August, 2015

STATE MEDICAL FACULTY OF WEST BENGAL

Preliminary Examinations
for Diploma in Perfusion Technology : DPfT

Paper – I
ANATOMY & PHYSIOLOGY

Time – 3 hours Full Marks – 80

Group – A

Q-1) Write the correct Answer: **10x1 = 10**

i) The posterior descending artery is branch of the:
- a) Circumflex Coronary Artery
- b) Right Coronary Artery
- c) Left Anterior Descending Coronary Artery
- d) Ramus Inermedius

ii) Most common type of VSD is:
- a) Muscular
- b) Perimembranous
- c) Inlet type
- d) Outlet type

iii) In an ECG grid, on vertical axis, 1 small square is equivalent to:
- a) 0.1 mV
- b) 0.2 mV
- c) 0.3 mV
- d) 0.4 mV

iv) Coronary sinus drains into:
- a) RA
- b) LA
- c) LV
- d) RV

v) AV node is situated in:
- a) Fossa ovalis
- b) Junction of SVC & right atrium
- c) Koch's triangle
- d) Interventricular septum

vi) The protective pericardial Sec enclosing the heart normally contains approximately:
- a) 50ml pericardial Fluid
- b) 100ml pericardial Fluid
- c) 150ml pericardial Fluid
- d) 200ml pericardial Fluid

vii) Tricuspid valves are all, except:
- a) Tricuspid valve
- b) Mitral valve
- c) Pulmonary valve
- d) Aortic valve

viii) Largest white blood cells are:
- a) Neutrophil
- b) Eosinophil
- c) Basiophil
- d) Monocyte

ix) Duration of a single cardiac cycle is:
- a) 0.5 Sec
- b) 0.8 Sec
- c) 0.6 Sec
- d) 0.9 Sec

x) Femoral artery is the continuation of:
- a) Aorta
- b) Common lliac artery
- c) Internal lliac artery
- d) External lliac artery

Contd.....P2/

Preliminary Examinations
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Paper – I
ANATOMY & PHYSIOLOGY

Group – B

Answer any Two from Question No. 2 to 5 and any Four from Question No. 6

2x20 = 40

Q2. Discuss normal coagulation mechanism. What is the role of heparin and Protamine during CPB? What steps do you follow to monitor heparin and protamine administration during and after open heart surgery?

5+5+5+5 = 20

Q3. Define mean blood pressure and cardiac index. What are their normal values? What are their significances during cardiopulmonary bypass? Describe cardiac cycle?

5+5+5+5 = 20

Q4. Enumerate different blood groups and types. What is the importance of crossmatching? What are the causes of hemolysis during CPB and how can you prevent them?

5+5+5+5 = 20

Q5. Draw a labeled diagram of heart and lungs. Describe oxygen hemoglobin dissociation curve. Define Bohr and Haldane effects.

5+5+5+5 = 20

Group – C

Q6. Write short notes on (**Any Four**):- **4 x 7½ = 30**

a) Coronary venous drainage.
b) Blood gas analysis.
c) Coronary artery anatomy.
d) Mitral Valve apparatus.
e) Central Venous Pressure.

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STATE MEDICAL FACULTY OF WEST BENGAL

Preliminary Examinations
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Paper – II
PATHOLOGY, PHARMACOLOGY

Time – 3 hours | Full Marks – 80

Group – A

Q-1) Write the correct Answer: **10x1 = 10**

i) Drug to counteract metabolic acidosis is:
- a) Sodium Thiosulphate
- b) Sodium carbonate
- c) Sodium bicarbonate
- d) Sodium gluconate

ii) Anticoagulation effect of heparin is neutralized after weaning from CPB with:
- a) Argotroban
- b) Isoprenalin
- c) Nitroglycerine
- d) Protamine sulphate

iii) All are inotropes, except:
- a) Isoprenaline
- b) Amiodarone
- c) Amrinone
- d) Dobutamine

iv) During operations patients of the St. Jehovah's witness do not allow:
- a) Gelatins
- b) Balanced salt solutions
- c) Heparin
- d) Homologous blood

v) Heparin is an activator of:
- a) Thrombin
- b) Antithrombin-III
- c) Factor-X
- d) Factor-XII

vi) Rheumatic fever most commonly affects:
- a) Mitral Valve
- b) Aortic valve
- c) Tricuspid Valve
- d) Pulmonary Valve

vii) Feature of Heparin resistance:
- a) ACT>400 after full heparinisation
- b) Antithrombin ill deficiency
- c) Requires whole blood transfusion
- d) None of the above

viii) 1 mg of heparin is equal to:
- a) 100 IU of heparin
- b) 200 IU of heparin
- c) 400 IU of heparin
- d) 500 IU o heparin

ix) Commonest type of ASD is:
- a) Ostium primum
- b) Ostium Secundum
- c) Sinus venosus
- d) Coronary sinus

x) Cardiac Myxoma commonly occupies:
- a) Right atrium
- b) Left atrium
- c) Right ventricle
- d) Left ventricle

Contd.....P2/

Preliminary Examinations
for Diploma in Perfusion Technology : DPfT

Paper – II
PATHOLOGY, PHARMACOLOGY

Group – B

Answer any Two from Question No. 2 to 5 and any Four from Question No. 6

2x20 = 40

Q2. Describe the pathology of atherosclerosis. Define triple vessle disease and cardiac aneurysm. Write the advantages and disadvantages of CPB in CABG.

5+5+5+5 = 20

Q3. What is heparin and Protamine? Mention their doses and method of use during cardiopulmonary bypass. What is Protamine reaction? What is its management?

5+5+5+5 = 20

Q4. Describe the pathology of ASD, TOF, MS and AS.

5+5+5+5 = 20

Q5. Enumerate the commonly used inotropic drugs and vasodilators in cardiac surgery. Describe their mechanism of actions and doses given during Cardiac surgery. What is anti arrhythmic drug?

5+5+5+5 = 20

Group – C

Q6. Write short notes on (**Any Four**):- **4 x 7½ = 30**

a) Pump Lung.
b) Fibrinolytic Inhibitors.
c) Solumedrol.
d) Composition of priming fluid.
e) Composition of crystalloid Cardioplegic solution.

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STATE MEDICAL FACULTY OF WEST BENGAL

Preliminary Examinations
for Diploma in Perfusion Technology : DPfT

Paper – III
BASIC PHYSICS AND CHEMISTRY, BIOMEDICAL ELECTRONICS, INTRODUCTION TO PERFUSION TECHNOLOGY

Time – 3 hours Full Marks – 80

Group – A

Q-1) Write the correct Answer: **10x1 = 10**

i) 6 packs of platelets are to be administered when platelet count is less than:
- a) 1 Lakh
- b) 2 Lakh
- c) 3 Lakh
- d) 4 Lakh

ii) Commonly used for invasive arterial blood pressure management:
- a) Radial artery
- b) Ulnar artery
- c) Brachial artery
- d) All

iii) With ideal occlusion water level falls about:
- a) 1cm/per min
- b) 2cm/per min
- c) 3cm/per min
- d) 4cm/per min

iv) Recommended dose of Protamine for reversal of heparin is:
- a) 1-1.3mg/100U of heparin
- b) 0.5-1mg/100U of heparin
- c) 1.5-2.0mg/100U of heparin
- d) 2.0-3.3mg/100U of heparin

v) Temperature for profound hypothermia:
- a) 16-18°C
- b) 27-28°C
- c) 30-32°C
- d) 08-10°C

vi) Zero reference point for CVP measurement:
- a) Right atrium
- b) Right ventricle
- c) Left atrium
- d) Left ventricle

vii) Which of the following types of Oxygenator is more efficient?
- a) Bubble Oxygenator
- b) Membrane Oxygenator where blood flows through the fibers and gas flows outside.
- c) Membrane Oxygenator where gas flows through the fibers and blood flows outside
- d) Disc Oxygenator

viii) Size of tubing used for Gas line:
- a) ¼" internal diameter
- b) $^{3}/_{8}$" internal diameter
- c) ½" internal diameter
- d) None of the above

ix) Low venous return may be due to:
- a) Malposition of caval catheters
- b) Kink in venous line
- c) Airlock in venous line
- d) All of the above

x) Diameter of a 24 F venous Cannula is approximately:
- a) 24 mm
- b) 12 mm
- c) 10 mm
- d) 8 mm

Contd.....P2/

Preliminary Examinations
for Diploma in Perfusion Technology : DPfT

Paper – III
BASIC PHYSICS AND CHEMISTRY, BIOMEDICAL ELECTRONICS, INTRODUCTION TO PERFUSION TECHNOLOGY

Group – B

Answer any Two from Question No. 2 to 5 and any Four from Question No. 6

2x20 = 40

Q2. Mention the difference between –

a) Roller Pump and Centrifugal Pump
b) Ante grade and retrograde Cardioplegia
c) Bubble and Membrane Oxygenator
d) Pulsatile and non-pulsatile pump

5+5+5+5 = 20

Q3. Write a brief account on heat exchanger, pressure transducer, Cardioplegia delivery system, arterial Cannula.

5+5+5+5 = 20

Q4. Design a CPB Circuit with diagram for an AVR operation on adult patient.

20

Q5. What is bubble trap? What are the effects of aortic air embolism? Write a short note on air lock in venous line & its solution; mention causes of aortic Cannula high line pressure.

3+6+6+5 = 20

Group – C

Q6. Write short notes on (**Any Four**):- **4 x 7½ = 30**

a) Colloidal Osmotic Pressure
b) Manifold
c) ACT
d) Starting law and termination of bypass
e) Calculation of blood flow during CPB.

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STATE MEDICAL FACULTY OF WEST BENGAL

Preliminary Examinations
for Diploma in Perfusion Technology : DPfT

Paper – IV
INSTRUMENTATION AND MEASUREMENT DETAILS OF PERFUSION TECHNIQUES

Time – 3 hours Full Marks – 80

Group – A

Q-1) Write the correct Answer: **10x1 = 10**

i) Total bypass means:
a) Bypass runs in full flow
b) Caval snares are tightened
c) Heart is arrested completely
d) All of the above

ii) Most important cause of hemolysis during CPB is:
a) Roller pump
b) Oxygenator
c) Cardiotomy suction
d) Blood transfusion reaction

iii) Optimal ACT during CPB is:
a) 280 seconds
b) 380 seconds
c) 480 seconds
d) 580 seconds

iv) Balloon inflation in IABP:
a) Occurs during systole
b) Occurs during diastole
c) Enhances systolic blood pressure
d) Increases systolic vascular resistance

v) In pediatric perfusion:
a) Flow rate is 80-100 ml/kg/min
b) Temperature gradient between patient and water-bath is 8°C
c) All of the above
d) None of the above

vi) Ringer Lactate, when used as a priming fluid in a diabetic patient, may cause:
a) Hyperglycemia
b) Hypoglycemia
c) No change in blood glucose level
d) Lactic acidosis

vii) In hypothermia:
a) There is vasodilatation
b) Blood viscosity is reduced
c) Safe period is increased
d) Blood pH is unaltered

viii) Haematocrit on bypass is kept ordinarily:
a) 22 to 29%
b) 30 to 40%
c) 40 to 50%
d) 10 to 21%

ix) Termination of bypass begins with:
a) Total occlusion of venous line
b) Total occlusion of aortic line
c) Gradual clamping of venous line
d) Gradual clamping of aortic line

x) Desirable mean systolic blood pressure on CPB:
a) 30 – 40mm of Hg
b) 40 – 50mm of Hg
c) 60 – 90mm of Hg
d) 100 – 120mm of Hg

Contd.....P2/

Preliminary Examinations
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Paper – IV
INSTRUMENTATION AND MEASUREMENT DETAILS OF PERFUSION TECHNIQUES

Group – B

Answer any Two from Question No. 2 to 5 and any Four from Question No. 6

2x20 = 40

Q2. What are the safety-checks to be performed during pre-bypass, and by-pass? Mention the criteria of good perfusion.
5+5+10 = 20

Q3. Define antegrade and retrograde Cardioplegia. Mention the main ingredient of Cardioplegia solution and their action. What is the initial dose, temperature and blood to crystalloid ratio in blood Cardioplegia?
5+5+5+5 = 20

Q4. Describe the different types of venous Cannula. Mention the cause of low venous return and its solution. Discuss the criteria for discontinuation of CPB.
4+6+10 = 20

Q5. Discuss briefly –
i) Temperature relation to CPB
ii) Arterial filter
iii) Venting of the heart
iv) Heat Exchanger
5+5+5+5 = 20

Group – C

Q6. Write short notes on (**Any Four**):- **4 x 7½ = 30**

a) Pre-bypass calculation
b) Initiation of bypass
c) Cross-clamp period
d) Defibrillator
e) Membrane Oxygenator.

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