEUMATIC TOURNIQUETS – Uses, tourniquet time mechanism of use

SUCTION APPARATUS, SUCTION CATHETERS – Principle and uses

Electrical hazards in the OT

Occupational hazards to OT personnel

Clinical Anaesthesia-

General and regional anaesthesia-Choice of anaesthesia technique-(General Anaesthesia, Monitored Anaesthesia Care, Local Anaesthesia)Preparation of patient, drugs, equipment, emergency drugs(Check list/Protocols)

Patient:

Pre Anaesthetic evaluation,investigations,ASA grading,airway assessment(ASA Difficult Airway Algorithm)

Pre operative preparation-fasting,IVaccess,premedication,preloading,Informed written consent, pre oxygenation

Monitoring-Basic standards(P,BP,R,SpO₂,T,ETCO₂)-non invasive/invasive

Fluid and electrolyte management during pre operative period

Drugs-availability and choice of drugs,dosage,dilutions and labeling

Concept OF Induction,Neuro muscular paralysis,Intubation,Ventilation,Reversal and Recovery during GA

Central Neuraxial Blockade –Spinal,Epidural and Caudal

Effects of regional anaesthesia including Central Neuraxial Blockade on various systems

Tourniquets

Patient positioning,hazards and care of the patient during regional anaesthesia and positioning

Post operative care of high risk patients

Latest CPR guidelines

Medico Legal liabilities

Record keeping

DETAILED SYLLABUS OF CLINICAL ANAESTHESIA

Central neuraxial blockade

- Spinal
- Epidural
- Caudal
- Indications and contra indications
- Additives
- Effects / complications

- Effects of regional anaesthesia including central neuraxial blockade on various systems

- Tourniquets – importance of cuff pressure and tourniquet time in upper and lower limb

- Patient positioning hazards and care of the patient during regional anaesthesia and positioning

- Latest CPR guidelines
 - a. BLS
 - b. ACLS
 - c. Drugs used in CPR
 - d. Defibrillator

- Medico legal liabilities: Dereliction of duty, what to do when faced with adverse situation

- Record keeping: Writing Method and importance.

- Preoperative preparation

- Informed written consent: Different types of consents and the process.

- Pre oxygenation

Monitoring – invasive / non invasive

Basic standards

PR, BP, RR, SPO₂, Temperature, Etco₂

Fluid & Electrolyte management during pre operative period

- Ringer lactate (RL)
- Dextrose normal saline (DNS)
- Normal saline (NS)
- Hydroxy ethyl starch (HES)
- Blood transfusion
- ABG and correction of acidosis and electrolytes

Drugs

- Availability and choice of drugs
- Dosage
- Dilutions and preparing infusions, pumps
- Labeling

Concept of – induction and analgesia

- Neuro muscular paralysis
- Ventilation
- Intubation
- Reversal
- Recovery during GA

General anaesthesia – indications, drugs used, preparation, monitoring, reversal

Regional anaesthesia – types, drugs used indications, complications

GMAC – drugs used, indications, monitoring

LA – drugs used, complications, indications

Preparation of patient drugs, equipment, emergency drugs

Pre Anaesthetic evaluation

- Investigations
- ASA grading
- Airway assessment

Pre operative preparations

- Fasting
- IV access
- Premedication

PRACTICAL SYLLABUS FOR ANAESTHESIOLOGY DRUGS (8HOURS)

IDENTIFICATION OF THE DRUG

CHEMICAL COMPOSITION, FORMULATION, PRESERVATIVE

USED, PHARMACODYNAMICS, USES, ROUTES OF ADMINISTRATION, SIDE

EFFECTS, CONTRA INDICATIONS

1. Intravenous Anaesthetic agents

: Thiopentone, Propofol, Ketamine, Etomidate (1 HOUR)

2. Inhalational Anaesthetic agents : Oxygen, Nitrous

Oxide, Halothane, Isoflurane, Sevoflurane, Desflurane (1 HOUR)

3. Benzodiazepines: (Diazepam, Lorazepam, Midazolam) and

Opioids (Morphine, Pethidine, Fentanyl, Buprenorphine) (1 HOUR)

4. Muscle Relaxants: Depolarising (Succinylcholine) Nondepolarizing (Vecuronium,

Atracurium, Rocuronium) Reversal agents (Neostigmine) (1 HOUR)

5. Local Anaesthetics: Lidocaine, Bupivacaine (1 HOUR)

6. Premedicants and adjuncts:

Antisialogogues (Atropine, Glycopyrrolate), Antiemetics (Metoclopramide, Ondansetron), Steroids (Hydrocortisone, Dexamethasone), Bronchodilators (Aminophylline), Antihistamines (Pheniramine maleate), Vasopressors (Ephedrine, Mephenteramine, Phenylephrine, Adrenaline, Noradrenaline, Dopamine, Dobutamine), Vasodilators (SNP, NTG) (1 HOUR)

7. Fluids:Crystalloids(NaCl,5%D,DNS,RL,Isolye P,Isolyte M),Colloids(Hetastarch,Albumin,Polygelatin) (1HOUR)
8. IV Cannulation and blood sampling (1HOUR)

EQUIPMENTS (12 HOURS)

- 1.Gas Cylinders-O₂,N₂O-Basic principles(colour coding,PINindex,filling ratio,Pressure and volume of gas available).Fixing of cylinders to anaesthesia work station (1HOUR)
- 2.Piped medical gases(O₂,N₂O,compressed air,suction)-colour coding,valves,quick couplers,hoses, Fixing of PMGs to anaesthesia work station (1HOUR)
- 3.Check list for anaesthesia work station (1HOUR)
- 4.Breathing systems-Mapleson's A,D and F,Closed system(low flow-CO₂ absorber(sodalyme baralime)
- 5.Airway-Face masks-types sizes available,Airways -types sizes available (1HOUR)
6. Airway- Supra glottis airway devices-LMA Classic,Proseal LMA,ILMA,IGEL,AMBU Aura,Combitube (1HOUR)
7. Airway- Endotracheal tubes-PVC,cuffed,uncuffed-all sizes available,Calculation of Internal Diameter and Length for age and weight (1HOUR)
- 8.Laryngoscopes-types available,parts blades, uses (1HOUR)
- 9.Airway adjuncts- stylets,light wand,bougies,tube exchangers,Magill's forceps (1HOUR)
10. Spinal and Epidural needles,epidural catheters,Peripheral Nerve Locator, tourniquets Miscellaneous:i)suction catheter,and apparatus,ii)nebulisers (1HOUR)

11. Perioperative fluid requirement calculation(1HOUR)

12.Bio medical waste management- segregation at source(colour coding of baskets),Cleaning and sterilisation of anaesthetic equipment (1HOUR)

LOG BOOK : TO BE MAINTAINED IN A COMMON FORMAT

II. THE DEVELOPMENT OF SKILLS IN AN ANAESTHESIA TECHNICIAN

A)GENERAL SKILLS TO BE DEVELOPED:

1.Writing skills:

- a)writing error free medical terms in english language
- b)record keeping

2.Reading skills:

to read instructions for operating equipments,names of the drugs including expiry date

3..Communication skills:

- a)communicate with patients and their relatives in taking informed written consent
- b) communicate in a comprehensible way with operating team members about technical matters.

B) SPECIFIC SKILLS TO BE DEVELOPED:

PRE ANAESTHETIC:

- 1.Checking and setting up of anaesthesia machine
- 2.Preparing intravenous fluids,drugs and administration equipment
- 3.Preparing airway devices(LMA, ET tube etc)
- 4.Communicating with patients on arrival in the OT.
- 5.Establishing peripheral venous access
- 6.Applying anaesthetic monitoring(ECG,BP,SpO2,ETCO2,EEG,BIS)

DURING ANAESTHETIC:

Assists in :

- induction and maintenance oo Anaesthesia
 - Helps in treating Anaphylaxis to Drugs
 - securing an airway
 - safe positionig
 - monitoring
 - collecting and analysis of blood samples
 - acquiring and administering drugs, fluids and equipment
- post anaesthetic:

Assists in :

- reversal and recovery
- transfer to Recovery/PACU

General Surgery

Introduction, special features of general surgery, neck procedures, like thyroidectomy, lymph node biopsies . Breast procedures like Excision of benign breast lump like fibroadenoma, mastectomy / lumpectomy for carcinoma breast.

Abdominal Incisions

Biliary tract procedures like Cholecystectomy open / Laparoscopic

Liver procedures like Hydatid cyst surgeries, Liver Resections, Treatment of liver Abscess

Splenic Procedures like Splenectomy

Pancreatic procedures like Whipple's Pancreaticoduodenectomy, Triple Bypass, Puestow's pancreaticojejunostomy

Esophageal procedures like : Heller's Cardiomyotomy

: Fundoplication

: Esophagectomy

Gastric procedures like : G J & Vagotomy

: Gastrectomy

Intestinal procedures like : R and (L) Hemicolectomies

: Anterior resection

: Abdominoperineal resection (APR)

Anorectal procedures like : Colostomy

: Haemorrhoids

: Fissures

: Fistula

: Pilonidal sinus

Hernia : Amputation of Extremities

3 hours classes in Each allied surgical subjects and superspecialties (40 classes)

Gynecology & obstetrics:

Introduction

Gynecology

Diagnostic Technically

Episiotomy

Caessaerian section

Vaginal & Abdominal Hysterectomy

Introduction, gynecology, diagnostic technique, vulvar procedures, vaginal, procedures, abdominal procedures, obsteries.

Orthopedics

Development of orthopedics, special features of orthopaedic surgery, extremities, fractures, Joint reconstruction, replacement, repairs of tendons and ligaments, vertebral column, cast application.

Ophthalmology

Introduction. The eye, ocular, operative procedures, eyelid and adnexal procedures trauma to the eye, general considerations.

Otolaryngology

Introduction, the ear, otologic operative procedures, microscopic surgeries, the nose, nasal operative procedures, oral cavity and throat operative procedures, The needle operative procedures on the larynx, trachea, bronchus, esophagus, gen consideration in ENT procedures.

Internal assessment (valued papers) to be kept for 1 year

Teachers dairy to be maintained

Log book to be maintained

Shown during Inspection

Paper	Subject	Q P Code	Marks	No. of Teaching hours
Paper 1	Anesthesiology	6131	100	80
Paper 2	Operative Surgery	6133	100	80
Practical			100	80

Recommended Text Books & References

ANATOMY

1. Singh (Inderbir) Text book of Histology J.P. Brothers, New Delhi
2. Difore Atlas of normal Histology Ed. 6 Lea & Febiger - 1989
3. Anatomy & Physiology for nurses

Reference Books:

1. Human Anatomy -- Chaurasia Vol. I, II & III
2. Human Anatomy -- A.K. Dutta Vol. I, II & III
3. Cunningham's Manual of Practical Anatomy -- Vol. I, II & III

PHYSIOLOGY

1. Anatomy and Physiology for Nurses by Evelyn Pearce -- 16th Edition Jay Pee brothers Publications
 2. Anatomy and Physiology for Nurses by Gupta & Gupta AITBs Publications
 3. Basic Anatomy & Physiology by N. Murgesh 5th Edition-- Publishers Satya
 4. Anatomy and Physiology illustrated by S.S. Nadakarni
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1. Fundamentals of Physiology - A text book for Nursing students by R.L. Bijalani -- Jay Pee Brothers Publications
 2. Human Physiology and Biochemistry by Prof. A.J.Jain, Arya Publications

BIOCHEMISTRY

Text Books:

1. Text book of Biochemistry for Dental Students– Pattabhiraman
2. Text book of Biochemistry for Dental Students, Harbans lal
3. Text book of Chemistry prescribed for II P.U.C. (students may need the basic knowledge of chemistry)

MICROBIOLOGY

1. Text Book of Microbiology by Anantha Narayan - 2 copies
2. Text Book of Microbiology by Rajesh Bhatia - 2 copies
3. Simplified Microbiology - The Trained Nurses Association of India (Latest edition)

OPERATION THEATRE

Reference Books:

1. Berry, Edna carnelia and Mary Louise Kohn - *Introduction to Operating Room technique, 4th edition*, Blukiston Publication, Mac Hills Kogakurha Ltd., London, 1972.
2. Brigden, Raymond J. *Operating Theatre techniques, 5th edition* - Churchill Living stone, Edinburg, London, Melbourne & Newyork, 1998.
3. Dixon, Elleen - *Theatre Technique, 5th edition*, N.R. brothers, Medical division, Sanyostagurj, Indore, India
4. Ananthanarayan R. C.K. Jayaram Paniker - *Text Book of Microbiology 4th edition*, Orient Longman Ltd., 1990
5. *Nurses role in O.T. and the Central Sterilisation* - KAS DP publishers
6. Latest edition of Bailey and Love's short practice of Surgery.