ROYAL COLLEGE OF PHYSICIANS OF IRELAND

GUIDELINE SYLLABUS
FOR MRCPI (GENERAL MEDICINE) PREPARATION

The Membership of the Royal College of Physicians of Ireland remains a recognised standard of achievement for further advancement in many spheres of medicine in Ireland, and abroad. To achieve the qualification of MRCPI, candidates are required to demonstrate competence in both the knowledge and clinical skills necessary for general medicine. It is recognised as an entry requirement for Higher Specialist Training in the medical specialities in Ireland.

The following guidelines endeavour to outline the areas of knowledge in which a candidate should have a clear understanding and competence. These guidelines are a guide and should be used in conjunction with a broad range of continuing medical educational activities including up-to-date knowledge of medical literature, medical advances and clinical techniques. The achievement of the knowledge and medical skills necessary to pass the Membership Examination is an important step along the path of continuing medical education.

Introduction

The guidelines present a framework of topics which should be covered, but it is not intended to be inclusive and candidates should not limit their studies solely to these topics.

The Part I Membership Examination is intended to assess knowledge of the basic clinical sciences and clinical application necessary for the practice of general medicine.

MEMBERSHIP EXAMINATION

Part I – General Medicine

Candidates for the Part I examination will not be accepted for the examination before the expiry of 18 months from the date given on the diploma of medical qualification. Candidates are not required to have undergone training in a specific post before entering the examination, but the College recommends that candidates prepare by spending time gaining clinical experience in suitable hospital posts, studying up-to-date clinical texts and by reading the current medical journals. In addition, it is recommended that candidates familiarise themselves with the style of questions used in the Part I examination.

The General Medicine Part I examination consists of a 50 question paper in multiple true/false format and a 50 question paper in Best of Many format designed to test knowledge of the basis of medical practice over a wide area, including statistics, clinical sciences, anatomy, physiology, biochemistry, pathology, microbiology, pharmacology, immunology, genetics and relevant principles of cell molecular and membrane biology. Paediatric topics are not tested in the general medicine Part I examination.

The multiple true/false style of question used in the Part I examination has an initial stem followed by five possible items for completion. One mark (+1) will be awarded for each correct answer (i.e. a true statement indicated as true, a false statement indicated as false). A zero (0) mark is awarded for each incorrect answer or a don't know answer. There is no negative marking.

The questions will appear in the format of the following example:

Hypercalcaemia is commonly found in the following:

A. Renal Tubular Acidosis.
B. Vitamin D Intoxication.
C. Pagets Disease of the Bone.
D. Hyperparathyroidism.
E. Secondary Hyperparathyroidism.

	A	B	C	D	E
1.	[T] [~~F~~]	[D] [~~T~~]	[F] [D]	[T] [~~F~~]	[D] [~~T~~]	[F] [D]	[T] [F]	[~~D~~]

The Best of Many style of question used in Part I has an initial stem often a clinical scenario with a prompt to select the single most appropriate response from a list of items (e.g. diagnosis). Ability to prioritise investigations and interpret graphs, images and numeral data is examined.

The questions will appear in the format of the following example:

Which of the following has the most anti-viral activity:

A. ganciclovir
B. ranitidine
C. danazol
D. amantadine
E. fluconazole

ANSWER: A

1.	[~~A~~]	[B]	[C]	[D]	[E]

The standard necessary to achieve a pass in General Medicine Part I examinations is established using a combination of normative referencing, test equating and criterion referencing. Every effort is made to ensure that the standard required to pass is fair and consistent at every examination.

Part I – Guideline Syllabus

The syllabus comprises a list of possible topics. These should be read as examples of topics which appear frequently on papers and in the Clinicals. However, it is important to realize that other topics, including rare diseases do appear. Actually no syllabus could be exhaustive, though the examination does reflect realistic medical practice.

Index

1. Molecular Biology and Genetics

- genes and genetic exchange: chromosomes, DNA structure, single- and double-stranded DNA, recombination, insertion, transpositions, transformation, transduction, conjugation, crossover, linkage, plasmids and bacteriophages, oncogenes, polymerase chain reaction
- gene expression: transcription of DNA into RNA, protein synthesis, errors
- human genetics
- congenital abnormalities
- inheritance patterns, dominant, recessive, autosomal, sex linked, penetrance, multifactorial
- chromosomal abnormalities
- genetic testing, genetic counselling, gene therapy

2. Biochemistry

- structure and function of: carbohydrates, fats, proteins, amino acids, purine and pyrimidine nucleotides, vitamins, lipids, porphyrins, complex carbohydrates, glycoproteins, and proteoglycans
- metabolic sequences (not detailed chemistry), regulation, disorders
  - glycolysis, pentose phosphate pathway, tricarboxylic acid cycle, ketogenesis, electron transport and oxidative phosphorylation,
  - gluconeogenesis, glycogenesis, fatty acid and triglyceride synthesis, glycogenolysis, ATP

3. Physiology

- cells and tissues
  - receptors, excitation and conduction of excitable tissues, voltage and ligand gated channels, cell components, intracellular organelles, movement and intracellular transport, secretion, intercellular junctions, gap junctions, and desmosomes, connective tissue cells and matrix, muscle cells, contraction, neuromuscular junction, excitation-contraction coupling, cell hypertrophy, cell injury and necrosis, free radical injury, cell cycle, mitosis, meiosis, apoptosis
- systems
  - homeostasis
  - ability to recognize normal health
  - ability to distinguish normal secondary responses to disease from primary disease processes
  - detail by individual system

4. Anatomy, structure and ultrastructure

- aspects of topographical anatomy which enable anatomical diagnoses
- organ position and relations, organ structure, histological structure and electron microscopic structure which enables pathologic diagnoses and classification of diseases, (ability to recognize detailed microscopic structure is not required)
- surface anatomy
- examples of clinically useful knowledge of structure include: distribution of peripheral nerves, dermatomes, central nervous system pathways, distribution of coronary arterial supply, lymphatic drainage of organs, surface anatomy of lobes of the lung, location of the kidney and ureters, relations of head of pancreas
- detail by individual system

5. Pathology

- inflammation
  - mediators, vascular response to injury, inflammatory cell recruitment, bactericidal mechanisms, wound healing, haemostasis
- neoplasia
  - histology, staging of neoplasms, hereditary neoplastic disorders, metastasis, tumor immunology, paraneoplastic features, epidemiology and prevention
- detail by individual system

6. Microbiology

- bacteria, aerobic, anaerobic

- viruses including oncogenic viruses and HIV
- rickettsia
- fungi
- parasites
- protozoa
- antigens, antibodies, isolation and culture
- disease manifestation by individual system

7. Immunology

- antigen presentation, tolerance
- cellular immunity: granulocytes, natural killer cells, macrophages, T lymphocytes, B lymphocytes and plasma cells
- humeral immunity: immunoglobulins, antibodies, complement, cytokines
- immunizations, live, antigenic extracts
- immunodeficiency, including AIDS
- hypersensitivity (types I–IV)
- transplantation including graft-versus-host reactions
- autoimmune disorders
- drug-induced alterations in immune responses, immunopharmacology

8. Therapeutics

- pharmacokinetics, drug half life, metabolism, renal clearance
- mechanisms of drug action
- dose response curves, efficacy, potency
- agonists and antagonists
- side effects
- interactions
- criteria for choice of most appropriate drug
- drug development
- detail by individual system

9. Medical ethics

- obtaining informed consent
- physician-patient relationships (*eg* confidentiality)
- patient compliance
- death and dying
- research
- interactions with other health professionals
- published management guidelines

10. Communication skills

- communicating bad news
- responding to distressed patients

- patient education

11. Environment

- nutrition, hydration
- temperature
- occupational hazards
  - radiation, hypobaric and hyperbaric pressure
  - toxic chemicals (*eg* chlorine gas, smoke inhalation, agricultural hazards, solvents, metals, poisons)
  - allergens
  - carcinogens

12. Statistics and epidemiology

- measurement
- location and dispersion: mean, median, mode, range, standard deviation, standard error, confidence intervals, percentiles
- distributions: normal, skew, transformed
- associations: correlation and regression
- critical analysis of test results: sensitivity, specificity, negative and positive predictive values, risk ratios
- graphical presentation of data
- study design
  - clinical trials
  - double blind, placebo controlled
  - cohort, case-control, cross-sectional, case series, longitudinal surveys
  - sampling and sample size statistical power
  - randomization, stratification
- hypothesis testing and statistical inference
  - statistical significance, Type I, II errors, probability
  - T-tests, Chi-square, analysis of variance, non-parametric tests
- epidemiology of diseases
  - cumulative and point prevalence, incidence
  - standardised mortality rates
  - geographical, gender, racial, social class factors in disease
  - prevention of disease in individuals and populations
  - health care delivery

13. Blood and lymphoreticular systems

- erythrocytes, haemoglobin, plasma proteins, leucocytes, platelets, coagulation and fibrinolysis, lymphoreticular system
- infections of the blood, reticuloendothelial system, and lymphatics
- allergy, anaphylaxis and other immunopathologies
- anaemias: iron deficiency anaemia, nutritional deficiencies, pernicious anaemia, other megaloblastic anaemias, haemolytic anaemia, anaemia associated with chronic disease, aplastic anaemia, pancytopenia, haemoglobinopathies, thalassaemia, sickle cell disease, polycythaemia vera, haemochromatosis
- leucocytes: increased and decreased counts (*eg* eosinophilia, agranulocytosis)
- haemorrhagic and haemostatic disorders: haemophilia, von Willebrand's intravascular coagulation, hypofibrinogenaemia; immune thrombocytopenic purpura, antiphospholipid syndrome, haemolytic-uraemic syndrome

- vascular and endothelial disorders
- neoplastic: lymphoma, leukaemia, multiple myeloma, mycosis fungoides
- blood counts, blood constituents, blood films, coagulation profile, fragility, bone marrow, bone scans
- drugs: blood and blood products, treatments for anaemias, drugs stimulating erythrocyte production (*eg* erythropoietin), drugs stimulating leucocyte production (*eg* G-CSF), anticoagulants, thrombolytics, antiplatelets, antimicrobials (*eg* antimalarials), antineoplastic and immunomodulatory drugs
- other treatments (*eg* plasmapheresis, bone marrow transplantation, splenectomy, chelating agents, radiation therapy)

14. Cardiovascular system

- cardiac cycle, mechanics, venous pressures, heart sounds, cardiac output, haemodynamics, including systemic, pulmonary, vascular resistance, blood volume, special circulation to coronary, cerebral, muscle, skin, heart muscle, excitation, pacemaking, conduction, contraction, metabolism, oxygen consumption, biochemistry, atrial natriuretic peptide, endothelium, vascular smooth muscle, microcirculation, and lymph flow, mechanisms of atherosclerosis, neural, hormonal and physical regulation of the heart, blood vessels, and blood volume, including responses to change in posture, exercise, and tissue metabolism
- syncope, ischemic heart disease, myocardial infarction, systemic hypotension, shock, systemic hypertension, septicaemia, endocarditis, myocarditis, pericarditis, acute rheumatic fever, systemic lupus erythematosus, vasculitis, temporal arteritis, tamponade, valvular disease, obstructive cardiomyopathy, dysrhythmias, systolic and diastolic dysfunction, low- and high-output heart failure, cor pulmonale, cardiac neoplasms, aneurysms, occlusions, varicosities, atherosclerosis, amyloidosis, aortic dissection, Marfan's syndrome, haemochromatosis, scleroderma, congenital disorders of the heart and central vessels
- electrocardiogram, echocardiogram, catheter data, cardiac function, imaging
- drugs: coronary and peripheral vasodilators, antiarrhythmics, antihypertensives, treatment of hypotension and shock, cholesterol and lipid lowering treatments, anticoagulants, thrombolytics, diuretics, angiotensin converting enzyme inhibitors, digoxin, inotropes
- other treatments (*eg* pacemakers, angioplasty, valves, surgery, transplantation)

15. Respiratory system

- airways, including mechanics and regulation of breathing, lung parenchyma, including ventilation, perfusion, gas exchange, pleura, surfactant, lung compliance
- pulmonary defence mechanisms, non-specific and specific
- upper respiratory tract infection, sinusitis, pharyngitis, pneumonia, bronchiectasis, abscess, empyema, tuberculosis, fungal infections, allergic and hypersensitivity disorders, asthma, aspergillosis, allergic alveolitis, connective tissue disorders, scleroderma, Wegener's granulomatosis, Goodpasture's syndrome, pneumoconioses, asbestosis, silicosis, byssinosis, acute respiratory distress syndrome, chronic bronchitis, chronic obstructive pulmonary disease, emphysema, □1 antitrypsin deficiency, smoking related disease, cystic fibrosis, sarcoidosis, cryptogenic pulmonary fibrosis, pulmonary eosinophilia, aspiration, pneumothorax, atelectasis, sleep apnoea, polyps, bronchogenic carcinoma, mesothelioma, metastatic tumors, hypoventilation, disorders of gas exchange, ventilation-perfusion imbalance, thromboembolic disease, pulmonary hypertension, pulmonary oedema, pleural effusion, systemic disorders affecting the respiratory system

- pulmonary function tests, forced expiratory manoeuvre, lung volumes, carbon monoxide transfer factor (diffusing capacity), arterial blood gases, O_2 and CO_2 transport, exercise testing, pleural fluid, imaging, bronchoscopy, sputum
- drugs: cough suppressants, expectorants, bronchodilators, anti-inflammatory and cytotoxics, antimicrobials
- other treatments (*eg* pleural taps, physiotherapy, oxygen therapy, nasal CPAP, artificial ventilation, surgical procedures, transplantation)

16. Endocrine system

- hypothalamus, posterior and anterior pituitary, thyroid, parathyroids, adrenal cortex, adrenal medulla, pancreatic islets, ovary and testis, other organs (*eg* kidney, heart, lung)
- peptide, steroid hormones, including vitamin D, thyroid, catecholamine hormones, renin-angiotensin system
- hypo- and hyperpituitarism, diabetes inspidus, syndrome of inappropriate antidiuretic hormone, subacute thyroiditis, Graves' disease, thyroid nodules, hypo- and hyper-thyroidism, goitre, hypo- and hyper-parathyroidism, diabetes mellitus, insulinoma, adrenogenital syndrome, pheochromocytoma, Cushing's, Addison's disease
- multiple endocrine neoplasia syndromes, systemic disorders affecting the endocrine system (*eg* haemochromatosis)
- hormone levels, regulation and effects, challenge tests
- drugs: hormones and hormone analogues, stimulators of hormone production (*eg* sulfonylureas), inhibitors of hormone production (*eg* carbimazole), hormone antagonists (*eg* propranolol), potentiators of hormone action (*eg* demeclocycline)
- other treatments (*eg* surgery, radiation)

17. Nervous system

- blood supply, nuclei, gray and white matter, reflexes, tracts, sensory and motor systems, basal ganglia and cerebellum, autonomic nervous system, peripheral nerves, axonal transport, excitation and conduction, neurotransmission, trophic and growth factors, brain metabolism, glia, myelin, blood-brain barrier, cerebrospinal fluid formation, pressure, flow and constituents
- infections, meningitis, traumatic, vascular, metabolic, congenital, neoplastic, degenerative, neurotransmission and idiopathic disorders, Guillain-Barré syndrome, multiple sclerosis, subdural and epidural haematomas, cord compression, delirium, Reye's syndrome, thromboembolic and haemorrhagic strokes, venous sinus thrombosis, arterial aneurysms, lupus, neural tube defects, cerebral palsy, mental retardation, Down's syndrome, Alzheimer's dementia, myasthenia gravis, Parkinson's disease, Huntington's disease, amyotrophic lateral sclerosis, epilepsy, headache, pain syndromes, sleep disorders, narcolepsy, restless legs syndrome, visual defects, papilloedema, optic atrophy, uveitis, scleromalacia, deafness, vestibular neuronitis, learning disorders, cerebral palsy, brain stem death, peripheral nerve injury, peripheral neuropathy, diabetic neuropathy
- cerebrospinal fluid pressure and composition, imaging, electrophysiology
- drugs: anaesthetics, analgesics, sedatives, antiepileptics, stimulants, amphetamines, antiparkinsonian drugs, skeletal muscle relaxants, neuromuscular junction blocking agents, anticholinesterases, antiglaucoma drugs, drugs modulating intracranial pressure, antimigraine agents
- other treatments (*eg* hyperventilation)

18. Psychiatry

- substance abuse
- schizophrenia, mania and other psychoses
- mood and anxiety disorders, reactive depression, self-harm
- personality disorders
- physical and sexual abuse
- treatments: anxiolytics, antidepressants, antipsychotic agents, non-drug therapies

19. Dermatology

- barrier functions, thermal regulation, sweat gland
- acne, carbuncle, furunculosis, abscess, cellulitis, necrotizing fasciitis, gangrene, herpes infections, measles, chickenpox, rubellam, verrucae, mycoses, dermatophytosis, parasitic infections, scabies, lice, alopecia, psoriasis, urticaria, allergic eczema, lupus erythematosus, scleroderma, dermatomyositis, burns, decubitus ulcers, effects of ultraviolet radiation, seborrheic dermatitis, actinic keratosis, basal cell carcinoma, squamous cell carcinoma, naevi, melanoma, ichthyosis, haemangiomas, Kaposi's sarcoma, lymphoma, neurofibromatosis, skin appendage tumours, vitamin deficiencies, hypervitaminosis, hyperhidrosis, vasculitis, Raynaud's disease, Ehlers-Danlos syndrome, Marfan's syndrome
- biopsy, reaction to light, allergens
- drugs: corticosteroids, antihistamines, emollients, sunscreen, retinoids, antimicrobial agents, cytotoxic and immunologic therapy, keratinolytics
- other treatments (*eg* PUVA)

20. Rheumatology

- septic arthritis, osteomyelitis, Lyme disease, rheumatoid arthritis, gout, ankylosing spondylitis, osteoarthritis, polymyositis, systemic lupus erythematosus, dermatomyositis, polymyalgia rheumatica, fibrositis, synovitis, tenosynovitis, injuries, osteosarcoma, metastatic disease, dwarfism, osteogenesis imperfecta, osteomalacia, osteoporosis, osteodystrophy, polyarteritis nodosa, bone ischaemia, Dupuytren's contracture, scoliosis, Paget's disease, disc disease
- connective tissue disorders: scleroderma, systemic lupus erythematosus, mixed connective tissue disease, Sjögren's syndrome
- joint aspiration, radiology
- drugs: nonsteroidal anti-inflammatory drugs, glucocorticoids, muscle relaxants, allopurinol, colchicine, uricosuric drugs, gold, cytotoxic agents, diphosphonates, calcitonin, oestrogen analogues
- other treatments (*eg* physiotherapy, surgery, casts, rehabilitation)

21. Gastrointestinal System

- essential nutrients and their functions, energy storage, energy balance, appetite, digestion and absorption, salivary glands, exocrine pancreas, hepatic, gastric and intestinal secretions, motility, absorption carbohydrate, fat, protein, vitamins, minerals, functions of liver and biliary system, gastrointestinal defence mechanisms and flora
- stomatitis, oesophagitis, gastritis, peritonitis, hepatitis, peptic ulcer, traveller's diarrhoea, food poisoning, cholecystitis, pancreatitis, Crohn's disease, ulcerative colitis, hiatus hernia, intestinal obstruction, volvulus, intussusception, oesophageal atresia, postsurgical obstruction, perforation of hollow viscus, inguinal, femoral, and abdominal wall hernias, esophageal and colonic diverticula, benign and malignant neoplasia, motility disorders, malabsorption, hepatitis, cirrhosis, hepatic failure, hepatic encephalopathy, jaundice, portal hypertension, ascites, oesophageal varices, cholelithiasis, cholecystitis, hepatic abscess, subphrenic abscess, neoplasms of the

liver, storage diseases, neoplasms of the biliary tract, haemorrhoids, ischemia, angiodysplasia
- imaging, malabsorbtion tests, endoscopy, liver function, tumour markers, secretions
- drugs: antacids, antisecretory drugs, motility drugs, mucosal protective agents, antibiotics, antidiarrhoeal drugs, antiemetic drugs, prokinetic drugs, fluid and electrolyte replacement, pancreatic replacement therapy, treatment of pancreatitis, lactulose, drugs to dissolve gallstones, anti-inflammatory, immunosuppressive, antineoplastic, and antimicrobial drugs
- other treatments (*eg* surgery, nasogastric and other tubes)

22. Urinary System

- kidneys, ureters, bladder, urethra, glomerular filtration rate and renal plasma flow, tubular reabsorption and secretion, including transport processes, urinary concentration and dilution, renal regulation of acid-base balance, body fluid and electrolytes, micturition, renal hormones and responses to hormones, nerves and chemicals
- glomerulonepritis, interstitial nephritis, pyelonephritis, papillary necrosis, cystitis, urethritis, nephrotic syndrome, transplant rejection, IgA nephropathy, obstructive uropathy, renal carcinoma, metastases, renal failure, acute and chronic, Fanconi's syndrome, renal tubular acidosis, nephrogenic diabetes insipidus, polycystic kidney disease, renal calculi, renal artery stenosis, systemic diseases affecting the renal system (*eg* diabetes mellitus, hepatitis, amyloidosis, systemic lupus erythematosus, Goodpasture's syndrome, Wegener's granulomatosis)
- imaging, renal function tests
- drugs: diuretics, antidiuretic drugs, treatment of volume, electrolyte, and acid-base disorders and to enhance renal perfusion (*eg* dopamine), anti-inflammatory, antimicrobial, immunosuppressive, and antineoplastic drugs, drugs used to treat lower urinary tract system (*eg* incontinence, bladder function, benign prostatic hyperplasia)
- other treatments (*eg* dialysis, renal transplantation)

23. Reproductive System

- sexually transmitted diseases, toxic shock syndrome, orchitis, hypogonadism, cystic mastitis, neoplastic disorders, infertility, polycystic ovaries, menopause, impotence, gynaecomastia, benign prostatic hyperplasia
- systemic disease during pregnancy, diabetes mellitus, cardiac disorders, hypertension, asthma
- fertility tests, hormones
- drugs: fertility drugs, contraception, treatment of menopause, stimulators and inhibitors of lactation, androgen replacement and antagonists, gonadotrophin-releasing hormone and gonadotrophin replacement, impotency therapy