

**B.Sc. RESPIRATORY THERAPY
SECOND YEAR
PAPER IV – EQUIPMENTS IN RESPIRATORY CARE**

Q.P. Code: 802614

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Recommendations for Storage and Use of Medical gases by The National Fire Protection Association and The Compressed Gas Associations.
2. Endotracheal Tube – Tube Markings, Indications, Contraindications, Technique of Insertion, Confirmation of placement, and Complications of Intubation.
3. Non Invasive Ventilation – Indication, Contraindication, Interfaces and Steps in Initiating Non Invasive Ventilation.

II. Write notes on: **(8 x 5 = 40)**

1. Heat Moisture Exchanger – Types and Working principle.
2. Abnormal waveforms of a Capnograph and its treatment.
3. Pitfalls of a Pulseoximeter.
4. Safety Mechanisms in AMBU.
5. Factors affecting Aerosol Therapy.
6. Power Source or Input power of a Ventilator.
7. Describe about Macintosh Blade and explain the technique of insertion.
8. Non Rebreathing Mask – Indications, Principle and Limitations.

III. Short answers on: **(10 x 3 = 30)**

1. Relative Humidity.
2. Beer's and Lambert's law.
3. Indications of a Peak Flow Meter.
4. Nasal Prongs.
5. Isothermic Saturation Boundary.
6. Oropharyngeal Airway – Indications, Contraindications and Technique.
7. Venturi Principle.
8. Describe Miller Blade.
9. Estimate the duration of gas if a portable liquid O₂ container contains 3 lb of liquid O₂ that supplies an O₂ delivery device running at 2 L/min.
10. Determine how long a G cylinder of O₂ with a gauge pressure of 1800 psi set to deliver 6 L/min will last until empty?

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Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. National Fire Protection Association and Compressed Gas Association Recommendations for Liquid Oxygen Systems – Bulk and Portable.
2. Endotracheal tube with Subglottic Suction catheter – Markings, Indications, Limitations, Technique of Insertion, Confirmation of placement, and Complications.
3. Enumerate on Low Flow Oxygen Delivery Devices.

II. Write notes on: **(8 x 5 = 40)**

1. Passover Humidifier – Types and Working principle.
2. Explain normal Capnographic waveform and its phases.
3. Normal Arterial waveform in a Pulseoximeter.
4. Differentiate Low Volume – High Pressure cuff and High Volume – Low Pressure Cuff.
5. Wrights Spirometer – Indications, Technique and Calculation of Vital capacity.
6. Relief Valves.
7. Explain and Draw a neat labelled diagram of Volume Displacement Designs in a ventilator.
8. Oxygen Concentrator – Indications, Working mechanism and Limitations.

III. Short answers on: **(10 x 3 = 30)**

1. Define Absolute Humidity.
2. Zones of a Peak Flow Meter.
3. Simple Face Mask – Description and Working Principle.
4. Nasopharyngeal Airway - Indications, Contraindications and Technique.
5. Define Humidity Deficit.
6. Describe Flexible blade (McCoy blade) and its uses.
7. Estimate the duration of gas if a portable liquid O₂ container contains 6 lb of liquid O₂ that supplies an O₂ delivery device running at 4 L/min.
8. Determine how long H cylinder of O₂ with a gauge pressure of 1200 psi set to deliver 10 L/min will last until empty?
9. Physical principles governing Humidifier function.
10. Disadvantages of a Dry Powder Inhaler.

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Time: Three Hours

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Answer all questions

I. Elaborate on: **(3 x 10 = 30)**

1. Describe the various types of defibrillator, its use and role in clinical practice.
2. Describe the physiology of humidification in health and disease. Describe the types of humidifiers.
3. Describe the characteristics and use of therapeutic aerosols.

II. Write notes on: **(8 x 5 = 40)**

1. Advantages and disadvantages of flow restrictors.
2. Factors affecting the reliability of pulse oximeters.
3. Define and describe few causes of hypotension.
4. Quality assurance of spirometer.
5. Advantages and disadvantages of oral tracheal intubation for artificial airway.
6. Patient factors in selecting appropriate oxygen therapy equipment.
7. Factors affecting the performance of small volume nebulizer.
8. Uses and complications of intercostal drainage systems.

III. Short answers on: **(10 x 3 = 30)**

1. Conditions associated with changes in end-tidal CO₂ levels.
2. Advantages and disadvantages of Peak Expiratory flow meter.
3. How will you confirm the correct position of artificial airway?
4. Indications for hyperbaric oxygen therapy.
5. Uses of inhaled nitric oxide.
6. How will you set up intercostal drainage system for bronchopleural fistula?
7. Synchronized intermittent mandatory ventilation.
8. Disadvantages of non-invasive ventilation.
9. Role of Bag-valve mask during resuscitation.
10. How will you process the bronchoscope after a procedure?

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SECOND YEAR

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Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Distribution and regulation of medical gases.
2. Non-invasive measurement of blood gases.
3. Describe the various types of artificial airway.

II. Write notes on:

(8 x 5 = 40)

1. Principles governing humidifier function.
2. Hazards of aerosol therapy.
3. Define and describe few causes of hypotension.
4. Quality assurance of spirometer.
5. Variables affecting the fractional inspired oxygen concentration of low-flow oxygen systems.
6. Factors affecting the performance of small volume nebulizer.
7. Uses and complications of intercostal drainage systems.
8. Modes of invasive mechanical ventilation.

III. Short answers on:

(10 x 3 = 30)

1. Complications of use of defibrillator.
2. Factors affecting the oxygen-dissociation curve.
3. Advantages and disadvantages of using Peak Expiratory flow meter.
4. How will you confirm the correct position of artificial airways?
5. Troubleshooting common problems with reservoir masks.
6. Indications for hyperbaric oxygen therapy.
7. Uses of inhaled nitric oxide.
8. Infection control in doing spirometry.
9. How will you set up intercostal drainage system for bronchopleural fistula?
10. Disadvantages of non-invasive ventilation.

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Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Spirometry – predictive reference values, interpretation and use in Patient care.
2. Limited Channel sleep study.
3. Thoracoscopy.

II. Write notes on:

(8 x 5 = 40)

1. FENO (Fraction of nitric oxide in expired air).
2. ECG monitoring in ICU / HDU.
3. Leak test in Bronchoscopy.
4. Endobronchial Ultrasound – indications and contraindications.
5. Cryoprobes for lung biopsy.
6. Tracheobronchial stents.
7. Body Plathysmography.
8. Chest tube drainage system for patient with Empyema and Bronchopleural fistula.

III. Short answers on:

(10 x 3 = 30)

1. Causes of Failure to record SpO₂ by Pulse Oximeter.
2. Diagnostic utility of Chest Ultrasound in ICU.
3. ABG findings in Obesity hypoventilation syndrome.
4. Nocturnal Pulse Oxymetry.
5. Steps in Disinfection of Bronchoscope.
6. How to minimize nosocomial infections in patient on Endotracheal tube.
7. Metered dose inhalers.
8. Double lumen Endotracheal tubes.
9. Stethoscope.
10. AMBU (Artificial Manual Breathing Unit).

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Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Polysomnography.
2. Flexible Bronchoscopes, preparation for procedure, accessories and precautions during use.
3. Non invasive Ventilation instruments, indications, precautions and adverse events.

II. Write notes on:

(8 x 5 = 40)

1. Vital signs Monitors in Respiratory high dependency unit, describe in brief about all the types of graphs and settings.
2. Biopsy needles for EBUS (Endobronchial ultrasound) guided TBNA (Transbronchial needle aspiration).
3. Conventional TBNA (Transbronchial needle aspiration) – indications and contraindications and precautions.
4. Bronchoscopic brush for smear cytology.
5. Sterilization of Bronchoscope, thoracoscope and storage.
6. Types of Rigid Bronchoscope and its uses.
7. Laryngeal mask airway.
8. Care of Tracheostomy tube.

III. Short answers on:

(10 x 3 = 30)

1. Cardiopulmonary Exercise test.
2. Pulse Oxymeter
3. Incentive spirometer.
4. Devices to assist in drainage of sputum from airways in patients with Bronchiectasis.
5. Nebulizer.
6. Chest tube drainage system for Pleural effusion.
7. Methacholine challenge test.
8. Allergic Skin test.
9. Dry powder inhalers.
10. Artificial airways.

B.Sc. RESPIRATORY THERAPY**SECOND YEAR****PAPER IV – EQUIPMENTS IN RESPIRATORY CARE****Q.P. Code: 802614****Time: Three Hours****Maximum: 100 Marks****Answer all questions****I. Elaborate on:****(3 x 10 = 30)**

1. Pulse Oxymeter – indications / utility in various respiratory disorders.
2. Types of Mechanical Ventilators and Ventilator output displays.
3. National Fire Protection Association and Compressed Gas Association Recommendations for Liquid Oxygen Systems – Bulk and Portable.

II. Write notes on:**(8 x 5 = 40)**

1. Variables affecting the fractional inspired oxygen concentration of low-flow oxygen systems.
2. Principles governing humidifier function.
3. Bronchoscopic forceps for Transbronchial lung biopsy.
4. Types of devices for Oxygen therapy.
5. Intercostal drainage Chest tubes.
6. How to detect persistent airleak in a patient with Pneumothorax and how to grade the severity of airleak?
7. Describe how to secure the Endotracheal tube and how to confirm correct placement?
8. Metered dose inhalers.

III. Short answers on:**(10 x 3 = 30)**

1. Simple Face Mask – Description and Working Principle.
2. Chest tube drainage system for Pneumothorax. Draw a diagram.
3. Describe Endotracheal suction equipment and procedure.
4. Pharyngeal airways.
5. Causes of Hydropneumothorax.
6. Zones of Peak Flow Meter.
7. Define Humidity Deficit.
8. Cleaning and sterilization of Thoracoscope.
9. Indications of Thoracoscopy.
10. Describe Flexible blade (McCoy blade) and its uses.

B.Sc. RESPIRATORY THERAPY

SECOND YEAR

PAPER IV – EQUIPMENTS IN RESPIRATORY CARE

Q.P. Code: 802614

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Capnography – its uses, advantages and its limitations.
2. Write briefly about difficult airway guidelines. How will you prepare difficult airway cart?
3. Write briefly about humidifiers - its types, advantages and disadvantages.

II. Write notes on:

(8 x 5 = 40)

1. Pin index system.
2. Double lumen tube.
3. Oxygen blender.
4. Oropharyngeal airway.
5. High flow nasal cannula.
6. Latex allergy.
7. Miller blade.
8. Beer Lambert law.

III. Short answers on:

(10 x 3 = 30)

1. Non rebreathing masks.
2. Video laryngoscope.
3. Paramagnetic oxygen analyser.
4. Magills forceps.
5. Esophageal detector device.
6. Preformed ET Tube.
7. McCoy blade.
8. Ultrasonic nebulizers.
9. ET Tube cuff types and its advantage and disadvantages.
10. Intubating stylet.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0321]

MARCH 2021

Sub. Code: 2614

(AUGUST 2020 EXAM SESSION)

B.Sc. RESPIRATORY THERAPY

SECOND YEAR (Regulation 2014-2015)

PAPER IV – EQUIPMENTS IN RESPIRATORY CARE

Q.P. Code : 802614

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Write briefly about defibrillator, its types, uses, applications in clinical settings.
2. Write about Bains modification of Mapleson D system - its functional analysis, leak testing, advantages and disadvantages.
3. Management of transport and monitoring of intubated and ventilated patient for MRI – respiratory therapist role.

II. Write notes on:

(8 x 5 = 40)

1. Diameter index system.
2. Flexometallic tube.
3. Peak flow meter.
4. Nasopharyngeal airway.
5. AMBU bag.
6. Endoscopic mask.
7. Intubating LMA.
8. Venturi principle and venturi mask.

III. Short answers on:

(10 x 3 = 30)

1. Simple face masks.
2. Fibre-optic bronchoscope – uses.
3. Pressure gauze.
4. Ideal characteristics of ET Tube.
5. Combitube.
6. Yankauer suction catheter.
7. Zones of peak flow meter.
8. Jet nebulizers.
9. Complications of laryngoscopy.
10. Bite block.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0222]

**FEBRUARY 2022
(AUGUST 2021 EXAM SESSION)**

Sub. Code: 2614

**B.Sc. RESPIRATORY THERAPY
SECOND YEAR (Regulation 2014-2015)
PAPER IV – EQUIPMENTS IN RESPIRATORY CARE
Q.P. Code : 802614**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Flexible Bronchoscopy – Indications, Contraindications, Preparation and Monitoring of the Procedure. Write Notes on Endobronchial Biopsy.
2. Tracheostomy – Tube Parts, Procedure Types, Size, Care and Changing of Tracheostomy Tube.
3. Types and Modes of Mechanical Ventilators.

II. Write notes on:

(8 x 5 = 40)

1. Interfaces of Non Invasive Ventilation.
2. Steps in Endotracheal Suctioning.
3. Oxygen Flowmeter.
4. High Flow Nasal Cannula.
5. Double Lumen Endotracheal Tube.
6. Technique for use of Dry Powder Inhaler.
7. Normal Capnographic Waveforms.
8. Intercostal drainage system for Empyema with Bronchopleural Fistula

III. Short answers on:

(10 x 3 = 30)

1. Guedel airway.
2. Air Entrainment Mask
3. Factors affecting accuracy of Pulse Oximeter.
4. Working Principle of Oxygen Concentrator.
5. Methods to assess Endotracheal Tube Position.
6. Relief valves.
7. Parts of Metered Dose Inhaler.
8. Types of Cuff Pressure Manometers
9. Advantages and Disadvantages of Spacer.
10. Types of artificial Airways

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0922]

SEPTEMBER 2022

Sub. Code: 2614

(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)

**B.Sc. RESPIRATORY THERAPY
SECOND YEAR (Regulation from 2014-2015)
PAPER IV – EQUIPMENTS IN RESPIRATORY CARE
Q.P. Code : 802614**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Safety systems in medical gas cylinders.
2. Oxygen flow meters - Principles and laws behind it - Write in detail.
3. Write briefly about preparation for emergency cricothyroidotomy and percutaneous tracheostomy.

II. Write notes on:

(8 x 5 = 40)

1. Guedel airway.
2. LMA classic.
3. Oxygen blender.
4. Wrights spirometer.
5. Relative and absolute humidity.
6. How will you check manual resuscitator?
7. Role of ultrasound in pulmonary diseases.
8. Portable suction units.

III. Short answers on:

(10 x 3 = 30)

1. Nasal prongs.
2. Rigid bronchoscope- Parts and Indications.
3. Closed suction catheter system.
4. Techniques of LMA insertion.
5. Suction catheters.
6. Oxygen toxicity.
7. Disinfection of respiratory equipment.
8. ET placement confirmation methods.
9. Pipeline distribution system.
10. Perilaryngeal airways.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0423]

APRIL 2023

Sub. Code: 2614

**B.Sc. RESPIRATORY THERAPY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – EQUIPMENTS IN RESPIRATORY CARE
Q.P. Code: 802614**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on: (3 x 10 = 30)

1. Various Oxygen Delivery Devices and their Indications and Contraindications.
2. Types of Artificial Airways – Uses, Care and Contraindications.
3. Define DLCO and write in detail about DLCO.

II. Write notes on: (8 x 5 = 40)

1. Aerosol Therapy.
2. Principles of Humidifier Function.
3. What is HFNO? Write the Indications and Complications.
4. 6 Minutes Walk Test and its Clinical Significance.
5. Normal Arterial Wave form in Pulse Oximeter.
6. Incentive Spirometer Mechanism and its Clinical Use.
7. Steps in Endotracheal Suctioning.
8. What is NIV? Types and its Indications and Contraindications.

III. Short answers on: (10 x 3 = 30)

1. Non-Rebreathing Mask.
2. Nebulizer.
3. Capnography.
4. Peak Flow Meter.
5. Ambu Bag.
6. Diaphragmatic Breathing Exercise.
7. Sterilization of Bronchoscope.
8. Venturi Principle.
9. Dry Powder Inhaler.
10. Care of Intercostal Chest Drainage (ICD).

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1123]

NOVEMBER 2023

Sub. Code: 2614

B.Sc. RESPIRATORY THERAPY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – EQUIPMENTS IN RESPIRATORY CARE
Q.P. Code: 802614

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. High Flow Oxygen Delivery Systems – Types, Principle, Advantages, Disadvantages and Clinical Uses of each.
2. Characteristics and Types of Therapeutic Aerosols. Write in Detail About Metered Dose Inhalers – Principle, Advantages and Disadvantages.
3. Non Invasive Ventilation – Indications, Contraindications, Interfaces, Management and Complications.

II. Write notes on:

(8 x 5 = 40)

1. Safety Precautions for Oxygen Cylinder.
2. Rigid Bronchoscopy – Indications.
3. Heat and Moisture Exchange Humidifiers.
4. Trans Bronchial Needle Aspiration.
5. Patient preparation for Spirometry.
6. Ultrasonic Nebulisers.
7. Steps in Extubation of Endotracheal Tube.
8. Tracheostomy Tube Care.

III. Short answers on:

(10 x 3 = 30)

1. Macintosh Blade.
2. Disadvantages of Dry Powder Inhaler.
3. Types of Intercostal Drainage Systems.
4. Tissue Oximetry.
5. Types of Spacers.
6. Types of Oxygen Flow Meters.
7. Methods of Nasotracheal Intubation.
8. Diagnostic Bronchoscopic Procedures.
9. Simple Face Mask – Working Principle.
10. Small Particle Aerosol Nebulizers.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0424]

APRIL 2024

Sub. Code: 2614

**B.Sc. RESPIRATORY THERAPY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – EQUIPMENTS IN RESPIRATORY CARE
Q.P. Code: 802614**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Endotracheal Tube – Write about indications, contraindications, technique of insertion and confirmation of position, tube selection and complications.
2. Distribution and Regulation of Medical gases.
3. ABG – Write about technique and precautions while taking sample and its role in Intensive Care Unit.

II. Write notes on:

(8 x 5 = 40)

1. Passover Humidifier – Types and working principle.
2. Patient factors in selection of appropriate oxygen therapy equipment.
3. Factors affecting the performance of small volume Nebulizer.
4. Hazards of Aerosol therapy.
5. Various modes of Invasive mechanical ventilation.
6. Endobronchial stenting.
7. Cryoprobe for lung biopsy.
8. Laryngoscope.

III. Short answers on:

(10 x 3 = 30)

1. Isothermic saturation boundary.
2. Miller blade.
3. Conditions associated with changes in end tidal CO_2 level.
4. Inhaled Nitric oxide – Indications.
5. PEEP (Positive and Expiratory Pressure).
6. Role of Bag – Valve mask during Resuscitation.
7. How to minimize Nosocomial infection in patients with endotracheal tube.
8. ABG finding in Type 2 Respiratory failure.
9. Methacholine challenge test.
10. Cardio pulmonary Exercise test.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1125]

NOVEMBER 2025

Sub. Code: 2614

B.Sc. RESPIRATORY THERAPY
SECOND YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – EQUIPMENTS IN RESPIRATORY CARE
Q.P. Code: 802614

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Difficult Airway Guidelines. How to prepare Difficult Airway Cart?
2. Humidifiers - Indications, Principle, Types, Hazards and Complications.
3. Endotracheal Tube – Parts, Types, Preparation and Procedure of Nasotracheal and Orotracheal Intubation.

II. Write notes on:

(8 x 5 = 40)

1. Types of Capnometers.
2. Air Entrainment Mask.
3. Bronchial Thermoplasty.
4. Types of Defibrillators.
5. Steps in changing Tracheostomy Tube.
6. Procedure and Uses of Incentive Spirometry.
7. Technique for use of Metered Dose Inhaler.
8. Laryngeal Mask Airway.

III. Short answers on:

(10 x 3 = 30)

1. Contraindications of Noninvasive Ventilation.
2. Parts of Double Lumen Endotracheal Tube.
3. Infection Control in Spirometry.
4. Parts of Peak Flow Meter.
5. Types of Nebulizers.
6. Safety Mechanisms in AMBU Bag.
7. Indications for Thoracoscopy.
8. Venous Oximetry.
9. Types of Endobronchial Ultrasound Probes.
10. Oxyhood.
