

[LB 0212]

AUGUST 2012

Sub. Code: 1412

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY

SECOND YEAR

PAPER – II PRINCIPLES OF PERFUSION TECHNOLOGY - I

Q.P. Code : 801412

Time: Three hours

Maximum: 100 marks

Answer ALL questions.

I. Elaborate on:

**Pages Time Marks
(Max.)(Max.)(Max.)**

- | | | | |
|---|---|----|----|
| 1. Describe the evolution of cardiopulmonary bypass and its uses in cardiac surgery. | 7 | 20 | 10 |
| 2. Discuss in detail the principles of extra-corporeal gas exchange. | 7 | 20 | 10 |
| 3. What is IABP? Explain in detail about the principle, functions, indications, contra-indications and complications of IABP. | 7 | 20 | 10 |

II. Write Notes on:

- | | | | |
|---|---|----|---|
| 1. Objectives of an ideal oxygenator. | 4 | 10 | 5 |
| 2. What are the components of membrane oxygenator? Explain its functions. | 4 | 10 | 5 |
| 3. What are the various methods used to reduce myocyte damage during reperfusion. | 4 | 10 | 5 |
| 4. What are the different types of hypothermia. | 4 | 10 | 5 |
| 5. Explain pulsatile flow. | 4 | 10 | 5 |
| 6. Describe the components of extra corporeal circulation. | 4 | 10 | 5 |
| 7. Explain the functions of heat exchangers. | 4 | 10 | 5 |
| 8. What are the effects of preload and after load on centrifugal pump flow? | 4 | 10 | 5 |

III. Short Answers on:

- | | | | |
|--|---|---|---|
| 1. What is bubble trap? | 2 | 4 | 3 |
| 2. Explain siphonage principle. | 2 | 4 | 3 |
| 3. Define reaction time. | 2 | 4 | 3 |
| 4. Name few commonly used sites for temperature monitoring. | 2 | 4 | 3 |
| 5. What is bellow pump? | 2 | 4 | 3 |
| 6. Describe the functions of flow meter. | 2 | 4 | 3 |
| 7. Roller pumps. | 2 | 4 | 3 |
| 8. What is the desirable pore size of arterial filter, gas filter, cardiectomy filter? | 2 | 4 | 3 |
| 9. Explain how to return the cardiectomy blood. | 2 | 4 | 3 |
| 10. What are the main components of cardioplegic solution. | 2 | 4 | 3 |

[LC 0212]

FEBRUARY 2013

Sub. Code: 1412

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY

SECOND YEAR

PAPER – II PRINCIPLES OF PERFUSION TECHNOLOGY - I

Q.P. Code : 801412

Time: Three hours

Maximum: 100 marks

Answer ALL questions.

I. Elaborate on:

(3 x 10 = 30)

1. Monitoring during Cardio Pulmonary Bypass - Physiological and Circuit variables.
2. Elaborate on Coagulation cascade.
3. Describe Complications of extracorporeal circulation.

II. Write Notes on:

(8 x 5 = 40)

1. Anticoagulation.
2. Blood surface interface.
3. Biocompatible materials.
4. Factors affecting hemostasis during Cardio Pulmonary Bypass.
5. Priming solution.
6. Pre Cardio Pulmonary Bypass check list.
7. Cerebral protection during Cardio Pulmonary Bypass.
8. Temperature Management in Cardio Pulmonary Bypass.

III. Short Answers on:

(10 x 3 = 30)

1. Extra corporeal membrane oxygen.
2. Perfusion record.
3. Intra Aortic Balloon Pump.
4. Circuit alarms.
5. Hematocrit.
6. Aprotinin.
7. Roller pumps.
8. Filters and bubble traps.
9. Venting of the heart.
10. Priming volume.

[LD 0212]

AUGUST 2013

Sub. Code:1412

B.Sc., CARDIO PULMONARY PERFUSION CARE TECHNOLOGY

SECOND YEAR

PAPER – II- PRINCIPLES OF PERFUSION TECHNOLOGY –I

Q.P. Code: 801412

Time : Three hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on

3 x 10 = 30

1. Hemodilution, Hematocrit and Priming volume
2. CPB circuit diagram incorporating all components
3. Complications of extra corporeal circulation

II. Write notes on

8 x 5 = 40

1. Cardioplegia
2. Coagulation Cascade
3. Bio compatible materials
4. systemic inflammatory response in CPB
5. Ultra filtration dialysis during CPB
6. Partial cardiopulmonary bypass
7. Hypothermia
8. Anticoagulation for CPB

III. Short answers on

10 X 3 = 30

1. Rotatory pumps
2. Tubings in CPB
3. Cell savers and washing system
4. Protamine
5. IABP
6. Left ventricular Assist devices
7. Hemostasis
8. Occlusion settings
9. Heparin reversal
10. Communication in conduct of CPB

[LF 0212]

AUGUST 2014

Sub. Code:1412

**B.Sc., CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR**

PAPER – II- PRINCIPLES OF PERFUSION TECHNOLOGY –I

Q.P. Code: 801412

Time : Three hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on:

(3x10=30)

1. Describe the evolution of oxygenator?
2. What is cardiopulmonary bypass? How do you initiate, manage & terminate? Explain.
3. Write in detail about IABP & its principle including indications & contra indications.

II. Write Notes on:

(8x5=40)

1. How does a roller pump play role in cardiopulmonary bypass?
2. Draw extracorporeal circuit diagram & label it.
3. Essential parameters monitored by perfusionist on CPB.
4. What is filter? Where do you need to incorporate exactly in your bypass circuit? Why?
5. Hypothermia & its uses in cardiac surgery.
6. What is arterial blood gas report & how will you react after looking at it?
7. Write the importance of perfusion flow rates & pressures.
8. Prepare a treatment chart for metabolic /respiratory & acidosis/alkalosis.

III. Short Answers on:

(10x3=30)

1. What is cardioplegia solution? How does it preserve myocardium?
2. Draw membrane oxygenator & specify all the components.
3. How does centrifugal pump differ from roller pump?
4. Basic difference between bubbler & membrane oxygenator.
5. How do you assess your priming volume?
6. Why hemofilter is mandatory for children especially?
7. Write the formula for calculating the patient body surface area, blood volume & circulating hematocrit.
8. What is "Ischemic period"?
9. What is free radical scavengers & give example?
10. Common complication due to improper aortic & venous cannulation.

[LG 0215]

FEBRUARY 2015

Sub. Code:1412

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR**

PAPER – II- PRINCIPLES OF PERFUSION TECHNOLOGY – I

Q.P. Code: 801412

Time : Three Hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Write in detail about IABP and its principle including indications and contra indications.
2. Describe the evolution of oxygenator.
3. What is cardiopulmonary bypass? How do you initiate, manage and terminate? Explain.

II. Write Notes on:

(8 x 5 = 40)

1. What is filter? Where do you need to incorporate exactly in your bypass circuit? Why?
2. Prepare a treatment chart for metabolic/respiratory and acidosis/alkalosis.
3. Essential parameters monitored by perfusionist on CPB.
4. Write the importance of perfusion flow rates and pressures.
5. Draw extracorporeal circuit diagram and label it.
6. What is arterial blood gas report and how will you react after looking at it?
7. How does a roller pump play role in cardiopulmonary bypass?
8. Hypothermia and its uses in cardiac surgery?

III. Short Answers on:

(10 x 3 = 30)

1. Basic difference between bubbler and membrane oxygenator.
2. What is "Ischemic period"?
3. What is cardioplegia solution? How does it preserve myocardium?
4. How do you assess your priming volume?
5. What is free radical scavengers and give example?
6. Draw membrane oxygenator and specify all the components.
7. Why hemofilter is mandatory for children especially?
8. Common complication due to improper aortic and venous cannulation.
9. How does centrifugal pump differ from roller pump?
10. Write the formula for calculating the patient body surface area, blood volume and circulating hematocrit.

[LH 0815]

AUGUST 2015

Sub. Code:1412

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY

SECOND YEAR

PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-I

Q.P. Code: 801412

Time : Three Hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain myocardial protection techniques and its strategies.
2. Describe all the ideal characteristics of an oxygenator, pump and what are the principles of extra corporeal gas exchange.
3. Draw circuit of CPB with hemofilter, name all the parts and also mention all important benefits of Hemofiltration in Detail.

II. Write Notes on:

(8 x 5 = 40)

1. Heparin – mechanism of action, dose and its effects on patient undergoing bypass.
2. How to initiate, manage and wean off bypass?
3. Indication, contraindication of IABP and mention its merits.
4. Difference between membrane and bubble oxygenator.
5. Blood conservation techniques in detail.
6. Essential parameter monitored on CPB and state some safety devices in extracorporeal circuit.
7. Effects of CPB on various organs...
8. Prepare a treatment chart for metabolic/ respiratory Acidosis and also Alkalosis.

III. Short Answers on:

(10 x 3 = 30)

1. What is TCA and its indications and technique?
2. Safety durations of various temperature and What is the required flow rate?
3. Mention the formula for the following 1) BSA, 2) Circulating hct, 3) Heparin to be added in prime formulae.
4. What is hand crank? When it is used?
5. Hypothermia merits and demerits 2 point each.
6. Causes for poor venous drainage.
7. What is Act? Why it is essential to be monitored during CPB. Mention normal Act values and values to be maintained in CBP.
8. Mention some Pioneer surgeon and their discoveries with CPB and cardiac surgery.
9. What is Prime? Aims of it?
10. Mention various kinds of Cardioplegia used till date which are commonly used in current practices.

[LI 0216]

FEBRUARY 2016

Sub. Code:1412

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY

SECOND YEAR

PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-I

Q.P. Code: 801412

Time : Three Hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. History of Cardiac surgery, pump, and oxygenator – write in detail?
2. Explain myocardial protection techniques and its strategies.
3. Draw circuit of CPB with hemofilter, name all the parts and mention all important benefits of Hemofiltration in Detail.

II. Write Notes on:

(8 x 5 = 40)

1. Indication, contraindication of 1ABP and mention its merits.
2. Prepare a treatment chart for metabolic/respiratory Acidosis and also Alkalosis.
3. Effects of CPB on various organs.
4. Blood conservations techniques, explain in detail.
5. How to initiate bypass, management of on bypass and how do you wean off bypass? Explain in detail.
6. Essential parameters monitored on CPB and state some safety devices in extracorporeal circuit.
7. Heparin- mechanism of action, dose and its effects on patients undergoing bypass.
8. Differentiate between Roller pump and centrifugal Pump.

III. Short Answers on:

(10 x 3 = 30)

1. Mention various kinds of Cardioplegia used till date... which are commonly used in current practices?
2. Hypothermia merits and de merits 2 point each.
3. Expand ECMO, LVAD, and VAVD.
4. What is Act? Why it is essential to be monitored during CPB? Mention normal ACT values and values to be maintained in CPB.
5. Mention some Pioneer surgeon and their discoveries with CPB and cardiac surgery.
6. Formula for the following 1) BSA, 2) Circulating hct, 3) Heparin to be added in prime.
7. What is hand crank? When it is used?
8. Role of perfusionist in OPCAB surgery.
9. Differences of Adult and pediatric circuits.
10. How to you check Occlusion in Roller pump?

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR**

PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-I

Q.P. Code: 801412

Time : Three Hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. How to initiate bypass, management of on bypass and how do you wean off bypass? Explain in detail.
2. Explain on myocardial protection techniques, its strategies and Reperfusion injury.
3. Explain the Role of Perfusionist in cardiac surgery, and also Draw a general circuit of CPB with all parts.

II. Write Notes on:

(8 x 5 = 40)

1. Write a Note Acute Normovolumic Hemodilution.
2. Explain in detail about the Membrane oxygenator with all parts and diagram.
3. Blood conservations techniques, explain in detail.
4. Various Tubing packs used in currently specify sizes of Raceway, venous, Arterial tubes.
5. State various inventions and discoveries in CPB.
6. What are the different sites of cannulation? Explain about Venous and Arterial cannulation in detail.
7. Aortic Cross Clamping what do you understand explain its needs and Measures to do after the Clamp release.
8. Write a note on Hypothermia?

III. Short Answers on:

(10 x 3 = 30)

1. What parameters are required to know the Adequacy of perfusion?
2. Differences of Adult and pediatric circuits.
3. How to you check Occlusion in Roller pump?
4. What is TCA and its indications and technique?
5. Safety durations of various temperature and what is the required flow rate?
6. Contraindication of IABP.
7. What is the significance of Lactate in CPB?
8. Causes for poor venous drainage.
9. What is Pulsatile Perfusion?
10. –Other name for Custodial CP.
–Who did the first heart Transplant in India?
–Expand – VVECMO, TOF.

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR**

PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-I

Q.P. Code: 801412

Time : Three Hours

Maximum : 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Give a note on Extracorporeal Circulation and also State the History and Evolution of CPB till date.
2. Draw a CPB circuit and address the case study with detailed explanation, Calculations Cannulae selection etc. CASE : 1 year babe weighing 5.5 kg. Height 65 cm HB 11.3 g/dl posted for VSD closure.
3. Explain in detail about Cardioplegia Types, needs of Cardioplegic Surgery, Routes of Administration with all Advantages and Disadvantages.

II. Write Notes on:

(8 x 5 = 40)

1. What is Prime? Aims of Priming and Priming solutions used currently in CPB.
2. Write a note on any 1 Adult Oxygenator and 1 Pediatric Oxygenator with all its Specifications.
3. How will you manage a Renal failure patient in CPB? Mention about CUF.
4. Essential parameter Monitored on CPB and state some safety devices in extracorporeal circuit.
5. Principles of Oxygenation and note on Extracorporeal Gas Exchange.
6. Heparin – mechanism of action, dose and its effects on patients undergoing bypass.
7. Effects of CPB on Brain and Lung, State some Neurological problems faced post operatively after cardiac surgery.
8. How will you Wean off from CPB? Mention all parameters.

III. Short Answers on:

(10 x 3 = 30)

1. What are the routine Preoperative Investigations in Cardiac Surgery?
2. State the common Abnormalities on Bypass. Highlight it.
3. What are the Contraindications of IABP?
4. How will you Treat a Massive Air Embolism during Bypass?
5. What are the different types of filter in CPB?
6. Mention the formula for the following a) K + correction b) Circulating hct c) Heparin to be added in prime formulae.
7. Mention an Osmotic Diuretic and give a note of it.
8. What is Hot Shot? When it is given?
9. What is Act? Why it is essential to be monitored during CPB. Mention normal ACT values and values to be maintained in CPB.
10. Composition of Delnido Cardioplegia with base solution. What is the Safe duration of it?

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I

Q.P. Code: 801412

Time: Three Hours**Maximum: 100 Marks**

Answer all questions

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

1. Give a note on extracorporeal circulation and also state the history of CPB till date.
2. What is priming and its aim? Different types of priming solutions used in CPB in detail.
3. Explain about ultra filtration, its significance, methods used in CPB and also draw a circuit of modified ultra filtration.

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

1. Write a note on Centrifugal Pump with diagram and mention its advantage over Roller pump.
2. What are membrane oxygenators? Write some characteristics of an oxygenator and its history till date.
3. Explain the strategies involved in preservation of Myocardium of Cardiac surgery.
4. Write some essential parameters to be monitored on CPB not less than 7 parameters.
5. Principles of oxygenation and note on extracorporeal gas exchange.
6. Heparin-mechanism of action, dose and its effects on patients undergoing bypass.
7. Effects of CPB on Brain and Lung. State some neurological problems faced post operatively after cardiac surgery.
8. Management of air embolic event in CPB and how you will avoid such incidents.

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

1. What is CAD? What are the factors which causes CAD?
2. What is IABP? Its uses and mention its contraindications.
3. Hypothermia merits and de merits three points each.
4. Composition of Delnido Cardioplegia with base solution. What is the safe duration of it?
5. Indications of Fem-Fem bypass and femoral cannulation.
6. Write a note on tetralogy of Fallot and mention some pediatric oxygenators.
7. a) Normal ACT value = ... seconds.
b) 1 ml Heparin = ... IU.
c) Write the formula for circulating hematocrit on pump.
8. What is ECMO? and mention its types in short.
9. Essential Cardioplegia additives and its roles in Myocardial preservation.
10. a) Expand MICS, ANH, LVAD b) Adult arterial filter microns,
c) 1 ml potassium Meq.

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I

Q.P. Code: 801412

Time: Three Hours**Maximum: 100 Marks**

Answer all questions

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

1. Write note on blood conservations techniques and also draw a standard CPB circuit with parts.
2. Write an elaborate essay on 'Ultra Filtration'.
3. What is Myocardial protection? State all the strategies and highlight about Reperfusion injury.

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

1. What is Priming? Aims of Priming. Priming solutions used currently in CPB.
2. Write a note on any 1 adult oxygenator and 1 pediatric oxygenator with all its specifications.
3. How will you manage a renal failure patient in CPB? Mention about CUF.
4. Essential parameter monitored on CPB and state some safety devices in extracorporeal circuit.
5. Principles of oxygenation and note on extracorporeal gas exchange.
6. Heparin-mechanism of action, dose and its effects on patients undergoing bypass.
7. Effects of CPB on Brain and Lung. State some neurological problems faced post operatively after cardiac surgery.
8. How will you Wean off from CPB? Mention all parameters?

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

1. What are the routine preoperative investigations in Cardiac surgery?
2. State the common abnormalities on bypass. Highlight it.
3. What are the contraindications of IABP?
4. How will you treat a massive air embolism during bypass?
5. What are the different types of filter in CPB?
6. Mention the formula for the following 1, K+correction 2, circulating hematocrit, 3, heparin to be added in prime formulae.
7. Mention an Osmotic diuretic and give a note of it.
8. What is Hot shot? When it is given?
9. What is Act? Why it is essential to be monitored during CPB? Mention normal ACT values and values to be maintained on CPB?
10. Composition of Delnido Cardioplegia with base solution. What is the safe duration of it?

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I

Q.P. Code: 801412

Time: Three Hours**Maximum: 100 Marks**

Answer all questions

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

1. Explain about ultra filtration? Its significance, methods used in CPB. Draw a circuit of modified ultra filtration.
2. Write note on blood conservations techniques and also draw a standard CPB circuit with parts.
3. What is priming and its aims? Different types of priming solutions used in CPB in detail.

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

1. Write 2 different Cardioplegia techniques in detail. What are the advantages of a Blood CP?
2. How do you Calibrate the heart lung machine and check occlusion, state methods to set Occlusion?
3. What are the different sites of Cannulation? Explain about venous and arterial Cannulation in detail.
4. Write a note on centrifugal pump with diagram and mention its advantage over roller Pump.
5. What is membrane oxygenator? Write some characteristic's of an oxygenator and its history till date.
6. Management of air embolic event in CPB, and how u will avoid such incidents.
7. Explain the strategies involved in preservation of Myocardium in Cardiac surgery.
8. Write some essential parameters to be monitored on CPB not less than 7 parameters.

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

1. a) Normal ACT value = ... seconds.
b) 1 ml Heparin = ... IU.
c) Write the formula for circulating hematocrit on pump.
2. What is ECMO and mention its types in short?
3. Essential Cardioplegia additives and its roles in Myocardial preservation.
4. a) Expand MICS, ANH, LVAD b) Adult arterial filter microns,
c) 1 ml potassium Meq.
5. What is CAD? What are the factors which causes CAD?
6. What is IABP? Its uses and mention its contraindications.
7. Hypothermia merits and demerits three points each.
8. Composition of Delnido Cardioplegia with base solution. What is the safe duration of it?
9. Indications of Fem-Fem bypass and femoral canulation.
10. Write an note on tetology of Fallot and mention some pediatric oxygenators commonly used?

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I

Q.P. Code: 801412

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe in detail about the ideals of oxygenator and explain membrane oxygenator in detail along with principles of gas transfer.
2. Draw the circuit diagram and explain the assembling and priming techniques of a patient admitted for VSD closure weighing 15Kgs with a height of 95 cms whose Hct is 30%.
3. Describe in detail about the Aorto atrio caval cannulation for CPB.

II. Write notes on:

(8 x 5 = 40)

1. What are the ideal properties of CPB pump and tubings?
2. List the Perfusionist prebypass check list.
3. Draw a flow chart debiting anticoagulation regimen on or.
4. Absolute and relative indication for femoral arterio-venous cannula.
5. Indications for IABP support.
6. Write a note on various technique of Myocardial Protection.
7. Write a note on Heparin.
8. Write a note on different types of Pumps used in Cardio Pulmonary Bypass.

III. Short answers on:

(10 x 3 = 30)

1. Define reaction time.
2. What are the advantages of a recirculation line?
3. Define conduction, convection and radiation.
4. Define rated blood flow.
5. List the types of filters used in CPB circuit.
6. Thermal conductivity values (k) of different heat exchanger material.
7. List the anti-hypertensive drugs.
8. Define α stat acid base management.
9. Draw on ECG wave form and label it.
10. a) Cardiac Index = .../.....
b) 1 mm = ...Fr.

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I**

Q.P. Code: 801412

Time: Three Hours

Maximum: 100 Marks

Answer all questions

I. Elaborate on:

(3 x 10 = 30)

1. Describe in detail about the ideals of Pump and explain principles of roller pump in detail.
2. Draw the circuit diagram and explain the assembling and priming techniques of a 65 year old patient admitted for CABG weighing 75Kgs with a height of 165 cms whose Hct is 30%.
3. Describe in detail about the Aorto atrio caval cannulation for CPB.

II. Write notes on:

(8 x 5 = 40)

1. List the Perfusionist prebypass check list.
2. What are the advantages of a recirculation line?
3. Write a note on Bubble oxygenator.
4. Coronary circulation.
5. Write a note on various technique of Myocardial Protection.
6. Write a note on Diuretics.
7. What are the ideal properties of tubings.
8. Write a short note on Evolution of CPB.

III. Short answers on:

(10 x 3 = 30)

1. Write a note on reaction time.
2. Correction of Hyperkalaemia and Bicarbonate.
3. Absolute and relative indication for femoral arterio-venous cannula.
4. Define rated blood flow.
5. Physiological effects of IABP counter pulsation.
6. Thermal conductivity values (k) of different heat exchanger material.
7. List the anti-hypertensive drugs.
8. Define α stat acid base management.
9. Draw on ECG wave form and label it.
10. a) Calibration for $\frac{1}{2}$ inch 1RPM = ...ml.
b) Cardiac output = ... X

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I

Q.P. Code: 801412

Time: Three Hours**Maximum: 100 Marks**

Answer all questions

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

1. History and development of cardiopulmonary bypass. Till date and also elaborate on Gibbons contribution to CPB in clinical practice.
2. Write a note on IABP with diagram. Indications, contraindications and complication of it.
3. Myocardial preservation strategies and techniques involved in cardiac surgery till date.

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

1. Ideal characteristics of a pump and oxygenator.
2. Differences between roller pump and centrifugal pump.
3. Draw an extracorporeal circuit with all parts and label it and perfusion pre bypass checklist chart.
4. What is priming? What is static priming? Aims of it and mention various types of priming solutions?
5. What is CAD? Risk factors of CAD? And draw coronary artery anatomy.
6. Adult and paediatric perfusion differences in all Aspects.
7. How to choose an arterial and venous cannula? Temperature based flow rates chart?
8. What is membrane oxygenator? Write some characteristics of an oxygenator and its history till date.

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

1. What are the sources of cerebral Emboli during CPB?
2. Mention the formula for the following: circulating Haematocrit, amount of RBC to be added in prime, heparin to be added in prime.
3. Mention all the parameters monitored during CPB.
4. Advantage of blood cardioplegia over crystalloid cardioplegia.
5. Correction of hyperkalaemia and bicarbonate.
6. What is MUF? When and where it is done? Formula for volume to be removed during this process.
7. Address this case : 1 yr old child with VSD, having weight of 5.3 kg, Height 120 cm, Hb 10.1%. What oxygenator, packs, cannula, prime will you choose and manage the case? Also calculate circulating haematocrit.
8. Renal protocol in CPB.
9. Describe the principles of venous drainage and causes of poor venous return?
10. Describe the principles of heat exchangers and tubing used in CPB.

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

[AHS 0321]

MARCH 2021

Sub. Code: 1412

(AUGUST 2020 EXAM SESSION)

B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY

SECOND YEAR (Regulations 2010-2011 & 2014-2015)

PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I

Q.P. Code : 801412

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Myocardial preservation Strategies and Techniques Involved in Cardiac surgery till date.
2. History and development of Cardiopulmonary Bypass Till date and also Elaborate on Gibbons contribution to CPB in clinical practice.
3. Write a note on IABP with diagram. Indications, Contraindications and complication of it.

II. Write notes on:

(8 x 5 = 40)

1. What is CAD? Risk factors of CAD? And draw a coronary Artery Anatomy.
2. Adult and Paediatric perfusion differences in all Aspects.
3. How to choose Cannula Arterial and Venous? Temperature Based Flow Rates Chart?
4. Safety Devices used in CPB and Mention its Functions.
5. Ideal characteristics of a Pump and Oxygenator.
6. Differences between Roller pump and centrifugal Pump.
7. Draw a Extracorporeal circuit with all parts and Label it and Perfusion Pre bypass checklist chart.
8. What is priming? What is static Priming? Aims of it and mention various types of priming solutions?

III. Short answers on:

(10 x 3 = 30)

1. What is MUF? When and where it is done? Formula for Volume to be removed during this process.
2. Address this case : 1 yr old child with VSD, having weight of 5.3 kg, Height 120 cm, Hb 10.1%. What oxygenator, packs, cannula, prime will you choose and manage the case? Also calculate circulating haematocrit.
3. Renal protocol in CPB.
4. Describe the principles of Venous Drainage and Causes of Poor Venous Return.
5. Describe the principles of Heat exchangers and tubing used in CPB.
6. What are the sources of Cerebral Emboli during CPB?
7. Mention the Formula for the following: (a) circulating Haematocrit, (b) Amount of RBC to be added in prime, (c) Heparin to be added in Prime.
8. Mention all the Parameters Monitored during CPB.
9. Advantage of Blood Cardioplegia over crystalloid Cardioplegia.
10. Correction of Hyperkalemia and Bicarbonate.

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

[AHS 0222]

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

Sub. Code: 1412

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR (Regulations 2010-2011 & 2014-2015)
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART – I
Q.P. Code : 801412**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Write a note on IABP with diagram. Indications, Contraindications and complication of it.
2. Myocardial preservation Strategies and Techniques Involved in Cardiac surgery till date.
3. History and development of Cardiopulmonary Bypass. Till date and also Elaborate on Gibbons contribution to CPB in clinical practice.

II. Write notes on:

(8 x 5 = 40)

1. How to choose Cannula Arterial and Venous? Temperature Based Flow Rates Chart.
2. Safety Devices used in CPB and Mentions its Functions.
3. Ideal characteristics of a Pump and Oxygenator.
4. Differences between Roller Pump and Centrifugal Pump.
5. Draw an Extracorporeal circuit with all parts and Label it and Perfusion Pre bypass checklist chart.
6. What is priming? What is static Priming? Aims of it and mention various types of priming solutions.
7. What is CAD? Risk factors of CAD? And draw a coronary Artery Anatomy.
8. Adult and Paediatric perfusion differences in all Aspects.

III. Short answers on:

(10 x 3 = 30)

1. What are the sources of Cerebral Emboli during CPB?
2. Mention the Formula for the following: circulating Haematocrit, Amount of RBC to be added in prime, Heparin to be added in Prime.
3. Mention all the Parameters Monitored during CPB.
4. Advantage of Blood Cardioplegia over crystalloid Cardioplegia.
5. Correction of Hyperkalemia and Bicarbonate.
6. Describe the principles of Venous Drainage and Causes of Poor Venous Return.
7. Describe the principles of Heat exchangers and tubing used in CPB.
8. Address this case : Patient with VSD of weight 5.3 kg Height 120 cm, Hb 10.1%, age 1yr. What oxygenator, packs, cannula, prime you chose and Manage the case. Also calculate Circulating haematocrit.
9. Renal protocol in CPB.
10. What is MUF? When and where it is done? Formula for Volume to be removed during this process.

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

[AHS 0922]

SEPTEMBER 2022

Sub. Code: 1412

(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR (Regulations from 2010-2011 & 2014-2015)
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-1
Q.P. Code : 801412**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain IABP -its principles, indications, insertion and complications.
2. Draw a CPB circuit diagram with incorporating all components.
3. Write the ideal characteristics of an ideal blood pump and explain about the roller pump in detail.

II. Write notes on:

(8 x 5 = 40)

1. Role of Heparin in Cardio Pulmonary Bypass.
2. Write a note on normovolemic hemodilution.
3. Difference between Adult and pediatric priming solution.
4. Oxygen free radical scavengers.
5. Write a note on Principles of gas exchange in true membrane oxygenator.
6. Occlusion checking procedure and its importance.
7. List the causes of low venous return.
8. Write a note on centrifugal pump.

III. Short answers on:

(10 x 3 = 30)

1. Mannitol.
2. Activated clotting time.
3. Define blood flow rate.
4. Adrenaline and its uses.
5. Pre – bypass checklist.
6. Cardiotomy filter.
7. Patient cooling and rewarming gradient.
8. Short note on Venous drainage in Cardio pulmonary Bypass.
9. Short note on Bubble trap.
10. Short not on Arterial Line filters.

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

[AHS 0423]

APRIL 2023

Sub. Code: 1412

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR (Regulations 2010-2011, 2014-2015 & 2018-2019 onwards)
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-1
Q.P. Code: 801412**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain the Management of the Coagulation Parameters during CPB.
2. Draw the CPB circuit of an adult undergoing Mitral Valve Replacement.
3. Describe the Modes of Heat Transfer and uses of Heat Exchanger devices in CPB.

II. Write notes on:

(8 x 5 = 40)

1. Importance and Procedure of Occlusion checking.
2. Cardioplegia.
3. Complications of Venous Cannulation.
4. Protamine Reactions and its Management.
5. Bubble Oxygenator.
6. Bivalirudin.
7. Activated clotting time.
8. Sodium Bicarbonate.

III. Short answers on:

(10 x 3 = 30)

1. Left Ventricular assist device - Indications.
2. Tranexamic acid.
3. John. H. Gibbon.
4. Methods of Various Cannulation.
5. Insertion techniques of an IABP.
6. Gas line filters.
7. Perfusion emergencies.
8. Different types of Tubing materials.
9. Priming solutions.
10. Types of Hypothermia.

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

[AHS 1123]

NOVEMBER 2023

Sub. Code: 1412

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR (Regulations 2010-2011, 2014-2015 & 2018-2019 onwards)
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-1
Q.P. Code: 801412**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

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

1. Define IABP. Explain in detail about Indications, Contraindications, Procedures and complications.
2. Explain in detail about Intrinsic and Extrinsic Coagulation pathway and also write a note on Heparin.
3. Pulsatile perfusion vs Non Pulsatile perfusion. Principles of Pulsatile perfusion and benefits of it.

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

1. Delnido Cardioplegia, its composition, preservation time and Elaborate in detail.
2. Congenital Heart diseases.
3. ECMO and its types and indications, complications of it.
4. Membrane Oxygenators.
5. Criteria to conduct of Bypass and Weaning of CPB.
6. Stenting vs Surgery, Conduits used for CABG.
7. Diabetic patient management and AKI patient management in CPB.
8. Commonly used drugs in CPB, mention its function roles.

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

1. Hazards of Blood filters.
2. Magnesium, Xylocard uses in ECC.
3. Expand : VAVD, RVAD, MICS.
4. Heat exchangers.
5. Various types of Filters used in CPB.
6. Flows for various temperature, at what degree you employ total circulatory arrest.
7. Prebypass Checklist.
8. Effects of CPB on Kidney and Brain.
9. Sterile techniques followed in Operation Theatre.
10. Father of Cardiac perfusion and his contributions in Cardiac Surgery.

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

[AHS 0424]

APRIL 2024

Sub. Code: 1412

**B.Sc. CARDIO PULMONARY PERFUSION CARE TECHNOLOGY
SECOND YEAR (Regulations 2010-2011, 2014-2015 & 2018-2019 onwards)
PAPER II – PRINCIPLES OF PERFUSION TECHNOLOGY – PART-1
Q.P. Code: 801412**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

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

1. Compare and Contrast the Membrane and Bubble Oxygenator.
2. Explain the Principles, Indications, Insertion and Complications of Intra-aortic Balloon Pump.
3. Explain in detail about the various alternatives of Heparin. Add a note on Heparin Activity Test.

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

1. Del – Nido Cardioplegia.
2. Albumin and its uses.
3. Bio line coated tubing.
4. Benefits of Hemodilution.
5. List the Clotting factors.
6. Various types of Arterial cannulas used for CPB.
7. Types and Uses of Heat Exchangers in CPB.
8. Absolute and Relative Indications for Femoral cannulation and its Complications.

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

1. Causes of High line pressure.
2. Hemolysis.
3. Bubble trap.
4. Composition of Cardioplegic solution.
5. Hematocrit and its importance in CPB.
6. Perfusion record.
7. Working principle of Centrifugal pump.
8. Diastolic Augmentation.
9. Gas filters.
10. Difference between Adult and Pediatric circuits.
