

DIPLOMA IN CRITICAL CARE TECHNOLOGY

SECOND YEAR

**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS 02 THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Venturi principle of Oxygen therapy.
2. Troubleshooting high peak pressure alarm on a ventilator.
3. Various methods to ensure proper placement of endotracheal intubation.

II. Write notes on:

(10 x 5 = 50)

1. Indications and contraindications of Non invasive ventilation.
2. Advantages of inhaled mode of drug administration.
3. Measures to ensure successful extubation.
4. Information derived from a pressure volume loop.
5. Importance of maintaining adequate cuff pressure
6. Compare closed suction versus open suction techniques.
7. Advantages of adaptive support ventilation (ASV) over SIMV mode of ventilation.
8. Harmful effects of positive end expiratory pressure.
9. Advantages and contraindications of nasal intubation.
10. Disadvantages of high oxygen administration.

III. Short Answers on:

(10 x 2 = 20)

1. Draw pressure time curve depicting peak and plateau pressures.
2. Where should the endotracheal tube be anchored for a five year old boy?
3. What is biotrauma? How is it caused?
4. Elaborate on advantages of tracheostomy tube over oral endotracheal tube.
5. How can you assess on the bedside of an impending respiratory failure?
6. What level of tracheal ring should the tracheostomy tube be placed?
7. What are the precautions to be taken before endotracheal suctioning?
8. When should the ventilatory tubings be changed?
9. What are the various recruitment manoeuvres possible?
10. What are the factors affecting the waveform of a pulse oximetry?

DIPLOMA IN CRITICAL CARE TECHNOLOGY**SECOND YEAR****PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS 02 THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING***Q.P. Code : 841213***Time : Three Hours****Maximum : 100 marks****Answer ALL questions****I. Elaborate on:****(3 x 10 = 30)**

1. What are the various modes of mechanical ventilation? Describe SIMV in detail.
2. A 60 year old patient has a GCS of 5T/15. He is on a FiO₂ of 0.3 and a PEEP of 10cm H₂O, on SIMV with a machine set rate of 0 and a pressure support of 15cmH₂O. He has a PaO₂ of 100mmHg, pH = 7.40 and PaCO₂ = 60mmHg. His total respiratory rate is 40 /min. He has had a nasogastric feed 1 hour before. His cuff leak is positive and his forced vital capacity is 1000ml. Would you extubate this patient? What are the factors.
 - a) Against extubating the patient.
 - b) In favour of extubating the patient.
3. Bains circuit - draw a diagram, label parts and describe its functioning.

II. Write notes on:**(10 x 5 = 50)**

1. Measures to prevent ventilator associated pneumonia.
2. Describe steps in the use of a defibrillator.
3. What are the various types of oxygen delivery systems?
4. Describe the concept of PEEP with the help of diagrams.
5. A patient is on SIMV with a tidal volume of 500ml, Pressure support of 20cmH₂O and a PEEP of 8cmH₂O. The ventilator starts alarming because the peak inspiratory pressure is 40cmH₂O. What are the possible causes of this alarm? How will you manage the problem?
6. How will you prepare to transport a mechanically ventilated patient?
7. Describe the uses of oropharyngeal and nasopharyngeal airways with diagrams.
8. Steps of endotracheal suctioning.
9. Approach to hypoxia in a ventilated patient.
10. Ventilator settings for ARDS.

III. Short Answers on:**(10 x 2 = 20)**

1. Indications for NIV.
2. Contents of intubation tray.
3. Causes of low pressure alarm in invasive mechanical ventilation.
4. Draw a pressure time graph of a patient on volume controlled ventilation and label the parts.
5. Draw a 2-bottle system for a patient who has had a pneumothorax.
6. Advantages and disadvantages of closed suctioning.
7. Conditions where pulse oximetry can give false readings.
8. Bernoulli's principle.
9. Classify humidification devices.
10. Parameters to monitor before, during and after a tracheostomy.

DIPLOMA IN CRITICAL CARE TECHNOLOGY**SECOND YEAR****PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS 02 THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING***Q.P. Code : 841213***Time : Three Hours****Maximum : 100 marks****Answer ALL questions****I. Elaborate on:** **(3 x 10 = 30)**

1. Describe how a critical care technologist can contribute to improving tracheobronchial hygiene.
2. A patient needs an invasive arterial line. Describe how you would assist the procedure and elaborate on zeroing and leveling of the transducer.
3. What is the principle of pulse oximetry? What are the various sites where the pulse oximeter can be placed? Give the advantages and disadvantages of this device.

II. Write notes on: **(10 x 5 = 50)**

1. Weaning check list.
2. Indications and contraindications for Non invasive ventilation.
3. Hazards of electrical equipment in the ICU.
4. How will you assist in a tracheostomy for a patient in your ICU?
5. Compare and contrast Nebulisation and metered dose inhalers (MDI) in mechanically ventilated patients.
6. What is the normal endotracheal cuff pressure? How is it monitored?
What are the hazards of low or high cuff pressures.
7. Describe airway pressure release ventilation (APRV).
8. What is dead space ventilation? What measures can you take to reduce dead space?
9. You have just successfully assisted in an endotracheal intubation, and when the ventilator is connected, you notice that the required tidal volume is not delivered (set is 500ml, delivered is 200ml). What are the possible reasons for this?
10. Describe the technique of sampling arterial blood gas by poke.

III. Short Answers on: **(10 x 2 = 20)**

1. Confirmation of endotracheal tube placement.
2. Management of post intubation stridor.
3. Quality control in Arterial blood gas (ABG) machine.
4. Complications of endotracheal suctioning.
5. Indications for defibrillation.
6. Draw a diagram of a 3 bottle intercostal drainage system for a patient with an empyema.
7. What are normal values for PaO₂, PaCO₂, pH and HCO₃?
8. List the causes of an over damped invasive arterial blood pressure trace.
9. Steps to prevent central venous and arterial line related bloodstream infections.
10. What default alarm limits settings would you set on a ventilator for invasive SIMV mode ventilation?

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**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS 02 THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three Hours

Maximum : 100 marks

Answer ALL questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe and details about airway clearing techniques.
2. Describe and details about assisting techniques of pulmonary artery catheter insertion measuring cardiac output by thermo dilution.
3. What is the principle of pulse oximetry? What are the various sites where the pulse oximetry can be placed? Give the advantages and disadvantages of this device.

II. Write notes on:

(10 x 5 = 50)

1. Write in details about Weaning.
2. Describe and details about modes of ventilator.
3. Ventilator settings for ARDS.
4. Pericardiocentesis.
5. Bedside pulmonary function test.
6. How to assisting tracheostomy procedure in ICU?
7. Steps of chest physiotherapy.
8. Trouble shooting.
9. Describe : Extubation procedure.
10. Write some points about O₂ therapy.

III. Short Answers on:

(10 x 2 = 20)

1. Conformation of endotracheal tube placement.
2. Immediate management for cardiac tamponade.
3. Define: Tidal Volume.
4. Advantages of closed suctioning.
5. Nebulizers.
6. Write short notes on (a) CPAP (b) BI-PAP circuit.
7. Write short notes on O₂ therapy devices and their limitations.
8. Draw a Naso pharyngeal airway and label its parts.
9. 12 lead ECG.
10. Define Extubation.

DIPLOMA IN CRITICAL CARE TECHNOLOGY

SECOND YEAR

**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O₂THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

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

1. Write in detail about initial ventilator settings and write briefly about ventilator modes.
2. A 31 year male has multiple rib fracture and he is having a cardiac temponade and what is the immediate management? Enumerate about the procedure.
3. What is the principle of pulse oximetry? What are the various sites where the pulse oximetry can be placed? Give the advantages and disadvantages of this device.

II. Write Notes on: **(10 x 5 = 50)**

1. Ventilator timings.
2. Defibrillation.
3. High pressure alarm on ventilator, trouble shoot the alarm.
4. Indication for intra-arterial line, leveling, calibration.
5. Weaning.
6. Indication and contra-indication for NIV.
7. Multiparamonitor and alone monitor.
8. PEEP.
9. Describe about nebulization.
10. Bronchoscopy.

III. Short Answers on: **(10 x 2 = 20)**

1. ABG.
2. Inspiratory expiratory ratio.
3. Contraindication for intra arterial line.
4. Advantages and disadvantages of pulse oximetry.
5. Medications used in Nebulization.
6. Common mechanical problem in ventilator.
7. Write the types of flow patterns.
8. Parameters to be monitored in mechanically ventilated patients.
9. 12 lead ECG.
10. Measurement of cardiac output.

DIPLOMA IN CRITICAL CARE TECHNOLOGY

SECOND YEAR

**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O₂ THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three hours

Maximum: 100 Marks

Answer **ALL** questions.

I. Elaborate on:

(3 x 10 = 30)

1. Describe the following in detail :
 - (a) Modes of Mechanical ventilation.
 - (b) Technique used in Suctioning of Endotracheal Tube.
 - (c) Managing Hypoxia in a Ventilated Patient.
2. What is the Initial Assessment of Trauma in Emergency?
How would you Monitor a patient with severe Head injury in ICU?
3. A patient with Urinary Tract Infection developed Sepsis and Multi organ dysfunction is on Ventilator.
 - (a) What are the daily parameters to be monitored?
 - (b) What are the prophylaxis for Deep vein Thrombosis and pressure ulcers?
 - (c) What are the techniques used in Suctioning Tracheal secretions.

II. Write notes on:

(10 x 5 = 50)

1. Types of Positive Pressure Ventilation.
2. Prevention of Ventilator Acquired Pneumonia.
3. Chest Physiotherapy and Incentive Spirometry.
4. Prevention and management of Bedsores.
5. Modes of Oxygen Therapy.
6. Precautions in managing a patient with Swine flu.
7. Monitoring while transporting a Ventilated patient.
8. Indications for Extubation and Complications after Extubation.
9. Describe Cardiac Tamponade and management.
10. Drugs and dosage for a patient with Hypotension.

III. Short answers on:

(10 x 2 = 20)

1. Types of Blood pressure management.
2. Fumigation.
3. Parts of Laryngoscope.
4. Causes of Upper gastro intestinal bleeding.
5. Organ Donation.
6. Risk factors for Coronary Artery Disease.
7. Level of Tracheal ring for a tracheostomy tube.
8. Medicines used in Nebulizers.
9. Define respiratory acidosis.
10. Colour codes in waste disposal management.

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**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O₂ THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. a) Describe the Four types of rhythms in ECG Monitor for a patient with No Central pulse.
b) Evaluate a patient with a Heart Rate of 120/minute.
c) Indications for tracheostomy.
2. A 20 years aged Boy met with a road accident brought to Emergency Unit in unconscious state with chest and Head injury.
a) Describe the initial assessment and investigation required
b) Describe Management of Head injury.
3. Describe in detail about various types of Shocks.

II. Write notes on:

(10 x 5 = 50)

1. Describe steps in using Defibrillator.
2. Ventilator settings for ARDS.
3. Ryle's tube insertion and feeding Techniques.
4. Contents in a Airway Tray and Daily check list.
5. Monitoring a patient in an advanced Cardiac Life support Ambulance.
6. Management of Tension Pneumothorax.
7. Weaning off Ventilator.
8. Adjunct of Airway.
9. Barotrauma.
10. Evaluation of Generalized Anasarca.

III. Short answers on:

(10 x 2 = 20)

1. Draw and Label a Laryngoscope.
2. What is ETO Sterilization?
3. Three steps in Defibrillation.
4. Five point Auscultation after Intubation.
5. How will you confirm Endotracheal Intubation?
6. Sizes of Venflon.
7. Alpha Bed.
8. Compression and ventilation Ratio in CPR.
9. Uses of Atropine.
10. Drugs and dosage used in Supraventricular Tachycardia.

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SECOND YEAR**

**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O₂ THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail about pulse oximeter.
2. Write about the technique of arterial line insertion and setting of transducer.
3. How do you evaluate and manage a patient who comes to the emergency department with severe head injury?

II. Write notes on:

(10 x 5 = 50)

1. What are SIMV and ASV modes?
2. What is non-invasive ventilation?
3. Short notes on different oxygen delivery systems.
4. Post extubation care of patients.
5. Explain PEEP.
6. What are the advantages and disadvantages of a humidifier?
7. What is MDI? Why do you use it with a spacer?
8. What is ventilator associated pneumonia?
9. What are the ventilator settings for a patient with COPD?
10. How to set up for an endo tracheal intubation?

III. Short answers on:

(10 x 2 = 20)

1. ABG and its uses.
2. What is pericardiocentesis?
3. What is CPAP?
4. How do you monitor cardiac output?
5. What are vaso-active drugs?
6. What is chest tube placement?
7. What are the uses of venture mask?
8. What is metabolic acidosis?
9. What is closed airway suctioning?
10. Different types of shock.

**DIPLOMA IN CRITICAL CARE TECHNOLOGY
SECOND YEAR**

**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O₂ THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail about the procedure of endotracheal tube intubation?
2. Write in detail about the different types of oxygen delivery systems?
3. What are the airway cleaning techniques? Steps to maintain adequate airway in an intubated patient?

II. Write notes on:

(10 x 5 = 50)

1. Write short notes on pulse oximeter.
2. What is non-invasive ventilation?
3. What are the different types of humidifiers and their advantages and disadvantages?
4. What is arterial blood gas? Mention its uses.
5. Explain the procedure of extubation.
6. Placement of 12 lead ECG with diagram.
7. Draw an E.T tube and label its parts.
8. What are the hazards of oxygen therapy?
9. Write briefly about the various ventilator settings.
10. What is pericardiocentesis?

III. Short answers on:

(10 x 2 = 20)

1. What is PEEP?
2. What are the uses of pulmonary artery catheterization?
3. What are nebulizing agents?
4. What is closed suctioning technique?
5. Materials to set up arterial line insertion.
6. What do you mean by FiO₂?
7. What are oral airways and their different sizes?
8. What are the different types of laryngoscope blades?
9. What are the indications for defibrillation?
10. What are the different types of shock?

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CARE OF PATIENT ON VENTILATOR EQUIPMENT
MAINTENANCE AND TROUBLESHOOTING**

Q.P. Code : 841213

Time : Three Hours

Maximum : 100 Marks

Answer All questions.

I. Elaborate on:

(3 x 10 = 30)

1. What is the principle of pulse oximetry? Enumerate advantages and disadvantages of this device?
2. Describe in detail about various types of shock.
3. Describe the following in detail. (a) Modes of mechanical ventilation.
(b) Technique used in suctioning of endotracheal tube.
(c) Managing hypoxia in a ventilated patient.

II. Write notes on:

(10 x 5 = 50)

1. PEEP.
2. Defibrillation.
3. Weaning.
4. Modes of oxygen therapy.
5. Drugs and dosage for a patient with hypotension.
6. Prevention and management of bedsores.
7. Barotraumas.
8. Evaluation of generalized anasarca.
9. Management of tension pneumothorax.
10. Post extubation care of patients

III. Short answers on:

(10 x 2 = 20)

1. What is bronchoscopy?
2. What are nebulizing agents?
3. Draw nasopharyngeal airway.
4. Uses of atropine.
5. What is ETO sterilization?
6. Drugs and dosage used in supraventricular tachycardia.
7. ABG.
8. Write the types of flow patterns.
9. 12 lead ECG.
10. Measurement of cardiac output.

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

[LR 1220]

**DECEMBER 2020
(AUGUST 2020 EXAM SESSION)**

Sub. Code: 1213

**DIPLOMA IN CRITICAL CARE TECHNOLOGY
SECOND YEAR – (Regulation from 2010 -2011)**

**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O₂ THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT MAINTENANCE AND
TROUBLESHOOTING**

Q.P. Code: 841213

Time : Three Hours

Maximum : 100 Marks

Answer All Questions.

I. Elaborate on:

(3 x 10 = 30)

1. Describe in detail about Pulse Oximetry for the following headings:
a) Principle b) Sites c) Advantage d) Disadvantages
2. Describe the monitoring process for a patient with Severe Head Injury in ICU.
3. Describe in detail about various types of Shock.

II. Write notes on:

(10 x 5 = 50)

1. Write in detail about Weaning.
2. Ventilator setting in ARDS.
3. Steps of Chest Physiotherapy.
4. Defibrillation.
5. Hazards of Oxygen Therapy.
6. Management of COVID positive cases in ICU.
7. How to assist Tracheostomy procedure in ICU.
8. Preparation to Transport a Mechanically ventilated patient.
9. Endotracheal Cuff Pressure.
10. Bronchoscopy.

III. Short answers on:

(10 x 2 = 20)

1. Uses of Atropine.
2. What are the different types of laryngoscope blades?
3. Humidification Devices.
4. Organ donation.
5. Sizes of Venflon.
6. What are Vaso – Active drugs?
7. Uses of Venturi mask.
8. Draw Pressure time Curve.
9. Drugs and Dosage used in Supraventricular Tachycardia.
10. Indications for NIV.

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

[AHS 0122]

JANUARY 2022

Sub. Code: 1213

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSION)

**DIPLOMA IN CRITICAL CARE TECHNOLOGY
SECOND YEAR – (Regulation from 2010 -2011)
PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O₂ THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT MAINTENANCE AND
TROUBLESHOOTING
*Q.P. Code: 841213***

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

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

1. Describe about Airway Clearing techniques.
2. Write in detail about Initial Ventilator settings. Add a note on Ventilator modes.
3. Describe in detail about Assessment of Trauma in Emergency.

II. Write notes on: (10 x 5 = 50)

1. Pulse Oximeter.
2. Indication and Contraindication of Non Invasive Ventilation.
3. Disadvantages of High Oxygen administration.
4. Weaning Checklist.
5. Pericardiocentesis.
6. Management of Bedsores.
7. Signs & Symptoms of COVID-19.
8. Pneumothorax.
9. What is Arterial Blood gas? Mention its uses.
10. PEEP.

III. Short answers on: (10 x 2 = 20)

1. Draw and label Laryngoscope.
2. Three steps in Defibrillation.
3. What is chest tube placement?
4. Closed suctioning techniques.
5. Contents of Intubation Tray.
6. Normal values for PaO₂, PaCO₂.
7. Complications of Endotracheal Suctioning.
8. Tidal Volume.
9. Peak & Plateau pressures on Ventilator and its significance.
10. Fumigation.

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

[AHS 0922]

SEPTEMBER 2022

Sub. Code: 1213

(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)

DIPLOMA IN CRITICAL CARE TECHNOLOGY

SECOND YEAR – (Regulation from 2010 -2011)

**PAPER III – CRITICAL CARE TECHNOLOGY, AIRWAYS O2 THERAPY,
CARE OF PATIENT ON VENTILATOR EQUIPMENT MAINTENANCE AND
TROUBLESHOOTING**

Q.P. Code: 841213

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3x10 = 30)

1. What is the Initial assessment of Trauma in Emergency? How would you monitor a patient with severe head injury in ICU?
2. What are the airway clearing techniques? Steps to maintain adequate airway in an intubated patient.
3. A patient with urinary tract infection developed sepsis and multiorgan failure is on ventilator.
 - a. What are the daily parameters to be monitored?
 - b. What is the prophylaxis for deep vein thrombosis?
 - c. What are the techniques used in suctioning tracheal secretion?

II. Write notes on:

(10 x 5 =50)

1. Bronchoscopy.
2. Multiparamonitor.
3. Basic life support.
4. Indication for intra-arterial line.
5. Precaution in managing a patient with swine flu.
6. Types of positive pressure ventilation.
7. Describe cardiac tamponade and management.
8. Barotrauma.
9. Draw endotracheal tube and label its parts.
10. What is noninvasive ventilation?

III. Short answers on:

(10 x2 =20)

1. Draw and label a laryngoscope.
2. Alpha Bed.
3. Adrenaline.
4. Cardiac output measurement.
5. Vasopressin.
6. Five point auscultation after intubation.
7. What are oral airways and sizes?
8. Sizes of venflon.
9. Fumigation.
10. Causes of upper gastrointestinal bleeding.
