



RACP
Specialists. Together

RACP sample Divisional Written Examination questions

Paediatrics & Child Health Clinical Applications and Medical Sciences questions 1–31

Note:

These are sample questions. Full examinations have 170 items and are split into two papers: Clinical Applications (100 questions) and Medical Sciences (70 questions). EMQs appear at the end of each paper.

QUESTION 1

What proportion of a population is more than 3 standard deviations above the population mean for a normally distributed characteristic (e.g. height, weight)?

- A. 0.1%.
- B. 1%.
- C. 2.5%.
- D. 5%.

QUESTION 2

A 6-year-old girl has a systemic reaction with widespread urticaria 10 minutes after being stung on her foot by a wasp.

What is the best estimate of anaphylaxis occurring with the next wasp sting?

- A. < 1%.
- B. 10%.
- C. 50%.
- D. > 90%.

QUESTION 3

A 4-year-old boy is left in the care of his stepfather for the weekend. When the boy's mother comes home, she finds that he is refusing to walk. The stepfather explains that, on the previous day, the boy jumped off a chair, landing on his feet, and cried afterwards.

The boy is taken to the emergency department. The x-ray of his femur is shown.



What is the most likely cause of his injury?

- A. Accidental injury.
- B. Inflicted injury.
- C. Pathological fracture due to a bone tumour.
- D. Pathological fracture due to metabolic bone disease.

QUESTION 4

A 15-year-old male is brought to the emergency department with a 1-week history of distractibility, irritability and unusual behaviour. His mother reports that he has not been sleeping, and that he stole her credit card to purchase hundreds of bibles online. He was sent home from school after other students complained that he was telling everyone to repent as the end of the world is near.

He appears agitated and his speech is very fast. His physical examination is normal and his urine drug screen is negative.

What is the most likely diagnosis?

- A. Bipolar affective disorder.
- B. Conduct disorder.
- C. Disruptive mood dysregulation disorder.
- D. Schizophrenia.

QUESTION 5

A 2-year-old child presents with anaphylaxis following first ingestion of peanuts.

What is the likelihood of the child's allergy to peanuts resolving by adulthood?

- A. 5%.
- B. 10%.
- C. 20%.
- D. 30%.

QUESTION 6

A 6-month-old infant presents with severe recurrent infection. His lymphocyte count is $< 0.2 \times 10^9/L$ and flow cytometry does not detect any T, B or NK cells. His blood count is otherwise normal. He is diagnosed with severe combined immune deficiency.

Which is the most likely underlying cause?

- A. Adenosine deaminase (ADA) deficiency.
- B. Common gamma chain (γ_c) deficiency.
- C. Interleukin 7 receptor alpha (IL-7R α) deficiency.
- D. Janus kinase 3 (JAK3) deficiency.

QUESTION 7

In which form of muscular dystrophy is cardiac arrhythmia most common?

- A. Duchenne.
- B. Becker.
- C. Emery–Dreifuss.
- D. Limb–girdle.

QUESTION 8

In which subtype of juvenile idiopathic arthritis is male predominance typical?

- A. Enthesitis-related.
- B. Oligoarticular.
- C. Rheumatoid negative polyarticular.
- D. Systemic.

QUESTION 9

A 15-year-old presents with a 12-month history of increasing musculoskeletal pain in her arms, legs and back associated with fatigue, non-restorative sleep and intermittently feeling hot without fever. In the past 4 months, she has missed at least 2 days per week of school and recently has had to give up netball.

On examination, her blood pressure is normal. She is tender over the suboccipital muscle insertions, mid-point of the trapezius muscles, lateral epicondyles, greater trochanters and medial fat pad proximal to the knee joints bilaterally. She is not clinically weak. The rest of her musculoskeletal and general physical examination is normal.

Screening investigations reveal:

Full blood examination	Normal	
Erythrocyte sedimentation rate (ESR)	15 mm/hr	[< 8]
C-reactive protein (CRP)	< 5 mg/dL	[< 5]
Urea and electrolytes, creatinine	Normal	
Creatinine kinase	80 U/L	[40–240]
Thyroid-stimulating hormone (TSH)	1.21 mIU/L	[0.47–4.68]
Antinuclear antibody (ANA)	1:160 dense fine speckled pattern	
Human leukocyte antigen B27 (HLA-B27)	Detected	
Urinalysis	Normal	

What is the most likely diagnosis?

- A. Enthesitis-related arthritis.
- B. Juvenile fibromyalgia.
- C. Juvenile polymyositis.
- D. Systemic lupus erythematosus.

QUESTION 10

What is the most common cause of death in children and adolescents with chronic anorexia nervosa?

- A. Encephalopathy.
- B. Malnutrition.
- C. Suicide.
- D. Tachyarrhythmias.

QUESTION 11

A 21-month-old presents with failure to thrive. His parents report that, despite his weight, he eats very well. His linear growth is on the 50th percentile. They also state that he is happy, alert and sociable. When questioned, they report that he vomits 1–2 times per month. After initial investigation, magnetic resonance imaging (MRI) is performed and a central nervous system (CNS) tumour is identified.

What is the most likely location of the mass?

- A. Cerebellum.
- B. Hypothalamus.
- C. Medulla.
- D. Pineal gland.

QUESTION 12

A patient with acute myeloid leukaemia (AML) is receiving intensive chemotherapy using high-dose cytarabine. She has been neutropenic for 4 days, has developed severe mucositis and is now hypotensive.

Which pathogen is most likely to be responsible?

- A. Herpes simplex virus.
- B. *Scedosporium apiospermum*.
- C. *Staphylococcus epidermidis*.
- D. *Streptococcus viridans*.

QUESTION 13

A 4-year-old boy presents with a 1-year history of patterned, repetitive and complex hand movements that his parents usually notice at the end of the day or when driving home from daycare. The nature and frequency of the movements have not changed over time. His development is age-appropriate and his neurological examination is normal.

What is the most likely diagnosis?

- A. Chronic motor tic disorder.
- B. Paroxysmal kinesigenic dyskinesia.
- C. Stereotypic movement disorder.
- D. Sydenham chorea.

QUESTION 14

An 11-year-old girl is receiving a novel intravenous antibiotic with dose-limiting toxicity. The drug is cleared as follows:

40% unchanged in the bile

60% unchanged by renal excretion

She has a glomerular filtration rate (GFR) of 90 mL/min and is currently receiving 100 mg intravenously every 24 hours.

She develops significant renal impairment and her GFR decreases to 30 mL/min.

What is the most appropriate revised dosing regimen?

- A. 33 mg daily.
- B. 40 mg daily.
- C. 60 mg daily.
- D. 100 mg second daily.

QUESTION 15

A 10-year-old boy is under follow-up after a Fontan procedure 2 years previously. His height and weight are noted to have been static for the past year. He does not have abdominal pain. He passes soft, bulky stools 1–2 times daily. He does not have oedema or ascites.

Investigations show:

Stool microscopy	Occasional fat globules seen	
Stool culture	Negative	
<i>Clostridium difficile</i> toxin	Negative	
Faecal calprotectin	107 µg/g	[< 50]
Steatocrit	47%	[< 20]
Faecal elastase	500 µg/g	[> 200]
Faecal alpha-1-antitrypsin	2.1 mg/g	[< 0.5]
HLA DQ2	Positive	
HLA DQ8	Negative	
Tissue transglutaminase	16 u/ml	[< 15]
Anti-endomysial antibody	Negative	
Albumin	23 g/L	[32–48]

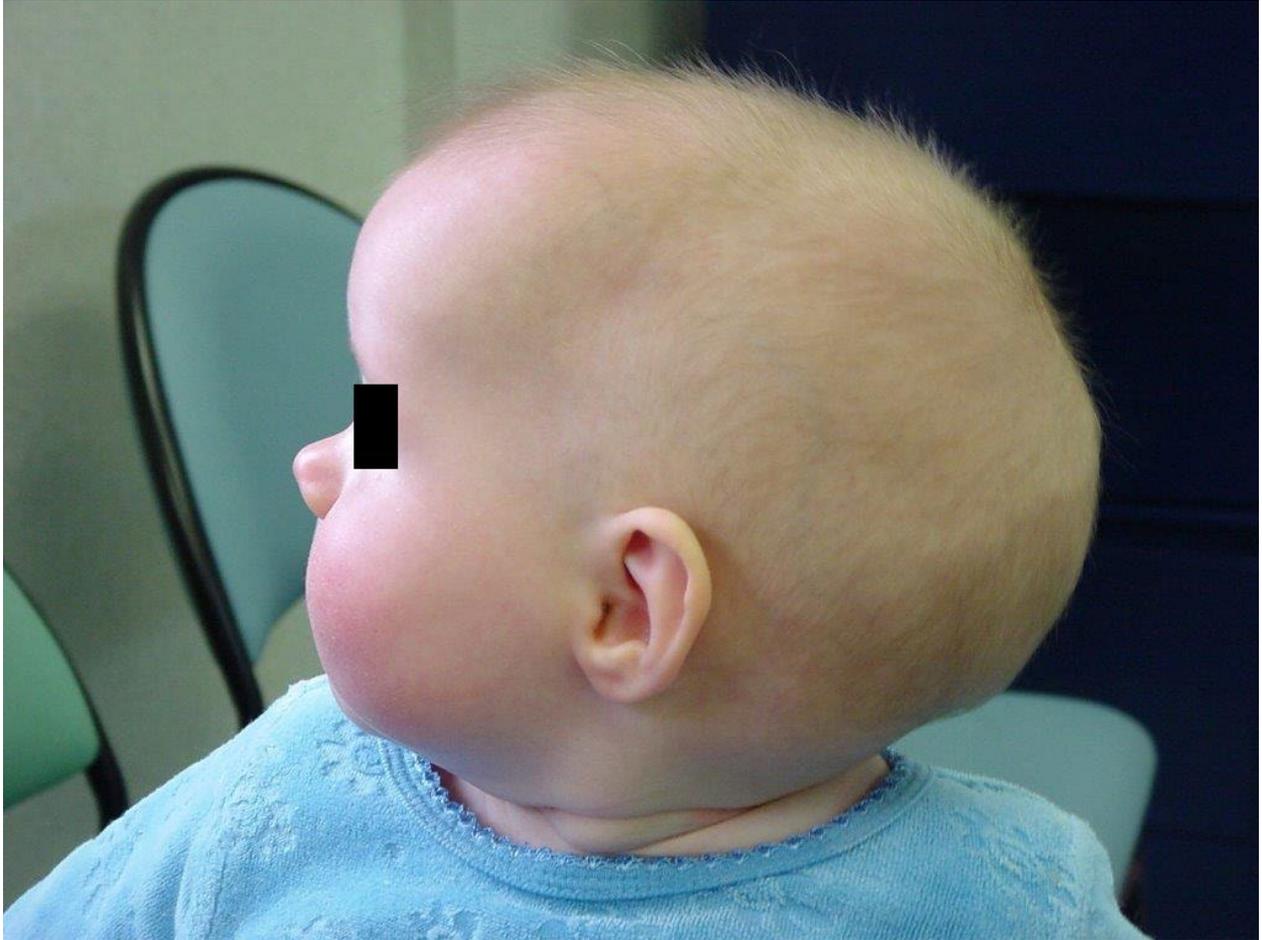
What is the most likely reason for his diarrhoea?

- A. Coeliac disease.
- B. Inflammatory bowel disease.
- C. Pancreatic insufficiency.
- D. Protein-losing enteropathy.

QUESTION 16

A mother is concerned about the shape of her baby's head after several comments were made by other parents at a playgroup. Pictures of the baby's head are shown.





What is the diagnosis?

- A. Coronal craniosynostosis.
- B. Lambdoid craniosynostosis.
- C. Metopic craniosynostosis.
- D. Sagittal craniosynostosis.

QUESTION 17

A 12-year-old girl with autoimmune hepatitis type 1 diagnosed at the age of 9 years presents with sudden onset of abdominal pain, jaundice and pruritus. She has been receiving azathioprine 100 mg daily since diagnosis. She was weaned off steroids a year after diagnosis. Her 6-thioguanine nucleotide (6-TGN) level is $320 \text{ pmol}/8 \times 10^8 \text{ red blood cells (RBC)}$ [235–450]. Ultrasound scan reveals a smooth liver with normal echotexture, prominent bile ducts and a normal-sized spleen. The gall bladder is large and thin-walled but contains no stones.

Blood results are as follows:

Bilirubin (total)	120 $\mu\text{mol}/\text{L}$	[< 20]
Bilirubin (conjugated)	111 $\mu\text{mol}/\text{l}$	[< 4]
Alkaline phosphatase (ALP)	722 U/L	[100–460]
Gamma glutamyltransferase (GGT)	610 U/L	[< 24]
Aspartate aminotransferase (AST)	79 U/L	[< 32]
Alanine aminotransferase (ALT)	62 U/L	[5–20]
Albumin	34 g/L	[29–42]
IgG	10.1 g/L	[7.0–16.0]
IgA	2.0 g/L	[0.8–2.8]
IgM	0.9 g/L	[0.4–2.3]
Antinuclear antibody (ANA) titre	40	[< 40]
Smooth muscle antibodies (SMA) titre	40	[< 40]

What is the most likely diagnosis?

- A. Acalculous cholecystitis.
- B. Autoimmune sclerosing cholangitis.
- C. Drug-induced liver injury.
- D. Non-alcoholic fatty liver disease.

QUESTION 18

In the analysis of a randomised trial that compares normally distributed blood pressures in two groups, which statistical approach is most appropriate?

- A. Chi-squared test.
- B. Logistic regression.
- C. Pearson correlation.
- D. Student T-test.

QUESTION 19

A 5-month-old boy is admitted to the ward for investigation of poor feeding and loss of previously acquired head control. Further investigation confirms subacute necrotising encephalomyopathy (Leigh disease). Sequencing of the mitochondrial DNA (mtDNA) does not identify a causative variant.

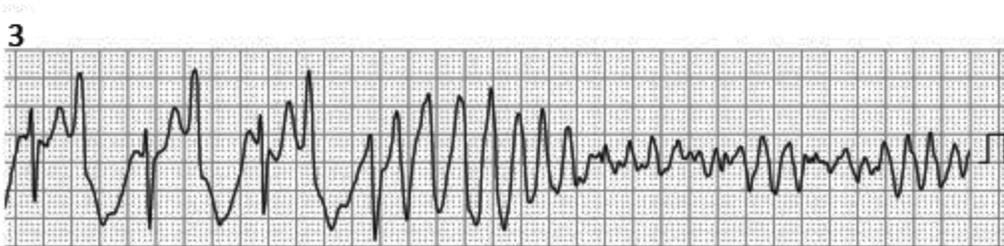
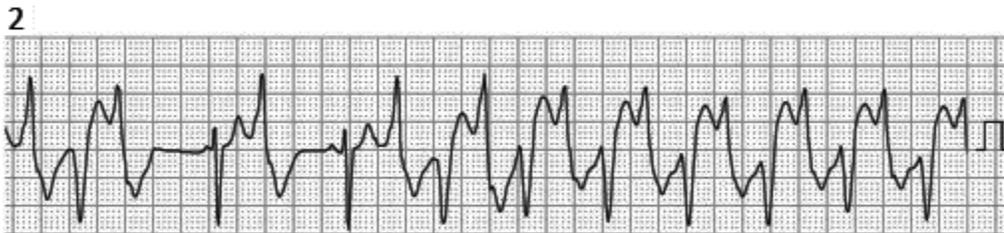
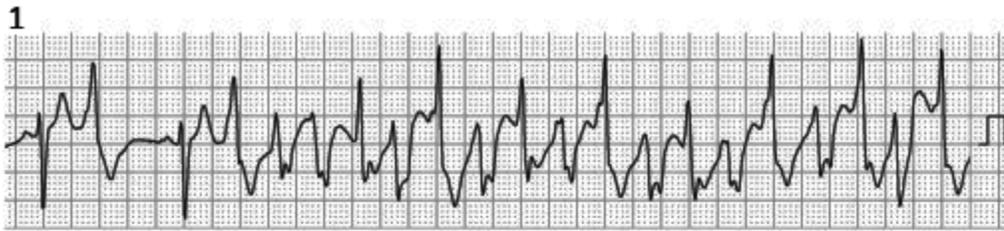
What is the most likely explanation for the mtDNA sequencing not identifying a causative variant?

- A. Mitochondrial gene deletion.
- B. Non-genetic form of subacute necrotising encephalomyopathy.
- C. Nuclear DNA variant.
- D. Variant that cannot be detected due to heteroplasmy.

QUESTION 20

A 13-year-old boy who collapsed at school during a cross-country race is brought to the emergency department by ambulance. He had presented to the emergency department 3 months previously following a brief syncopal episode. An electrocardiogram (ECG) performed at that visit was reported as normal and he was discharged home with a diagnosis of vasovagal syncope.

Consecutive lead II rhythm strips recorded en route to hospital during his latest episode are shown:



What is the diagnosis?

- A. Catecholaminergic polymorphic ventricular tachycardia.
- B. Hypertrophic cardiomyopathy.
- C. Long QT syndrome.
- D. Wolf–Parkinson–White syndrome.

QUESTION 21

In acute appendicitis, which clinical feature is associated with an increased likelihood of appendiceal perforation?

- A. Age < 4 years.
- B. Caucasian race.
- C. Fever > 38.5 °C.
- D. Increased white cell count.

QUESTION 22

Which drug used for induction for tracheal intubation causes the least cardiovascular instability?

- A. Ketamine.
- B. Midazolam.
- C. Propofol.
- D. Thiopentone.

QUESTION 23

Thiopurine methyltransferase activity testing is used to identify patients at risk of developing myelosuppression from which drug?

- A. Azathioprine.
- B. Cyclosporin.
- C. Methotrexate.
- D. Mycophenolate mofetil.

QUESTION 24

Titres of which autoantibodies best correlate with clinical disease activity in systemic lupus erythematosus?

- A. Anti-double stranded deoxyribonucleic acid (anti-dsDNA) antibodies.
- B. Anti-ribonucleoprotein (anti-RNP) antibodies.
- C. Anti-Smith (anti-Sm) antibodies.
- D. Antinuclear antibodies (ANA).

QUESTION 25

What is the mechanism of action of sildenafil?

- A. Calcium channel blockade.
- B. Cyclic guanosine monophosphate (cGMP)-specific phosphodiesterase inhibition.
- C. Endothelin receptor ET_A and ET_B antagonism.
- D. Prostacyclin (PGI₂) receptor activation.

QUESTION 26

An electrodecremental response on nerve conduction studies is characteristic of what neuromuscular condition?

- A. Congenital myopathy.
- B. Guillain–Barré syndrome.
- C. Myasthenia gravis.
- D. Spinal muscular atrophy.

QUESTION 27

Where does messenger ribonucleic acid (mRNA) splicing occur?

- A. Cytoplasm.
- B. Endoplasmic reticulum.
- C. Golgi apparatus.
- D. Nucleus.

QUESTION 28

Clonidine may be used as a treatment for attention deficit hyperactivity disorder and sleep problems in children.

What is the mechanism of action of clonidine?

- A. Antagonist of dopamine (D₂) and 5-hydroxytryptamine (5-HT₂) receptors.
- B. Centrally acting alpha-2 adrenergic agonist.
- C. Increases dopamine and noradrenaline (norepinephrine).
- D. Inhibits the presynaptic reuptake of noradrenaline (norepinephrine) and serotonin.

QUESTION 29

What is the goal energy intake in kilocalories per kg per day to achieve appropriate growth in a premature infant of less than 28 weeks gestation?

- A. 70.
- B. 90.
- C. 120.
- D. 150.

Extended matching questions (EMQs)

The extended matching question format provides a list of several answer options that can be chosen across many questions following a common theme.

- ***For each theme, candidates are provided with a list of 8 answer options.***
- ***Candidates are provided with 2 questions.***
- ***The correct answer for each of the 2 questions is provided in the list of 8 options.***
- ***Select a SINGLE correct answer from this list of options for EACH of the 2 questions, and mark your answer sheet with this correct option, from A to H.***
- ***An option may be correct for more than one question.***

QUESTIONS 30 and 31

In neonates, use of which antibiotic has been associated with the adverse effect described?

Answer options

- A. Ceftriaxone.
- B. Clindamycin.
- C. Erythromycin.
- D. Gentamicin.
- E. Meropenem.
- F. Metronidazole.
- G. Penicillin.
- H. Vancomycin.

QUESTION 30

Crystal deposition in lung when co-infused with calcium.

QUESTION 31

Pyloric stenosis.

[END OF EXAMINATION]