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MRCS Practice Papers
Part A: Paper 2
EMQs
Second edition
# Contents

*Foreword*  
ix  

*Examination technique*  
ix  

*Abbreviations*  
xi  

## Questions

<table>
<thead>
<tr>
<th>Practice Paper</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>3</td>
<td>105</td>
</tr>
</tbody>
</table>

## Answers

<table>
<thead>
<tr>
<th>Practice Paper</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>153</td>
</tr>
<tr>
<td>2</td>
<td>203</td>
</tr>
<tr>
<td>3</td>
<td>251</td>
</tr>
</tbody>
</table>

*Index*  
295
QUESTIONS
PRACTICE PAPER 1

THEME: DIATHERMY

A  Monopolar diathermy
B  Bipolar diathermy
C  Cutting
D  Coagulation
E  Blend

For each of the following scenarios, choose the most appropriate option from the list above. Each option may be used once, more than once or not at all.

☐ 1  Requires a patient plate electrode to be applied.
☐ 2  This is safer to use in patients with pacemakers.
☐ 3  Uses pulsed, short, high-frequency bursts.
☐ 4  Safe for use on digits.
☐ 5  Can be used for buzzing (touching other instruments to pass current through them).
THEME: EXTENSOR COMPARTMENTS OF THE WRIST

A I
B II
C III
D IV
E V
F VI

For each of the following statements, choose the most appropriate compartment from the list above. Each option may be used once, more than once or not at all.

- 6 Extensor carpi radialis brevis is in this compartment.
- 7 This compartment lies radial to Lister’s tubercle at the wrist.
- 8 Extensor digiti minimi is in this compartment.
THEME: SEPSIS

A Bacteraemia
B Systemic inflammatory response syndrome (to sepsis) (SIRS)
C Sepsis
D Severe sepsis
E Septic shock

For each of the following clinical scenarios, choose the most appropriate diagnosis from the list above. Each option may be used once, more than once or not at all.

9 A 30-year-old man presents with severe right loin pain, radiating to the groin. A mid-stream urine (MSU) shows blood, protein and nitrites. A KUB study reveals a calculus. His temperature is 39.1 °C, pulse 127/min, respiratory rate (RR) 38 breaths/min and BP 81/43 mmHg despite 3 litres of intravenous fluids, and his white cell count (WCC) is 21 × 10^9/l.

10 A 79-year-old woman 1 week post-op has a pyrexia of 38.4 °C, pulse 104/min, BP 144/90 mmHg and WCC 14 × 10^9/l. Chest X-ray (CXR) shows a left lower lobe pneumonia.

11 A 30-year-old male post-op patient had blood cultures taken 48 hours ago which are positive. He is currently apyrexial, pulse 64/min, RR 12 breaths/min, BP 123/82 mmHg, with a normal WCC.

12 A 27-year-old female post-op patient has a temperature of 38.7 °C, pulse 86/min, RR 24 breaths/min, BP 127/74 mmHg and WCC 16 × 10^9/l. Her CXR is clear, an MSU negative and the wound is fine.
THEME: FACIAL NERVE PALSIES

A Multiple sclerosis
B Acoustic neuroma
C Sarcoidosis
D Cholesteatoma
E Parotid tumour
F Surgery
G Temporal bone fracture
H Ramsay Hunt syndrome
I Chronic suppurative otitis media
J Cerebrovascular accident (CVA)
K Bell’s palsy

For each of the following scenarios, choose the most appropriate option from the list above. Each option may be used once, more than once or not at all.

13 An 18-year-old man presents to A&E with a head injury. He has a facial nerve palsy, Battle’s sign and haemotympanum.

14 A 30-year-old woman presents with a sudden-onset facial nerve palsy sparing the forehead. She has a past medical history of optic neuritis.

15 An 80-year-old man presents with a facial nerve palsy, preceded by severe pain in the distribution of the facial nerve. He reports vertigo and hearing loss. Papules are seen on the tongue.

16 A 50-year-old man presents with a facial nerve palsy. He has had an intermittent discharge from his right ear for 2 months. He has posterosuperior retraction of the tympanic membrane.

17 A 55-year-old woman presents with a facial nerve palsy, sensorineural hearing loss, tinnitus and vertigo.

18 A 23-year-old man presents with a facial nerve palsy and a 3-month history of conductive hearing loss. The tympanic membrane is dull in the left ear.
THEME: ANAESTHETIC AGENTS

A  Thiopentone sodium
B  Propofol
C  Etomidate
D  Suxamethonium
E  Atracurium
F  Vercuronium
G  Halothane
H  Enflurane
I  Isoflurane
J  Sevoflurane
K  Nitrous oxide

For each of the following statements, choose the most appropriate agent from the list above. Each option may be used once, more than once or not at all.

19  Can cause a ‘coronary steal’ syndrome.
20  The most rapidly acting depolarising muscle relaxant.
21  The only inhalational anaesthetic not known to cause malignant hyperpyrexia.
22  The induction agent with a slight anti-emetic effect, which is the agent of choice with laryngeal masks.
THEME: FLEXOR TENDON INJURIES

A  Zone 1  
B  Zone 2  
C  Zone 3  
D  Zone 4  
E  Zone 5 

For each of the following injuries, choose the most appropriate zone from the list above. Each option may be used once, more than once or not at all.

☐  23  Laceration across both hypothenar and thenar eminences.
☐  24  Most difficult to repair, often yielding poor functional outcome.
☐  25  Laceration across the metacarpophalangeal (MCP) joints.
THEME: DAY-CASE SURGERY

A  Suitable for day-case surgery
B  Unsuitable for day-case surgery

For each of the following patients, choose the most appropriate option from the list above. Each option may be used once, more than once or not at all.

26  A 40-year-old woman listed for varicose vein stripping, with no significant past medical history. Weight 90 kg, height 155 cm. Her husband can look after her post-op and she lives 10 minutes from the hospital.

27  A 64-year-old with well-controlled asthma listed for rigid cystoscopy. Weight 74 kg, height 173 cm. He lives with his wife approximately 10 minutes form the hospital.

28  A 50-year-old man with angina requiring frequent GTN spray, listed for a knee arthroscopy. Weight 70 kg, height 180 cm. He lives with his wife approximately 5 minutes from the hospital.
For each of the following scenarios, choose the most appropriate trauma class from the list above. Each option may be used once, more than once or not at all.

29 An 18-year-old football player who sustained a kick to the loin during a game subsequently develops microscopic haematuria.

30 A 30-year-old man who has been stabbed in the right loin with a kitchen knife arrives in A&E with a pulse of 112/min, BP 120/100 mmHg. He has frank haematuria. IVU reveals urinary extravasation.

31 Following a hysterectomy a patient has macroscopic haematuria, ileus, pain and a low-grade fever. IVU reveals leakage from the left ureter. A 75% laceration with no devascularisation is found.
### THEME: BURNS

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>A</td>
<td>10 800 ml</td>
</tr>
<tr>
<td>B</td>
<td>5400 ml</td>
</tr>
<tr>
<td>C</td>
<td>8640 ml</td>
</tr>
<tr>
<td>D</td>
<td>4320 ml</td>
</tr>
<tr>
<td>E</td>
<td>17 280 ml</td>
</tr>
<tr>
<td>F</td>
<td>14 400 ml</td>
</tr>
</tbody>
</table>

For each of the following scenarios, choose the correct volume of fluid replacement required from the list above. Each option may be used once, more than once or not at all.

- **32** A man weighing 80 kg is admitted as an emergency after being rescued from a house fire. He has red, painful, blistered burns to his right arm, chest and abdomen. How much fluid does he require over the first 24 hours following his injury?

- **33** A 60-kg woman is admitted to A&E with extensive burns. Her left arm and leg have dry, white, painless burns, and her anterior torso has erythematous painful burns with blistering. How much fluid does she require over the first 8 hours after her injury?

- **34** A 120-kg chef is involved in a fire at work. He has sustained red, painful, blistered burns to both his arms, and has erythematous areas to his chest that haven’t blistered. How much fluid does he require for resuscitation over the first 8 hours after this injury?

- **35** An 60-kg woman is involved in a house fire after falling asleep with a lit cigarette. She sustains full-thickness burns to both arms and legs, and partial-thickness burns to the front of her torso. How much fluid should she be given in the first 24 hours after this injury?
THEME: ANTI-EMETICS

A  Cyclizine
B  Metoclopramide
C  Ondansetron
D  Levomepromazine
E  Haloperidol

For each of the following, choose the most appropriate anti-emetic from the list above. Each option may be used once, more than once or not at all.

☐ 36  A selective 5-hydroxytryptamine antagonist, useful for preventing vomiting caused by cytotoxic drugs.

☐ 37  A dopamine-receptor antagonist that acts in the chemoreceptor trigger zone (CTZ).

☐ 38  An H1-receptor antagonist, most effective if given before the onset of nausea and vomiting.

☐ 39  A non-phenothiazine antipsychotic used to combat vomiting caused by emetogenic anti-cancer drugs.
THEME: SURGICAL INCISIONS

A  Lanz
B  Kocher’s
C  McEvedy’s
D  Inguinal
E  Lockwood’s
F  Gridiron
G  Collar

For each of the following operations, choose the most appropriate incision from the list above. Each option may be used once, more than once or not at all.

40  A 63-year-old lady presents with a lump in her right groin, lateral and inferior to the pubic tubercle. It is tender to palpation and irreducible, with erythema to the overlying skin. Which incision would you make for her emergency procedure?

41  A 17-year-old girl presents with a 2-day history of right iliac fossa pain. She has a temperature 37.8 °C and has vomited twice. Her blood tests reveal: CRP 142 mg/l, WCC 14.6 × 10⁹/l. She requires an emergency operation. Which incision would you use?

42  A 52-year-old man undergoes a laparoscopic cholecystectomy. During dissection around Calot’s triangle, unusual anatomy is discovered and it is no longer safe to proceed laparoscopically and the procedure is converted to an open one. Which incision would you make?

43  A 45-year-old lady with Graves’ disease presents with a large goitre and wants to have her condition corrected as she is hoping to get pregnant within the next couple of years. Which incision would you make for her elective procedure?
THEME: ANATOMICAL RELATIONS

A  Artery
B  Nerve
C  Vein

For each of the following, choose the most appropriate structure from the list of options above. Each option may be used once, more than once or not at all.

☐ 44  In the popliteal fossa, which structure lies the deepest?
☐ 45  In the cubital fossa, what is the most medial structure?
☐ 46  At the hilum of the kidney, what is the most anterior structure?
☐ 47  Of the femoral structures immediately inferior to the inguinal ligament, which structure lies most lateral?
THEME: URINARY TRACT INFECTIONS

A  Chlamydia
B  Escherichia coli
C  Klebsiella
D  Mycobacterium tuberculosis
E  Proteus spp.
F  Schistosoma haematobium
G  Streptococcus pneumoniae

For each of the following scenarios, choose the most likely pathogen from the list above. Each option may be used once, more than once or not at all.

48  A 26-year-old woman presents with ureteric colic. A KUB study reveals a staghorn calculus in the right kidney.

49  A 32-year-old HIV-positive woman attends clinic with symptoms of recurrent UTIs. Multiple mid-stream urine specimens have been sent by her general practitioner and have only revealed sterile pyuria.

50  A 35-year-old businessman presents with a first episode of frank haematuria. He has just returned from a business trip to Egypt.
Monopolar diathermy works with a high-power unit (400 W), passing the current from the active electrode through the patient to the patient plate electrode and back to the generator. It can be used for cutting and buzzing.

Bipolar diathermy works with a low-power unit (50 W), passing the current between the tips of the forceps. It is therefore safer for use in patients with pacemakers and on end-arteries in the extremities, eg digits, scrotum, penis. It cannot be used for cutting or buzzing.

Cutting diathermy works with a continuous output, coagulation with a pulsed, short, high-frequency output, and blend with a combination of the two.
## Extensor Compartments of the Wrist

6   B – II  
7   B – II  
8   E – V  

**Table 1** The extensor compartments of the wrist and their contents

<table>
<thead>
<tr>
<th>Compartment</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Abductor pollicis longus</td>
</tr>
<tr>
<td></td>
<td>Extensor pollicis brevis</td>
</tr>
<tr>
<td>II</td>
<td>Extensor carpi radialis brevis</td>
</tr>
<tr>
<td></td>
<td>Extensor carpi radialis longus</td>
</tr>
<tr>
<td>III</td>
<td>Extensor pollicis longus</td>
</tr>
<tr>
<td>IV</td>
<td>Extensor indicis</td>
</tr>
<tr>
<td></td>
<td>Extensor digitorum</td>
</tr>
<tr>
<td>V</td>
<td>Extensor digiti minimi</td>
</tr>
<tr>
<td>VI</td>
<td>Extensor carpi ulnaris</td>
</tr>
</tbody>
</table>

At the wrist extensor compartment II lies radial to Lister’s tubercle and compartment III ulnar to it.
SEPSIS

9  E – Septic shock
10  C – Sepsis
11  A – Bacteraemia
12  B – SIRS

The important definitions concerning sepsis are:

**Bacteraemia** – the presence of bacteria in the bloodstream.

**SIRS** – a systemic inflammatory response to a range of insults, with two or more of:

- Temperature > 38 °C or < 36 °C
- Pulse < 90/min
- RR > 20 breaths/min or Pa\(\text{CO}_2\) > 4.3 kPa
- WCC > 12 × 10⁹/l or < 4 × 10⁹/l

**Sepsis** – SIRS with a documented infection.

**Severe sepsis** – SIRS with a documented infection and hypotension, hypoperfusion and organ dysfunction.

**Septic shock** – sepsis with hypotension persisting despite adequate fluid resuscitation.
**FACIAL NERVE PALSIES**

13  
G – Temporal bone fracture  
The recent head injury suggests temporal bone fracture, and Battle’s sign and haemotympanum are both signs of this.

14  
A – Multiple sclerosis  
The sparing of the forehead suggests that the cause of the facial nerve palsy is supranuclear. Optic neuritis is a common presentation of multiple sclerosis.

15  
H – Ramsay Hunt syndrome  
Ramsay Hunt syndrome is herpes zoster. The history of severe pain prior to the palsy and associated vertigo and hearing loss, coupled with papules (which can be present in the ear canal or on the tongue), point to this diagnosis.

16  
D – Cholesteatoma  
The 2-month history of intermittent discharge is a concerning feature with the facial nerve palsy. Cholesteatomas should not be missed as a diagnosis, and typically cause retraction pockets in the tympanic membrane.

17  
B – Acoustic neuroma  
The accompanying symptoms, particularly the sensorineural hearing loss, are typical of acoustic neuroma.

18  
I – Chronic suppurative otitis media  
The history of hearing loss, which is found to be conductive, coupled with a dull tympanic membrane due to fluid collecting behind it, point to chronic suppurative otitis media.
ANAESTHETIC AGENTS

19 I – Isoflurane
20 D – Suxamethonium
21 K – Nitrous oxide
22 B – Propofol

Induction agents include:
• Thiopentone sodium
• Propofol
• Etomidate

Propofol is the only one with a slight anti-emetic effect, and is the choice of agent with laryngeal masks.

Depolarising muscle relaxants:
• Suxamethonium

Non-depolarising muscle relaxants:
• Atracurium
• Vecuronium

Inhalational agents include:
• Halothane
• Enflurane
• Isoflurane
• Sevoflurane
• Nitrous oxide

All the inhalational agents except nitrous oxide can cause malignant hyperpyrexia. Suxamethonium can also cause it.

Isoflurane is known to be associated with a ‘coronary steal’ syndrome.
The zones of flexor tendon injury are:

Zone 1 – between the distal interphalangeal and proximal interphalangeal joint creases

Zone 2 – between the midpoint of the middle phalanx and distal palmar crease

Zone 3 – between the distal palmar crease and the distal margin of the carpal tunnel

Zone 4 – over the carpal tunnel

Zone 5 – from the proximal margin of the carpal tunnel up the wrist and forearm

Zone 2 is often referred to as ‘no man’s land’ and repairs here often have poor outcomes.
DAY-CASE SURGERY

26 B – Unsuitable for day-case surgery
27 A – Suitable for day-case surgery
28 B – Unsuitable for day-case surgery

The contraindications to day-case surgery are:

- ASA > 2 (the patient in Q28)
- BMI >35 (The patient in Q26)
- Extent of pathology
- No one at home after the procedure
- Lives more than 1 hour away from the hospital
- No access to a phone
URINARY SYSTEM TRAUMA

29  A – Class I
30  D – Class IV
31  C – Class III

**Classification of renal trauma:**

Class I – renal contusion or contained subcapsular haematoma

Class II – cortical laceration without urinary extravasation

Class III – parenchymal laceration > 1 cm into renal substance without urinary extravasation

Class IV – laceration across corticomedullary junction

Class V – renovascular pedicle injury

**Classification of ureteric trauma:**

Class I – haematoma or contusion

Class II – laceration with < 50% transection

Class III – laceration with > 50% transection

Grade IV – complete transection with < 2 cm devascularisation

Grade V – complete transection (avulsion) with > 2 cm devascularisation
According to ATLS guidelines, the recommended formula for calculating the volume of fluid required for resuscitation following burns is the Mount Vernon or modified Parkland formula. It calculates the volume of fluid required over the first 24-hour period following the burn (TBSA = total body surface area):

$$4 \text{ ml} \times \%\text{TBSA} \times \text{weight (kg)}$$

Half of this fluid should be given in the first 8 hours post-injury and the remainder over the next 16 hours. The recommended fluid is an isotonic crystalloid such as Hartmann’s solution or normal saline.

When calculating the TBSA, the ‘rule of 9s’ is employed. The head and upper limbs represents 9% each, the anterior and posterior torso and each lower limb represent 18% each, and the perineum is the remaining 1%.

The different depths of burns can be estimated from their appearance. Superficial burns have a localised area of pain and erythema, without signs of blistering. Partial-thickness burns involve the epidermis and the dermis and are red, painful and blistered. Full-thickness burns can be white and waxy or red and leathery. They are dry and painless, and involve the epidermis, dermis and subcutaneous tissues.
# ANTI-EMETICS

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<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>C – Ondansetron</td>
</tr>
<tr>
<td>37</td>
<td>B – Metoclopramide</td>
</tr>
<tr>
<td>38</td>
<td>A – Cyclizine</td>
</tr>
<tr>
<td>39</td>
<td>E – Haloperidol</td>
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</table>
SURGICAL INCISIONS

40  C – McEvedy’s
This patient has a femoral hernia which is likely to be strangulated. In this situation an extraperitoneal approach using a vertical incision over the lateral aspect of the lower rectus sheath is most appropriate. From this position the sac can be withdrawn and, if necessary, bowel ressected. In an elective femoral hernia repair a low inguinal incision (Lockwood) can be made.

41  A – Lanz
This patient gives a history consistent with acute appendicitis. For this procedure either a gridiron or Lanz incision could be used, although in a young female patient a Lanz incision is preferred as this is more in keeping with Langer’s lines.

42  B – Kocher’s
A Kocher’s incision is a subcostal incision used for open cholecystectomy.

43  G – Collar
A collar incision is made for a total or subtotal thyroidectomy.
ANATOMICAL RELATIONS

44 A – Artery
The contents of the popliteal fossa are (from deep to superficial): popliteal artery, popliteal vein, tibial nerve, common peroneal nerve.

45 B – Nerve
From lateral to medial, the contents of the cubital fossa are: biceps tendon, brachial artery, median nerve (TAN).

46 C – Vein
At the renal hilum, from anterior to posterior, lie: renal vein, renal artery, renal pelvis and ureter.

47 B – Nerve
The femoral structures lie (from lateral to medial): femoral nerve, femoral artery, femoral vein, Y-fronts (NAVY).
URINARY TRACT INFECTIONS

48 E – *Proteus* spp.
Staghorn calculi occur in strongly alkaline urine. They are usually associated with bacteria that produce urease, which breaks down urea to form ammonia. *Proteus* is the most common of these.

49 D – *Mycobacterium tuberculosis*
HIV patients and other immunocompromised patients are particularly susceptible to tuberculosis. Tuberculosis should always be suspected in patients with sterile pyuria in the absence of any other demonstrable abnormality.

50 F – *Schistosoma haematobium*
Schistosomiasis is endemic to the Middle East, Egypt in particular. The parasite lays eggs in the urinary tract, causing irritation. It can lead to squamous metaplasia, stone disease, or, if left untreated, squamous cell carcinoma.