

MANIPAL ACADEMY OF HIGHER EDUCATION

(Deemed University)

MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – JULY 2005

SUBJECT: PAPER I: BASIC SCIENCES AS APPLIED TO ANAESTHESIOLOGY

Monday, July 04, 2005

Time: 3 Hrs.

Max. Marks: 100

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- ✍ Be brief in your answers, padding your answers will not get you any extra credit.
✍ Illustrate your answer with clearly labeled diagrams where appropriate
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1. Diagrammatically depict the relationship between the phases of the cardiac cycle, aortic pressure, and blood flow in the right and left coronary arteries giving a brief explanation for the differences. (10 marks)
2. Define the terms *closing volume*, *closing capacity* and *functional residual capacity (FRC)*. Enumerate the methods used to measure FRC and briefly describe any one of them. (3 + 2 + 5 = 10 marks)
3. Calculate the total body water in a 70-kg adult male. How is this body water distributed between the extracellular and the intracellular compartments? What are the primary methods of regulation of body water? (2 + 2 + 6 = 10 marks)
4. Describe the divisions and functions subserved by the autonomic nervous system in the human body. (10 marks)
5. Explain the effect of changes in cardiac output and ventilation on the uptake of inhalational anaesthetic agents. (5 + 5 = 10 marks)
6. On the basis of their cardiovascular and respiratory effects, discuss your reasons for choosing or avoiding etomidate, ketamine, propofol or thiopentone as an induction agent in (a) a patient with bronchial asthma and (b) a patient with well-controlled hypertension. (5 + 5 = 10 marks)
7. Describe the methods currently used for monitoring body temperature during surgery. What is the significance of measuring core temperature and skin temperature intraoperatively? (7 + 3 = 10 marks)
8. Define the terms *absolute humidity* and *relative humidity*. Explain the design and functioning of a heat-and-moisture exchanger. (4 + 6 = 10 marks)
9. Draw a labeled diagram to depict the segmental cutaneous nerve supply of the anterior aspect of the body. (10 marks)
10. Describe the anatomy of the brachial plexus at the level of the axilla. Describe the technique of blocking the brachial plexus through the axillary approach. What is the singlemost drawback of this approach and how do you overcome this drawback? (3 + 4 + 3 = 10 marks)



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MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – JULY 2005**SUBJECT: PAPER II: CLINICAL ANAESTHESIOLOGY I**

Tuesday, July 05, 2005

Time: 3 Hrs.

Max. Marks: 100

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- ✍ **Be brief in your answers, padding your answers will not get you any extra credit.**
- ✍ **Illustrate your answer with clearly labeled diagrams where appropriate**
1. Discuss your anaesthetic plan in a 27-year old primigravida scheduled for emergency caesarian due to third degree placenta praevia. What are the complications you anticipate in this patient?
(7 + 3 = 10 marks)
 2. What are the anticipated complications of hysteroscopic surgery? What steps you will take to counter these problems?
(6 + 4 = 10 marks)
 3. What are the maternal and foetal benefits of the technique of labour analgesia. (10 marks)
 4. With the help of labeled diagrams, describe the anatomy of the epidural space. What are the factors that contribute to the negative pressure in the epidural space? (7 + 3 = 10 marks)
 5. Describe the technique of brachial plexus block by subclavian perivascular technique. What are the advantages of this approach over the axillary and the interscalene approaches?
(6 + 4 = 10 marks)
 6. Classify local anaesthetic agents according to their chemical structure and duration of action. Mention the important side effects of local anaesthetic agents. (3 + 3 + 4 = 10 marks)
 7. What are the options for pain relief in a child following lower abdominal surgery. Give your plan for postoperative analgesia in a 3-year old 15-kg child undergoing left uretric reimplantation.
(5 + 5 = 10 marks)
 8. A 56-year old known diabetic is scheduled for emergency below knee amputation for diabetic gangrene. He is disoriented, has sunken eyeballs, a blood pressure of 90/40 mmHg and a heart rate of 130 beats per minute. Random blood sugar is 460 mg% and urine examination reveals sugar 3+ and ketonuria. Describe your plan for preoperative optimisation of this patient.
(10 marks)
 9. What are the anaesthetic implications of modified electroconvulsive therapy (MECT)? What is unilateral MECT and what are its advantages over conventional MECT? (8 + 2 = 10 marks)
 10. Discuss your preoperative preparation, perioperative monitoring and anaesthetic management of a 10-year old boy scheduled for repair of corneal tear following a perforating corneal injury sustained 2 hours earlier. The child has received clear fluids an hour earlier.
(3 + 2 + 5 = 10 marks)



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MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – JULY 2005**SUBJECT: PAPER III: CLINICAL ANAESTHESIOLOGY II**

Wednesday, July 06, 2005

Time: 3 Hrs.

Max. Marks: 100

- ✍ Be brief in your answers, padding your answers will not get you any extra credit.
✍ Illustrate your answer with clearly labeled diagram where appropriate.

1. A 2-year old child with recurrent lower respiratory tract infections is diagnosed to have a patent ductus arteriosus (PDA). Discuss the preoperative preparation, plan for anaesthesia (including monitoring) and potential complications during ligation of the PDA. (2 + 5 + 3 = 10 marks)
2. Outline the checklist before discontinuing cardiopulmonary bypass (CBP). State giving reasons what drugs / equipment you will keep ready in order to manage problems that might occur in the immediate post-CBP period. (6 + 4 = 10 marks)
3. A 20-year old male develops tracheal stenosis following prolonged ventilatory support. The magnetic resonance image of the trachea shows a stenosed segment starting 1 centimetre below the cricoid cartilage. Describe the intraoperative management of the airway and ventilation in this patient scheduled for resection and reconstruction of the stenotic segment which is 2 centimetres long and 5 mm in diameter at its narrowest portion. (10 marks)
4. A 50-year old male with no known illness develops seizures, vomiting and drowsiness. On investigation, he is found to have left frontal lobe meningioma and he is posted for excision of the tumour. What measures can be taken preoperatively and intraoperatively to decrease or prevent a rise in intracranial tension. Briefly describe the anaesthetic plan. (3 + 7 = 10 marks)
5. What are the guidelines to be followed while using a limb tourniquet. Enumerate any two contraindications to the use of a tourniquet. What are the physiological changes associated with tourniquet application and release? (4 + 2 + 4 = 10 marks)
6. A 64-year old lady with renal cell carcinoma and systemic hypertension is posted for radical nephrectomy. Her investigations reveal a haemoglobin of 8.2 gm%, serum sodium 136 mEq/L, serum potassium 5.2 mEq/L, serum chloride 97 mEq/L, random blood sugar 93 mg%, blood urea 120 mg%, serum creatinine 4.3 mg%, pH 7.31 and HCO₃ 20 mEq/L. Describe the perioperative anaesthetic management of this patient. (10 marks)
7. A 1-day old term baby weighing 3.2 kg presents with respiratory distress. Examination reveals a scaphoid abdomen. Describe the perioperative anaesthetic management of this neonate scheduled for repair of a left-sided diaphragmatic hernia.. (10 marks)
8. An 11-year old boy with burns over the neck and chest sustained 6 months earlier is posted for release of contracture over the neck. On examination, extension of the neck and mandibular movement are restricted with a mouth opening of around 1½ fingers. Outline your preoperative evaluation and intraoperative anaesthetic management with special reference to the airway. (10 marks)
9. What is modified electroconvulsive therapy (MECT)? What is the recommended current strength and what are the sites of application of this current? Describe your anaesthetic management of an 18-year old lady with severe endogenous depression on antidepressant medication posted for the MECT? Enumerate the complications that can occur during the procedure. (1 + 2 + 5 + 2 = 10 marks)
10. A 32-year old lady, suspected to have Guillain-Barré syndrome, is intubated in the emergency room and posted for magnetic resonance imaging (MRI) of the brain. On examination, the patient is awake but restless, sweating, has a respiratory rate of 32 breaths per minute and a pulse rate of 108 beats per minute. Describe your anaesthetic management of this patient in the MRI room. (10 marks)



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MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – JULY 2005**SUBJECT: PAPER IV: REANIMATOLOGY & CRITICAL CARE MEDICINE,
MANAGEMENT OF CHRONIC PAIN STATES AND MISCELLANEOUS
ANAESTHESIOLOGY-RELATED TOPICS**

Thursday, July 07, 2005

Time: 3 Hrs.

Max. Marks: 100

- ✍ Be brief in your answers, padding your answers will not get you any extra credit.
✍ Illustrate your answer with clearly labeled diagrams where appropriate.

1. Write briefly on the following variants of conventional cardiopulmonary resuscitation (CPR):
a) IAC-CPR (b) ACD-CPR (c) Vest-CPR (d) Open-CPR
(2½ X 4 = 10 marks)
2. Write the algorithm for the management of pulseless ventricular tachycardia / ventricular fibrillation. (10 marks)
3. A 35-year old man presents to the emergency room with a history of blunt injury to the left side of the chest and abdomen. On examination, he has a feeble pulse at a rate of 120 beats per minute and a blood pressure of 86/60 mmHg. Outline the preoperative and intraoperative management of this patient scheduled for exploratory laparotomy. (5 + 5 = 10 marks)
4. Describe the preparation and indications for the use of fresh frozen plasma and cryoprecipitate. (5 + 5 = 10 marks)
5. What is a 'minitracheostomy'? How is it performed? Enumerate its uses and the problems associated with it. (1 + 5 + 2 + 2 = 10 marks)
6. Enumerate the practical diagnostic criteria for acute respiratory distress syndrome (ARDS). Discuss the pathophysiology of ARDS. Enumerate the nonconventional methods of management of ARDS. (3 + 4 + 3 = 10 marks)
7. What are the options of pain relief in a 38-year old lady diagnosed to have carcinoma breast with metastasis and lymphoedema of the arm. (10 marks)
8. With the help of a labeled diagram, outline the "pain pathways". Add a note on the "gate control theory". (7 + 3 = 10 marks)
9. A 60-year old man with carcinoma of the cheek and restricted mouth opening (interincisor gap of 1.2 centimetres) is posted for wide excision of the growth and a flap reconstruction. Discuss the plan for airway management in this patient. (10 marks)
10. Describe the terms mean, mode and median. Draw a Gaussian curve of frequency distribution and explain the term standard deviation. (2 + 2 + 2 + 4 = 10 marks)



MANIPAL ACADEMY OF HIGHER EDUCATION

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MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – DECEMBER 2005

SUBJECT: PAPER I: BASIC SCIENCES AS APPLIED TO ANAESTHESIOLOGY

Monday, December 05, 2005

Time: 3 Hrs.

Max. Marks: 100

General Instructions to Candidates:

- Be brief in your answers; padding your answers will not get you any extra credit.
- Illustrate your answer with clearly labeled diagrams where appropriate.

1. State the Starling's law of the heart. What are the factors affecting ventricular preload? Draw a normal ventricular function curve and depict how this changes in cardiogenic shock and during exercise. (2 + 3 + 5 = 10 marks)
2. Describe West's zones with reference to the distribution of ventilation and perfusion in a healthy adult in the erect position. What changes are brought about by the assumption of the supine and lateral decubitus positions in a conscious individual. (6 + 2 + 2 = 10 marks)
3. How do you classify hyponatraemia? Describe how you would treat a 70-kg adult male whose serum sodium drops to 110 mmol/L from 130 mmol/L during transurethral resection of the prostate. (4 + 6 = 10 marks)
4. Discuss the role played by the kidney in the maintenance of fluid, electrolyte and acid-base balance. (10 marks)
5. What are the factors affecting uptake of inhalational anaesthetics? Explain with numerical examples the *concentration effect* and the *second gas effect*. (4 + 3 + 3 = 10 marks)
6. Enumerate the alpha-2 agonists. What are their effects on the central nervous system and cardiovascular system? Write briefly about their uses in anaesthesia. (2 + 4 + 4 = 10 marks)
7. Classify the various members of the laryngeal mask airway. Describe the technique of intubating a patient using the intubating laryngeal mask airway. (5 + 5 = 10 marks)
8. What are the methods of measuring cardiac output with a pulmonary artery catheter? Explain the working principle of any *one* of them. What are the absolute indications for placement of a pulmonary artery catheter? (4 + 4 + 2 = 10 marks)
9. Describe the anatomy of the cervical plexus. Explain how would you perform the deep cervical plexus block. (5 + 5 = 10 marks)
10. Draw a schematic diagram describing the formation of the superior vena cava. Explain why the right subclavian is preferred over the left subclavian for central venous cannulation. (5 + 5 = 10 marks)



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MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – DECEMBER 2005**SUBJECT: PAPER II: CLINICAL ANAESTHESIOLOGY I**

Tuesday, December 06, 2005

Time: 3 Hrs.

Max. Marks: 100

- ✂ Be brief in your answers, padding your answers will not get you any extra credit.
✂ Illustrate your answer with clearly labeled diagrams where appropriate

1. Describe the factors that affect placental transfer of anaesthetic agents. Comment about placental transfer of the following drugs: *thiopentone, ketamine, propofol, diazepam, fentanyl, succinylcholine, lignocaine* and *bupivacaine*
(6+4 = 10 marks)
2. A 26-year old woman at 32 weeks of gestation is admitted to labour room with painless vaginal bleeding. On examination, she is pale with a heart rate of 130 beats/minute and a blood pressure of 90/50 mmHg. Discuss the anaesthetic management of this patient posted for emergency caesarian section.
(10 marks)
3. A neonate delivered vaginally following a prolonged labour has respiratory distress. The amniotic fluid contains thick, particulate meconium. Discuss the steps involved in the resuscitation of this neonate with an Apgar score of 3/10 at birth.
(10 marks)
4. Describe the technique of performing caudal block for postoperative pain relief in a 4-year old child weighing 15 kg scheduled for inguinal herniotomy.
(10 marks)
5. Describe the technique of performing an intravenous regional anaesthesia (IVRA) in a 25-year old woman scheduled for excision of a scar on the distal end of the forearm.
(10 marks)
6. A 20-year old man scheduled for inguinal herniorrhaphy complains of circumoral numbness and becomes apprehensive soon after receiving a lumbar epidural block with 17 ml of 12% lignocaine with adrenaline. What is your diagnosis and line of management?
(10 marks)
7. Discuss the relative merits and demerits of various techniques of pain relief for a 45-year old lady who has undergone open cholecystectomy.
(10 marks)

8. Describe the preoperative evaluation, preparation, anaesthetic management and postoperative care in a patient with uncontrolled hypertension with a blood pressure of 190/120 mm Hg posted for emergency laparotomy for perforated duodenal ulcer.

(2+2+3+3 = 10 marks)

9. Discuss the anaesthetic implications of a patient with sickle cell anaemia scheduled for skin grafting of a leg ulcer.

(10 marks)

10. Discuss the preanaesthetic evaluation, preparation and anaesthetic management of a 20-year old man with severe depression scheduled for modified electroconvulsive therapy.

(10 marks)

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MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – DECEMBER 2005**SUBJECT: PAPER III: CLINICAL ANAESTHESIOLOGY II**

Wednesday, December 07, 2005

Time: 3 Hrs.

Max. Marks: 100

General Instructions to Candidates:

- Be brief in your answers; padding your answers will not get you any extra credit.
- Illustrate your answer with clearly labeled diagrams where appropriate.

1. A 2-year old child with a history of cyanosis and squatting episodes is suspected to have Tetralogy of Fallot. List the options for anaesthesia in this child posted for cardiac catheterisation. Discuss the anaesthetic goals during this procedure. How will you manage a hypercyanotic spell? (3 + 4 + 3 = 10 marks)
2. A 50-year old male with triple vessel coronary artery disease (on oral nitrates, beta-blockers and low-dose aspirin) has NYHA class II dyspnoea and gets chest pain on climbing 2 flights of stairs. Discuss the perioperative management of this patient posted for elective open cholecystectomy. (10 marks)
3. A 35-year old male is posted for an emergency laparotomy for suspected duodenal ulcer perforation. He is a known asthmatic for the last 15 years and is currently on inhaled salbutamol and beclomethasone. His current respiratory rate is 25 breaths per minute and the patient has to pause for breath while speaking. Auscultation reveals bilateral rhonchi. What is your plan for preoperative optimisation (if any) and the plan for anaesthetic management? How would you manage severe intraoperative bronchospasm? (7 + 3 = 10 marks)
4. A patient with a pituitary tumour is posted for a trans-sphenoidal hypophysectomy. Describe briefly your preoperative assessment and preparation, and the plan for anaesthetic management. (3 + 7 = 10 marks)
5. A 16-year old boy with severe thoracolumbar scoliosis presents with NYHA Class II dyspnoea and cough with expectoration. He is posted for elective Harrington rod instrumentation in the prone position. Outline the plan for preoperative assessment and preparation of this patient. What are your perioperative anaesthetic goals? (5 + 5 = 10 marks)
6. A 27-year patient with chronic renal failure is on thrice-weekly maintenance dialysis for the past two years. Describe the preoperative preparation and intraoperative management of this patient scheduled to receive a renal transplant from a live sibling donor. (3 + 7 = 10 marks)
7. A 7-day old premature baby with history of vomiting and distension of abdomen is diagnosed to have intestinal obstruction due to congenital mesenteric bands. Describe the perioperative management of this neonate posted for emergency laparotomy. (10 marks)
8. Describe the perioperative anaesthetic management of a 11-year old girl with laryngeal papillomatosis and moderate stridor at rest posted for elective laser ablation of the papillomata. (10 marks)
9. How do you select patients for day care surgery? How do you manage a young lady posted for laparoscopic sterilisation as a day care procedure? What are the discharge criteria used following day care surgery? (3 + 4 + 3 = 10 marks)
10. Describe with examples the meanings of the terms *disinfection* and *sterilisation*. Enumerate the methods of sterilisation commonly used to sterilise anaesthetic equipment. (2 + 2 + 6 = 10 marks)



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MD (ANAESTHESIOLOGY) DEGREE EXAMINATION – DECEMBER 2005**SUBJECT: PAPER IV: REANIMATOLOGY & CRITICAL CARE MEDICINE,
MANAGEMENT OF CHRONIC PAIN STATES AND MISCELLANEOUS
ANAESTHESIOLOGY-RELATED TOPICS**

Thursday, December 08, 2005

Time: 3 Hrs.

Max. Marks: 100

General Instructions to Candidates:

- Be brief in your answers; padding your answers will not get you any extra credit.
- Illustrate your answer with clearly labeled diagrams where appropriate.

1. What are the causes of cardiac arrest during pregnancy? How does the resuscitation of a pregnant lady differ from that of non-pregnant victims. (4 + 6 = 10 marks)
2. Discuss the mechanism of action, indications and dosage of the following during CPR:
 - a) Adrenaline
 - b) Lignocaine
 - c) Amiodarone
 - d) Sodium bicarbonate (2½ X 4 = 10 marks)
3. In the context of trauma care, what is meant by the term 'triage'? Outline the principles of management of victims of mass disaster. (4 + 6 = 10 marks)
4. What is meant by the term 'transfusion trigger'? Elaborate (with examples) the American Society of Anesthesiologists Recommendations for Blood Transfusion. (2 + 8 = 10 marks)
5. Define the terms SIRS, sepsis and septic shock. Discuss the pathogenesis and clinical features of septic shock. (3 + 3 + 4 = 10 marks)
6. With the help of appropriate diagrams, compare and contrast pressure control ventilation (PCV) and pressure support ventilation (PSV). (10 marks)
7. Differentiate acute pain from chronic pain. Describe the mechanism for the perpetuation of pain. (4 + 6 = 10 marks)
8. With the help of a diagram, describe the anatomy of the stellate ganglion. Describe the technique of stellate ganglion block. Enumerate two indications and two complications of this block. (4 + 4 + 2 = 10 marks)
9. Briefly describe the techniques of submental intubation and retrograde tracheal intubation. (5 + 5 = 10 marks)
10. Design a clinical trial to assess the efficacy of a new analgesic 'newphine'. (10 marks)

