Question Papers
MTF Question 1
With regard to measurement of humidity, which of the following statements are correct?

a) Most instruments measure absolute humidity
b) Regnault's hygrometer has a silver tube containing ether
c) Absolute humidity can be measured by transducers
d) The hair hygrometer works on the principle that hair shortens as humidity increases
e) The wet and dry bulb hygrometer relies on the cooling effect by loss of latent heat of vaporisation for its function

MTF Question 2
Which of the following statements regarding ketamine are true?

a) Ketamine causes analgesia through its activity at opioid receptors
b) NMDA receptor antagonism is the main mechanism of ketamine effect
c) Ketamine blocks the release of glutamate in the CNS
d) Ketamine blocks activity at muscarinic receptors in the central nervous system
e) Like all general anaesthetic agents, ketamine has activity at the GABA_\_ receptor

MTF Question 3
Causes of hypokalaemia include:

a) Pyloric stenosis
b) Villous adenoma of rectum
c) Conn’s syndrome
d) Theophylline poisoning
e) Renal tubular acidosis

MTF Question 4
The physiological features of severe anorexia nervosa include:

a) Cardiomyopathy
b) Proteinuria
c) Bradycardia
d) Gastric dilation  
e) Panhypopituitarism

MTF Question 5  
Regarding the use of targeted temperature management after cardiac arrest:
  a) The ideal target temperature is 30 °C  
b) J waves are a common finding on the ECG of a patient at 31 °C  
c) At the end of the cooling period, passive rewarming should be allowed  
d) A heart rate of 38 beats per minute when the patient’s temperature is 32 °C is an indication for rewarming  
e) Shivering should preferentially be treated with a non-depolarising neuromuscular blocking drug (NMBD)

MTF Question 6  
Regarding gabapentin, which of the following statements are true?
  a) Gabapentin is an agonist at the γ-aminobutyric acid (GABA)A receptor  
b) Gabapentin is metabolised by the CYP3A4 isoenzyme  
c) Gabapentin is available in a transdermal drug delivery patch  
d) Gabapentin can be used for the treatment of acute pain  
e) Gabapentin enhances the action of morphine

MTF Question 7  
Regarding the neuromuscular junction:
  a) The synaptic cleft is 5 nanometres wide  
b) There are 10 acetylcholine receptors for every molecule of acetylcholine released in a conducted impulse  
c) Nerve fibres converge on the motor end-plate of the muscle fibre  
d) The terminal portion of the motor neurone is unmyelinated  
e) Prejunctional acetylcholine receptors have the same morphology as the postjunctional ones

MTF Question 8  
Regarding the porphyrias:
  a) They are rare acquired disorders of haem biosynthesis  
b) They are rare genetic disorders of haem breakdown  
c) Acute intermittent porphyria presents with neurovisceral crises and cutaneous manifestations  
d) Urine porphobilinogens are not raised between attacks in acute intermittent porphyria  
e) Treatment of an acute attack includes a low-carbohydrate diet

MTF Question 9  
Regarding urinary tract infection:
  a) Gram-negative organisms are usually involved  
b) It rarely causes sepsis  
c) More than 100 000 organisms/mm³ on urinary microscopy is significant
d) Urinary catheterisation is rarely associated
e) Treatment should include urinary catheterisation

MTF Question 10
Which of the following statements regarding pharmacology in renal failure are true?

a) In acute kidney injury (AKI), the loading dose of a drug which undergoes excretion via the renal tract may need to be increased
b) The commonest reason for AKI caused by aminoglycosides is that they cause an interstitial nephritis
c) Imipramine is a cause of obstructive (post-renal) AKI
d) Acetazolamide is a cause of obstructive (post-renal) AKI
e) When using ketamine for analgesia, the dose should be reduced in patients with AKI

MTF Question 11
Regarding the role and location of central chemoreceptors in the control of breathing:

a) The central chemoreceptors are located near the dorsal surface of the pons
b) Central chemoreceptors respond rapidly to changes in carbon dioxide tension in the blood
c) Central chemoreceptors respond rapidly to changes in oxygen tension in the blood
d) The pH of cerebrospinal fluid is slightly acidic compared with plasma
e) Respiratory acidosis causes a greater increase in ventilation than metabolic acidosis

MTF Question 12
With regard to the cardiovascular complications associated with obesity, which of the following statements are correct?

a) Renal blood flow is increased in obesity
b) Cardiac arrhythmias can be caused by fatty infiltration of the conduction system
c) Obese individuals have an increased cardiac output predominantly due to an increased heart rate
d) Absolute blood volume is increased
e) Systemic hypertension is 2 times more prevalent than in the non-obese population

MTF Question 13
With regard to critical care outreach services (CCOS), which of the following are true?

a) There is no evidence that it reduces the number of patients who have received cardiopulmonary resuscitation (CPR) prior to ICU admission
b) There is strong (level 1A) evidence that it reduces ICU mortality
c) CCOS was introduced into the NHS without formal prospective evaluation processes
d) Early warning scores may form part of the track and trigger approach
e) Education of ward staff and junior doctors commonly forms part of its remit

MTF Question 14
Which of the following are true of hyperosmolar non-ketotic coma (HONK)?

a) It is the same as hyperosmolar hyperglycaemic state
b) It is more common in type 1 diabetes than in type 2 diabetes
c) It presents with a mild ketosis
d) It presents in the absence of coma
e) Severe hyperglycaemia causes a functional thrombocytopenia

MTF Question 15
Which of the following are recognised treatment options used in confirmed cyanide poisoning?

a) Dicobalt edetate
b) Hydroxocobalamin
c) Gastric lavage
d) Sodium nitroprusside
e) Sodium thiosulphate

MTF Question 16
Functional residual capacity (FRC):

a) Can be measured using Fowler’s method
b) Is the sum of the residual volume and the expiratory capacity
c) Is a fixed volume
d) Exceeds the closing capacity in the elderly
e) May be reduced by restrictive lung disease

MTF Question 17
Which of the following statements are true regarding Turner syndrome?

a) Patients often suffer from menorrhagia
b) Common clinical features include short stature
c) It only affects females
d) Mental retardation is common
e) Coarctation of the aorta occurs in 10% of patients

MTF Question 18
Regarding psychological techniques in pain management:

a) There is no evidence to support psychological support in chronic pain patients
b) Psychological management is helpful to cure chronic pain conditions
c) Cognitive behavioural therapy challenges maladaptive thinking patterns
d) Encouraging patients to pace their activity facilitates coping with chronic pain
e) Psychological techniques encourage malingering behaviour

MTF Question 19
Which of the following statements regarding community-acquired pneumonia (CAP) are true?

a) A chest radiograph is necessary to make the diagnosis
b) Urea and electrolytes (U&E) offers important prognostic information
c) The white blood cell (WBC) count is an important prognostic determinant in non-immunosuppressed patients
d) *Staphylococcus aureus* is the most common causative organism
e) Macrolides should be discontinued in patients admitted to intensive care if the atypical pneumonia screen is negative

**MTF Question 20**

The following are true of the use of clonidine in critical care:

a) It is predominantly a postsynaptic $\alpha_2$-adrenoreceptor agonist
b) It has an oral bioavailability approaching 100%
c) On starting the medication it may cause initial, short-lived, hypertension
d) It can be stopped abruptly without a reducing dosage regime
e) It is the first-line treatment for agitation in a recently extubated patient with traumatic brain injury and established acute alcohol withdrawal

**MTF Question 21**

Regarding current religious rulings and cultural attitudes to brainstem death in the UK, which of the following statements are true?

a) It is considered haraaam (forbidden) for Muslims to become heart-beating organ donors
b) Orthodox Jewish law, *Halacha*, accepts brainstem death as comparable to cardiorespiratory death
c) *Shariah* (Islamic) law representatives in the UK consider brainstem death to be a true definition of death
d) Buddhist doctrine does not accept brainstem death to be a true definition of death
e) Brainstem death is still considered legal in the UK even if the patient’s family reject the diagnosis on religious grounds

**MTF Question 22**

Concerning the pipeline medical gas supply to theatres:

a) Medical oxygen is supplied at a pressure of 4 bar via a white coloured hose
b) Air is supplied via a black and white hose at a pressure of either 4 or 7 bar
c) The pipeline gas distribution network upstream of the wall terminal outlets is made of reinforced PVC with an antistatic core
d) Each Schrader valve has a similar external diameter irrespective of the gas pipeline that ends at it
e) By law it must be possible to disconnect a hose from a Schrader valve using one hand only

**MTF Question 23**

Which of the following statements regarding local anaesthetics are true?

a) Ester and amide local anaesthetic agents have exactly the same mechanism of action
b) Local anaesthetic agents are weak acids
c) A local anaesthetic agent with a low pKa will have a fast onset of activity
d) Local anaesthetic agents only work after being ‘trapped’ inside nerve cells
e) Local anaesthetic agents preferentially bind to sodium channels in their open state
MTF Question 24
Which of the following statements about the intercostal nerves are correct?

a) The intercostal nerves contain sensory, motor and autonomic fibres
b) The intercostal nerves supply the skin over the sternum and over the spine
c) The intercostal nerves run between the internal intercostal muscle and the transversus thoracic muscle
d) Paravertebral block will provide adequate analgesia for a rib fracture
e) A chest drain should be inserted at the inferior aspect of the intercostal space

MTF Question 25
The following are features suggestive of carcinoid syndrome:

a) Diarrhoea
b) Hypertensive episodes
c) Facial flushing
d) Dementia
e) Wheeze

MTF Question 26
When performing an arterial blood gas, which of the following are true?

a) Excess heparin in the syringe will make the sample more acidic
b) Carbon dioxide levels are measured by changes in electrode pH
c) Air bubbles in the sample increase the carbon dioxide partial pressure
d) A pH of 7.4 is equivalent to 40 mmol/L of hydrogen ions
e) A sample kept at room temperature has a lower hydrogen ion concentration

MTF Question 27
Which of the following statements regarding the Glasgow Coma Scale (GCS) are true?

a) A decorticate response to stimulus will score 2 on the motor component
b) Moaning in pain will score 2 on the voice component
c) A sternal rub is an appropriate painful stimulus
d) With asymmetrical limb movement, the best limb should be scored for the motor component
e) The original Glasgow Coma Scale was scored out of 14

MTF Question 28
Which of the following cause a rise in end-tidal carbon dioxide?

a) Pulmonary embolism
b) Hypovolaemia
c) Hyperthermia
d) Sepsis
e) Flow rates of less than 150 mL/kg/min using a coaxial Mapleson D circuit during spontaneous ventilation
MTF Question 29

Regarding renin:

a) Renin is released from the macula densa in response to a decrease in circulating volume
b) Release is inhibited by angiotensin II
c) Sympathetic stimulation, via activation of α-adrenoreceptors, stimulates renin release
d) Release is stimulated by atrial natriuretic peptide
e) Renin directly stimulates the release of vasopressin

MTF Question 30

Regarding magnesium:

a) Magnesium is the second most abundant extracellular cation
b) Magnesium antagonises N-methyl-D-aspartic acid (NMDA) receptors in the central nervous system
c) The biggest stores of magnesium in the body are in the skeleton
d) Magnesium is a cofactor for Na⁺/K⁺-ATPase
e) Hypomagnesaemia may produce cardiac arrhythmias similar to those caused by hypokalaemia

MTF Question 31

With regard to the diagnosis and treatment of gestational hypertension:

a) Oral hydralazine should be commenced as first-line treatment
b) Gestational hypertension is defined as a sustained sitting blood pressure > 140/90 mmHg occurring after 20 weeks gestation
c) Gestational hypertension is defined as an increase in systolic blood pressure ≥ 30 mmHg or diastolic blood pressure ≥ 15 mmHg occurring after 20 weeks gestation
d) Oral labetalol at a dose of 50–100 mg twice daily is appropriate initial treatment unless there are contraindications
e) Amlodipine is an acceptable alternative to nifedipine to treat gestational hypertension

MTF Question 32

Regarding the cranial vault in a healthy adult:

a) The mass of a human brain is approximately 1000 g
b) Brain parenchyma occupies 85% of the cranial volume
c) Volume of cerebrospinal fluid in the cranial vault is 150 mL
d) Blood occupies 7% of cranial vault volume
e) Early compensation for raised intracranial pressure (ICP) includes reduced production of cerebrospinal fluid

MTF Question 33

Regarding pyloric stenosis:

a) It is more common in females
b) Metabolic acidosis is common
c) Surgery must be performed immediately upon diagnosis
d) It usually presents in the first week of life

MTF Question 34
Which of the following statements about desflurane are true?

a) Desflurane has a lower blood:gas partition coefficient than nitrous oxide
b) Desflurane increases the risk of haemorrhage during obstetric procedures
c) Desflurane increases respiratory secretions and may cause bronchospasm
d) Desflurane is likely to cause bradycardia if used at high concentrations
e) Desflurane requires a special vaporiser because it is unstable at room temperature

MTF Question 35
Regarding Duchenne muscular dystrophy (DMD):

a) DMD presents from early childhood and is progressive
b) DMD occurs equally in both sexes
c) Genetic counselling is recommended
d) Calf hypertrophy with lower motor neurone signs and restrictive lung function deficit are indicative of DMD
e) Diagnosis is confirmed by response to steroid therapy and plasmaphoresis or immunoglobulin infusion

MTF Question 36
Which of the following statements regarding the internal jugular vein are correct?

a) The internal jugular vein drains the sigmoid sinus
b) The internal jugular vein joins the subclavian vein posterior to the clavicle
c) The internal jugular vein begins at the foramen lacerum at the base of the skull
d) Horner’s syndrome is a recognised complication of attempted cannulation of the internal jugular vein
e) The internal jugular vein is valveless

MTF Question 37
A 17-year-old girl is admitted to the emergency department with collapse following a 2-day history of vomiting. On examination she is slim, with patches of vitiligo. She is currently haemodynamically stable. Blood tests reveal sodium 129 mmol/L, potassium 5.2 mmol/L, creatinine 89 μmol/L. ECG shows sinus rhythm with peaked T waves. Ideal initial management should include:

a) Intravenous hydrocortisone
b) Salbutamol nebuliser
c) Short adrenocorticotropic hormone (ACTH) stimulation test
d) Calcium gluconate
e) Intravenous glucose and insulin infusion

MTF Question 38
Which of the following statements relating to an amniotic fluid embolism (AFE) are correct?