Get Through

MCEM Part A: MCQs

Iain Beardsell • Simon Bell • Sarah Robinson • Helen Rumbold

Consulting Editor: Diana Hulbert

The Royal Society of Medicine Press Limited

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Foreword I

It is an absolute pleasure to welcome this book to the resources available for trainees in emergency medicine preparing for the membership exam. This is a tough exam and it is a great credit to the commitment, and enthusiasm of trainees who dedicate themselves to preparing for and subsequently passing the exam. In turn, this provides the specialty of emergency medicine with an outstanding group of trainees who will take their skills and talents into the emergency medicine training programme to eventually emerge as exactly the highly skilled and experienced consultants needed to deliver an emergency medicine service of the highest quality and calibre. This is obviously a fundamental expectation of the public and the patients who put great trust and confidence in the quality of care provided in our emergency departments.

The authors should be congratulated for their diligence and hard work in compiling this book which will now become an essential companion for trainees preparing for the membership exam.

John Heyworth
President, College of Emergency Medicine

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Foreword II

The passing of the Membership of the College of Emergency Medicine (MCEM) Part A exam is a significant achievement and anything that can help future candidates is most welcome.

This book bridges a significant gap in training materials. By providing questions around the basic sciences within an emergency medicine context wherever possible, the authors, all practising emergency medicine physicians, have successfully covered large and important areas of the basic sciences curriculum. The provision of brief, but informative, explanations greatly enhances the book and makes for effective revision. I am sure that future candidates will avidly absorb its contents. I congratulate the authors on a job well done.

Mike Clancy
Dean, College of Emergency Medicine

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Preface

Passing the MCEM Part A represents the first step on the postgraduate exam ladder to achieving specialist accreditation in emergency medicine. Unless trainee emergency doctors successfully pass this exam they are unable to progress to further years of specialist training. Testing candidates in material that was previously covered perhaps only in the early years of medical school, success in this exam, for many, has proved difficult to achieve.

The MCEM Part A is a new exam; the first candidates to sit the MFAEM in 2003 (before the Faculty of Emergency Medicine became the College of Emergency Medicine) were not offered the choice of a multiple-choice paper specifically aimed at emergency doctors, but instead had to sit the primary paper of another specialty. The development of this exam is one of the more obvious steps forward in the evolution of emergency medicine and the training of emergency doctors in recent years.

With such a new exam there is an inevitable lack of published material to aid candidates in their preparation. This book aims to fill that gap. Written by practising emergency physicians, in a format mirroring that of the MCEM exam, it covers all areas of the syllabus. Accompanying each answer is a brief, but comprehensive, text explanation to augment revision. As such this book should prove useful from the moment that you decide to sit the exam to last minute cramming the night before.

We believe that emergency medicine is the most rewarding hospital specialty, with a breadth and diversity not encountered in any other, and we wish you luck in your future careers. We hope that this book will aid you in realising your ambition to become specialist emergency physicians.

IB, SB, SR, HR, DH

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Exam advice from the College of Emergency Medicine

History of the MCEM exam

The first sitting of the MCEM exam was in 2003 when there were 30 candidates. Since then there has been a lot of work on exam question and curriculum development. In December 2008 the exam was taken by 353 candidates in the UK, 12 in India and 19 in Singapore.

The basic science curriculum content has been determined by front-line emergency doctors (working over a 4-year period using Delphi methodology) as directly relevant to practice in emergency medicine. The exam is focused on the basic sciences relevant to the practice of emergency medicine. The curriculum is available on the College of Emergency Medicine website (www.collemergencymed.ac.uk/cem).

The MCEM Part A exam tests the basic science knowledge needed by emergency doctors and must be passed if the trainee is to progress beyond ST3. Basic sciences also feature in both the MCEM Part B and C, and the FCEM exams.

Question format

The MCEM A exam is conducted twice yearly and is an MCQ paper consisting of 50 questions derived from the curriculum, with four parts to each (i.e. a total of 200 questions per paper). The questions are true/false. There is no negative marking. The exam is of 2 hours' duration.

The question distribution across subjects is as follows:

Anatomy	10 questions (20%)
Physiology	10 questions (20%)
Pharmacology	5 questions (10%)
Microbiology	5 questions (10%)
Clinical	5 questions (10%)
Biochemistry	5 questions (10%)
Haematology	5 questions (10%)
Pathology	3 questions (6%)
Statistics	2 questions (4%)

Tips on revising for MCEM Part A

Many candidates do not understand the size of the task involved and are consequently ill prepared. Trainees need to appreciate that this exam represents a substantial undertaking, typically requiring 9 months' revision time (or the order of 1000 hours). This figure is less if the applicant has a good grounding in undergraduate basic sciences or has a basic science degree. In contrast, graduates from some UK medical schools may be in the position of having to learn large amounts of anatomy

and other basic sciences for the first time. In these cases proportionally greater time will be needed. Therefore potential candidates for this exam must look at the curriculum, discuss the exam with their trainer and, if they wish to take it, commit themselves (in the form of an educational agreement), ideally early in their F2 year, in order to give sufficient time for revision and two attempts at the exam. The trainers and the College of Emergency Medicine are resources that can help the candidate. However, it is the candidate's application and determination that are essential to success. The candidate will need to spend a significant amount of personal time reading and learning the recommended textbooks, as well as using electronic media.

Tips for learning in the workplace

1. Use patients as a trigger (e.g. radiographs, blood gases, hand injuries) for teaching some important basic science point. This requires putting a small amount of time to one side to learn a specific aspect of applied basic science per shift. This brings alive the basic sciences by demonstrating the relevance of the subject and also leads to a discussion on how these facts can be remembered at 02:00 while doing a night shift!
2. Consider developing the areas that you are covering in your revision by teaching the topic to your peers.
3. Set targets for coverage of the basic sciences and aim to review these with your trainer at least fortnightly.

Recommended reading

Anatomy

Ellis, H. *Clinical Anatomy*, 11th edn. Oxford: Wiley-Blackwell, 2006.
Moore KL, Dalley AF, Agur AMR. *Clinically Orientated Anatomy*, 6th edn. Baltimore, MD: Lippincott Williams & Wilkins, 2009.

Physiology

Ganong WF. *Review of Medical Physiology*, 22nd edn. New York: McGraw-Hill Medical, 2005.
McPhee SJ, Vishwanath RL, Ganong W. *Pathophysiology of Disease: An introduction to clinical medicine*, 5th edn. New York: McGraw-Hill Medical, 2006.

Pharmacology

British National Formulary. London: Pharmaceutical Press.
Neal M. *Medical Pharmacology at a Glance*, 6th edn. Oxford: Wiley-Blackwell, 2009.
Reid J, Rubin P, Whiting B. *Lecture Notes on Clinical Pharmacology*, 6th edn. Oxford: Wiley-Blackwell, 2001.

Microbiology

Champe P, Harvey R, Fisher B. *Microbiology*, 2nd edn. Baltimore, MD: Lippincott, Williams & Wilkins, 2006.

Clinical

Kumar P, Clark M. *Kumar and Clark's Clinical Medicine*, 6th edn. Philadelphia, PA: Saunders Ltd, 2005.
Wyatt J, Illingworth R, Graham C, Clancy M, Robertson C. *Oxford Handbook of Emergency Medicine*, 3rd edn. Oxford: Oxford University Press, 2006.

Biochemistry

Gaw A, Murphy MJ, Cowan RA et al. *Clinical Biochemistry: An illustrated colour text*, 4th edn. Edinburgh: Churchill Livingstone, 2008.

Haematology

Howard M, Hamilton P. *Haematology: An illustrated colour text*, 3rd edn. Edinburgh: Churchill Livingstone, 2007.

Pathology

Carton J, Daly R, Ramini P. *Clinical Pathology*. Oxford: Oxford University Press, 2006.

Statistics

Harris M, Taylor G. *Medical Statistics Made Easy*, 2nd edn. Oxford: Scion Publishing Ltd, 2008.

Abbreviations

5-HT	5-hydroxytryptamine or serotonin
βhCG	β human chorionic gonadotrophin
γGT	γ-glutamyl transpeptidase
ACE	angiotensin-converting enzyme
ACL	anterior cruciate ligament
ACTH	adrenocorticotrophin or adrenocorticotrophic hormone
ADH	antidiuretic hormone
AIDS	acquired immune deficiency syndrome
ALL	acute lymphoblastic leukaemia
ALP	alkaline phosphatase
ALT	alanine transaminase (or aminotransferase)
AML	acute myeloid leukaemia
ANA	anti-nuclear antibody
ANCA	anti-neutrophil cytoplasmic antibody
APLS	Advanced Paediatric Life Support
APTR	activated partial thromboplastin time ratio
aPTT	activated partial thromboplastin time
ARDS	acute respiratory distress syndrome
ARR	absolute risk reduction
AST	aspartate transaminase (or aminotransferase)
ATLS	Advanced Trauma Life Support
ATP	adenosine triphosphate
ATPase	adenosine triphosphatase
AV	atrioventricular
BCG	bacille Calmette–Guérin
BE	base excess
BNF	*British National Formulary*
BP	blood pressure
BSA	body surface area
CCK	cholecystokinin
CER	control event rate
CLL	chronic lymphocytic leukaemia
CMV	cytomegalovirus
CNS	central nervous system
CO	cardiac output
CPN	common peroneal nerve
CPR	cardiopulmonary resuscitation
CRH	corticotrophin-releasing hormone
CRP	C-reactive protein
CSF	cerebrospinal fluid
CT	computed tomography
CVA	cerebrovascular accident
D&V	diarrhoea and vomiting
DBP	diastolic blood pressure
DHEA	dihydroepiandrosterone
DIC	disseminated intravascular coagulation
DKA	diabetic ketoacidosis

2,3-DPG	2,3-diphosphogycerate
EBV	Epstein–Barr virus
ECF	extracellular fluid
ECG	electrocardiogram
ED	emergency department
EDV	end-diastolic volume
EER	experimental event rate
EOM	external oblique muscle
ESR	erythrocyte sedimentation rate
ESV	end-systolic volume
FEV_1	forced expiratory volume in 1 second
FFA	free fatty acid
FRC	functional residual capacity
FVC	forced vital capacity
G6PDH	glucose-6-phosphate dehydrogenase
GABA	γ-aminobutyric acid
GCS	Glasgow Coma Scale
GFR	glomerular filtration rate
GH	growth hormone
GHRH	growth hormone-releasing hormone
GI	gastrointestinal
GTN	glyceryl trinitrate
GUM	genitourinary medicine
Hb	haemoglobin
HbA	haemoglobin A
HbF	fetal haemoglobin
HbS	haemoglobin of sickle cell anaemia
HBsAg	hepatitis B surface antigen
Hib	*Haemophilus influenzae* type b
HIV	human immunodeficiency virus
HMG-CoA	hydroxymethylglutaryl coenzyme A
HR	heart rate
HRT	hormone replacement therapy
HSV	herpes simplex virus
HUS	haemolytic uraemic syndrome
HZV	herpes zoster virus
ICF	intracellular fluid
IGF	insulin-like growth factor
IL	interleukin
INR	international normalised ratio
IOM	internal oblique muscle
IT	intrathecal
IV	intravenous
IVC	inferior vena cava
KCCT	kaolin cephalin clotting time
LAD	left anterior descending artery
LCA	left coronary artery
LDH	lactate dehydrogenase
LDL	low-density lipoprotein
LR	likelihood ratio
MAP	mean arterial pressure

MCA	middle cerebral artery
MCV	mean corpuscular volume
MDR-TB	multi-drug-resistant tuberculosis
MMR	measles, mumps and rubella
NAC	*N*-acetylcysteine
NK	natural killer
NNH	number needed to harm
NNT	number needed to treat
NSAID	non-steroidal anti-inflammatory drug
PA	pernicious anaemia
PABA	*p*-aminobenzoic acid
PAS	periodic acid–Schiff
PCR	polymerase chain reaction
PE	pulmonary embolism
PEA	pulseless electrical activity
PEEP	positive end-expiratory pressure
PEP	post-exposure prophylaxis
PID	pelvic inflammatory disease
PNH	paroxysmal nocturnal haemoglobinuria
PP	pulse pressure
PPI	proton pump inhibitor
PT	prothrombin time
PTH	parathyroid hormone
PTT	partial thromboplastin time
PVN	paraventricular nucleus
RCA	right coronary artery
RF	rheumatoid factor
RSV	respiratory syncytial virus
SA	sinoatrial
SBP	systolic blood pressure
SCD	sickle cell disease
SIADH	syndrome of inappropriate antidiuretic hormone secretion
SIRS	systemic inflammatory response syndrome
SLE	systemic lupus erythematosus
SOB	shortness of breath
SON	hypothalamic supraoptic nucleus
SV	stroke volume
T_3	triiodothyronine
T_4	thyroxine
TAM	transverse abdominis muscle
TB	tuberculosis
TBG	thyroid (or thyroxine)-binding globulin
TBW	total body water
TCA	tricyclic antidepressant
TG	triglyceride
TIBC	total iron-binding capacity
TFT	thyroid function test
TIA	transient ischaemic attack
TMJ	temporomandibular junction
TNF	tumour necrosis factor

TRH	thyrotrophin-releasing hormone
TSH	thyroid-stimulating hormone
UTI	urinary tract infection
VF	ventricular fibrillation
$\dot{V}/\dot{Q}$	ventilation–perfusion ratio
VT	ventricular tachycardia
vWD	von Willebrand's disease
vWF	von Willebrand's factor
WPW	Wolff–Parkinson–White (syndrome)