



Jharkhand State Paramedical Council

RIMS Campus, Bariatu, RANCHI 834009

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Type a text of document save the document. Align the text with different formats. Align the text with different formats using Microsoft Word. Inserting a table ensuring Proper alignment of the table using MS word.

Module 2: Microsoft Power Point

Preparing a slide show with transition, animation and sound effect using MS – Power point. Customizing the slide show by inserting pictures and tables in the slides using MS – Power Point.

Module 3: Introduction to the Internet

Create an e – mail account. Use the internet to search for a subject of interest.

Theory Paper II (100 Marks)

Diploma in ICU Technician

Part A (50 marks)

1. Applied Anatomy related to critical care

(i) Introduction

(a) Medical Terminology

(b) Anatomical terms, planes, relations

(c) Anatomy of thoracic cage bones, muscles, innervations

(d) Nose, oral cavity

(e) Pharynx, Larynx

- Anatomy of thoracic cage bones, muscles, innervations

- Anatomy of the lungs – overview

- Pleura, lobes of lung, bronchi, trachea, hilum, bronchial tree

- Alveolus, Bronchioles,

- Blood supply,

- Lymphatics

- Innervation

(ii) CARDIOVASCULAR SYSTEM

- Overview of CVS

- Anatomy of heart-Pericardium, myocardium, endocardium, valves

- Anatomy of Vascular system – Major Vessf, Arteries, Veins, Capillaries

- Regional Circulation – coronary, cerebral, splanchnic

(iii) CENTRAL NERVOUS SYSTEM

- Basic organization of the nervous system – central Peripheral, Autonomic

- Cerebral blood flow

- Pain pathway



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2. Applied physiology related to critical care

(i) RESPIRATION SYSTEM

- (a) Physiology of berating
- (b) Homeostasis
- (c) Mechanics of Breathing, Muscle action
- (d) Lung Volumes & Capacity
- (e) Gas exchanges & transport – oxygen, Carbon dioxide
 - Diffusion
 - O₂ Transport and abnormalities
 - CO₂ Transport and abnormalities
- (f) Pressure, Volume
- (g) Resistance, Compliance
- (h) Ventilation and Perfusion, V/Q ratio
- (i) Gas exchange, mechanism of diffusion
- (j) Work of breathing
- (k) Transport of O₂ and CO₂, factors affecting oxygen transport
- (l) Acid – base balance
- (m) Pulmonary Function Tests
- (n) Arterial Blood Gas
- (o) Types of respiration failure – causes and treatment

(ii) CARDIOVASCULAR SYSTEM

- (a) Cardiac cycle
- (b) Cardiac output – factor effecting cardiac output
- (c) Cardiac conducting system
- (d) Regulation of rate, basic arrhythmias
- (e) Principles of ECG, Normal ECG
- (f) Blood pressure
- (g) Maintenance of normal blood pressure and factors affecting it
- (h) Systolic, diastolic, pulse pressure, mean
- (i) Oxygen delivery, uptake to tissues
- (j) Central venous pressure
 - Cardiac output, Stroke volume contractility
 - Preload, After load
 - Interpretation of common hemodynamic parameters
- (k) Assessment of hemodynamic parameters
 - Recognize the following regarding arterial Cannulation
- (l) Indications
- (m) Cannulation sites
- (n) Possible complications
- (o) Normal pressures and their significance
- (p) Pressure wave forms
- (q) Normal pressure and their significance
- (r) Pressure wave forms



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- (s) Significance of respiratory variation in the pressure wave forms
(t) CVP Monitoring
- Indications
 - Factors affecting measurement
 - Insertion sites
 - Types of catheters
 - Correct technique of pressure measurement
- (iii) CENTRAL NERVOUS SYSTEM
- Metabolic requirements of the brain
 - Consciousness, Coma, Brain injury
 - Sedation
 - Brain Death

3. Clinical Pharmacology

- (i) Drugs – Nomenclature
- (ii) Modes of action of drugs
- (iii) Routes of administration
- (iv) Drugs dose calculation – Dilution, infusion rate
- (v) Medical gases: O₂, N₂O
- (vi) Bronchodilators
- (vii) Mucokinetic agents
- (viii) Antihistamines
- (ix) Steroids
- (x) Drugs affecting autonomic nervous system
- (xi) Inotropic agents, Chronotropic agents
- (xii) Vasopressors & Vasodilators
- (xiii) Anti-hypertensives
- (xiv) Analgesics, sedatives
- (xv) Neuromuscular blocking agents

Antimicrobial drugs, antiviral and anti fungal agents – basic concepts

Antimicrobial Resistance – Basic concepts

Antiseptic agents

4. Clinical Microbiology and Infection Control

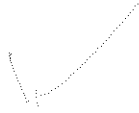
INTRODUCTION – Importance of infection in an ICU

Agents causing Infection

SPREAD OF INFECTION Source, host, transmission

Biohazardous materials

INFECTION CONTROL & UNIVERSAL PRECAUTIONS

- (i) Sterilisation & Disinfection-concepts
 - (ii) Methods of sterilization
 - (iii) Spread of infection
 - (iv) Elimination of source – Cleaning and sterilizing equipment
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- (v) Interrupting transmission of infection – role of health care workers
- (vi) Disposal of infection wastes
- (vii) Surveillance; quality control

Specific Infections

Nosocomial Infection Types – Prevention

HIV – AIDS

Hepatitis A, B, C

Tropical Infections – Tetanus, Malaria, Leptospirosis, Dengue, Rickettsial, Amoebiasis Sepsis

5. Airway Care

- (i) INDICATIONS FOR ARTIFICIAL AIRWAYS
 - (a) Relieving airways obstruction
 - (b) Secretion removal
 - (c) Protecting the airway
 - (d) Position Pressure Ventilation
- (ii) Selecting and establishing an artificial airway
 - (a) Nasal airways
 - (b) Pharyngeal airways
 - (c) Tracheal airways
- (iii) Airway Clearing Techniques
 - (a) Bronchoscope
- (iv) Airway Maintenance
 - (a) Securing the airway and confirming placement
 - (b) Providing adequate humidification
 - (c) Minimizing nosocomial infections
 - (d) Providing cuff care
 - (e) Facilitating clearance of secretions
 - (f) Troubleshooting airway emergencies
- (v) Extubation
 - (a) Indications
 - (b) Procedure
 - (c) Post extubation care & complications

6. Oxygen Therapy

- (i) Sources of oxygen for therapy
- (ii) Storage of oxygen
- (iii) Oxygen delivery systems
- (iv) Hazards of oxygen



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- (v) Modes of O₂ therapy
- (vi) Monitoring O₂
 - Delivery systems (in vitro)
 - Blood gases in patient (in vitro)
- (vii) Pulse oximetry
- (viii) Economic issues

Part – B(50 Marks)

7. MECHANICAL VENTILATION-NONINVASIVE AND INVASIVE

- (i) Basic concepts:- Mechanics of ventilation
 - Work of breathing
- (ii) Indications
- (iii) Humidification of gas
- (iv) Ventilator settings
- (v) Timings - Inspiratory, Expiratory, Inspiratory hold
- (vi) Flow
- (vii) Tidal volume
- (viii) Pressure - Peak
 - (a) Plateau
 - (b) PEEP
 - (c) "POP-OFF"
 - (d) Pressure support
- (ix) Proximal airway vs distal
- (x) FiO₂
- (xi) Modes of ventilation
 - Non Invasive, CPAP, BiPAP
 - Invasive modes - Controlled, Assisted, SIMV, APRV, Pressure Support
- (xii) Alarm settings
- (xiii) Care of ventilator & tubings – Sterility
- (xiv) Weaning-concepts
- (xv) Humidifier-types
 - Advantages and disadvantages
- (xvi) Inhaled drug therapy
 - nebulisation – different types, advantages & disadvantages
 - MDI with Spacer

8. CARE OF PATIENTS ON VENTILATOR



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- (i) Ensuring proper placement of tube
- (ii) Cuff pressure
- (iii) Tracheobronchial hygiene, suctioning
- (iv) Humidification, Chest physio
- (v) Ventilator settings
- (vi) Monitoring ventilatory parameters

9. Cardiovascular Support

- (i) Assisting in
 - (a) Arterial and central venous cannulation
 - (b) Peripheral venous cannulation
 - (c) PiCCO I Pulmonary artery catheter insertion – measuring cardiac output by the modulation
 - (d) Pericardiocentesis
 - (e) Transvenous pacemaker
- (ii) Placement of ECG leads taking 12 – lead dynamic ECG.
- (iii) Use of infusion devices for vasoactive medications.
- (iv) Assisting in electrical cardioversion and defibrillation. Placement of transcutaneous space maker.
- (v) Setting up invasive pressure monitoring leveling, calibration, zeroing; measuring pressures

10. RESPIRATORY SUPPORT:

- (i) Maintaining an open airway.
- (ii) Assisting in
 - (a) Tracheal intubation (oral, nasal)
 - (b) Cricothyrotomy, tracheostomy, trans tracheal catheters
 - (c) Mechanical ventilator support Monitoring airway pressures
 - (d) Topical use of respiratory medication (inhalers and nebulisers)
 - (e) Suctioning: Chest physiotherapy and incentive spirometry.
 - (f) Weaning techniques.
 - (g) Assisting in fiberoptic bronchoscopy.
 - (h) Oxygen therapy devices and their limitations
 - (i) Assisting in chest tube insertion and chest drain age system
 - (j) Bed side pulmonary function tests
 - (k) Arterial blood gas sampling, Using the ABG machine
 - (l) CPAP & BIPAP circuit



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11. CSSD PROCEDURES

- (i) Waste disposal collection of used items from user area, reception protective clothing and disinfections sage gaurds,
- (ii) Use of disinfection sorting and classification of equipmen tfor cleaning purposes, sharps, blunt lighted etc. contaminated high risk baby care- delicate instruments or hot care instruments,
- (iii) Cleaning process-use of detergents. Mechanical cleaning apparatus, cleaning instruments, cleaning jars, receivers bowls etc. trays, basins and similar hand ware utensils. Cleaning of catheters and tubings, cleaning glassware, cleaning syringes and needles.
- (iv) Materials used for wrapping and packing assembling pack contents. Types of packs prepared. Inclusion of trays and galliparts in packs. Method of wrapping and making use of indications to show that a pack of container has been through sterilization process date stamping.
- (v) General observation sprinciples of sterlization. Moist heat sterlization. Dry heat sterlization. EO gassterlization. H2O2 gas plasma vaposterlization

12. EQUIPMENT MAINTENANCE & BASIC TROUBLESHOOTING:

- (i) Ventilators, CPAP, BiPAP machines
- (ii) Pumps-Infusion, Syringe
- (iii) Monitors-Standalone & multi parameter
- (iv) ECG Machine
- (v) ABG Machine
- (vi) Defibrillator

PRATICAL : (100 MARKS)

VIVA : (100 MARKS)



झारखण्ड राज्य पारामेडिकल परिषद

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(Constituted by the Department of Health, Medical Education & family Welfare, Government of Jharkhand vide Notification no- 7(A)/Paramed.-11-09/09-356(7A)Ranchi, Dated 17.9.2010)

सभी डिप्लोमा पाठ्यक्रमों का Paper-I, Common रहेगा, जबकी
विषयवार Paper-II का सिलेबस अलग-अलग रहेगा।
