



ANNEXURE C

FC Path(SA)Viro Written Examination Blueprint

Topics	P1	P2	Rel	Imp	IF
Basic Virology					
Virus structure - symmetry, nature of envelopes, functions of virus-encoded proteins	N	Y	2	3	6
International Committee on Taxonomy of Viruses (ICTV) - criteria used for virus classification	N	Y	2	3	6
Replication strategies of viruses using Baltimore classification	N	Y	2	3	6
Viral genetics - genome organization, variation & diversity	N	Y	3	4	12
Pathogenesis					
Routes of transmission of viruses	N	Y	3	4	12
Specific host factors which influence pathogenesis & outcome of infection	N	Y	3	4	12
Specific virus factors which influence pathogenesis & outcome of infection	N	Y	3	4	12
Viral cell tropism, virus-host interactions, viral shedding	N	Y	3	4	12
Factors responsible for persistent viral infections	N	Y	3	4	12
Mechanisms underlying viral oncogenesis	N	Y	3	4	12
Viral Immunology					
Components & functions of innate immune systems in relation to virus infections	N	Y	3	4	12
Components & functions of Humoral adaptive immune responses in relation to virus infections	N	Y	3	4	12
Components & functions of Cellular adaptive immune responses in relation to virus infections	N	Y	3	4	12
Virus strategies to evade host immune responses	N	Y	3	4	12

Virus strategies to harm immune responses	N	Y	3	4	12
Immune responses which influence pathogenesis of viral disease	N	Y	3	4	12
Mechanisms of antigen processing & recognition by humoral & cellular adaptive immune response	N	Y	3	3	9
Antivirals					
Current guidelines on antiviral drugs - SA DOH EDL/STG	Y	N	3	4	12
Appropriate selection of antivirals based on clinical presentation & results of other investigations	Y	N	3	4	12
Mechanisms of action of antivirals	Y	N	3	4	12
Drug Interactions	N	Y	3	4	12
Antiviral use in immunocompetent, immunocompromised, neonate, infant & child, pregnant, elderly	N	Y	3	4	12
Empirical antiviral use for common infections & syndromic presentations	N	Y	3	4	12
Dose, route of administration, duration of treatment, adverse effects & compliance	Y	N	3	4	12
Safety – contraindications, side effects, monitoring, clinical features of toxicity, use in allergy, individuals with	Y	N	3	4	12
Mechanisms of resistance to antiviral.	N	Y	3	4	12
Genotypic tests for resistance.	N	Y	3	4	12
Using alternative drugs when resistance appears	N	Y	3	4	12
Viral Vaccines					
Classification of licensed viral vaccines in SA	Y	N	3	4	12
Use of licensed viral vaccines in SA	Y	N	3	4	12

Annexure 3 FCPath(SA)Virology Blueprint January 01 2021

Topics	P1	P2	Rel	Imp	IF
Advantages & disadvantages of vaccine design - attenuated, inactivated, recombinant, DNA, RNA, Vectors	N	Y	3	4	12
SA & WHO schedules for vaccination against viral diseases- EPI	Y	N	3	4	12
Vaccination protocols for patients with reduced immunity	N	Y	3	4	12
Use of vaccines in PEP e.g. Rabies, HAV, HBV	Y	N	3	4	12
Use of vaccines to boost pre-existing immunity e.g. VZV	Y	N	3	4	12
Safety profiles of vaccines & adverse effects	N	Y	3	4	12
Effects of vaccination on a population e.g. herd immunity, age shifts in natural infection	N	Y	3	4	12
Active & passive immunisation in prevention	N	Y	3	4	12
Active & passive immunisation in managing outbreaks	N	Y	3	4	12
Effects of vaccination on viruses e.g. antibody selection pressure	N	Y	3	4	12
Assays testing for immunity pre- & post-vaccination: available methods & limitations	N	Y	2	3	6
Initiatives in vaccine development against viruses such as CMV, HSV, HIV, HCV	N	Y	3	4	12
Mechanisms underlying vaccine-induced pathology	N	Y	3	4	12
Immunoglobulins					
Current guidelines on using IGs in practice for prophylaxis	N	Y	3	4	12
Safety of IGs	N	Y	3	4	12
Dose, route of administration, interactions with vaccines, adverse effects	N	Y	3	4	12
HIV Basics					
Pathogenesis	N	Y	3	4	12
Epidemiology - prevalence & incidence, national surveillance	Y	Y	3	4	12
Risks of transmission following sexual & non-sexual exposure - strategies for risk reduction	Y	Y	3	4	12
Clinical features - disease staging – AIDS related infections & diseases	Y	Y	3	4	12
Natural history, complications, morbidity & mortality, prognosis	Y	Y	3	4	12
Risk reduction for OIs - chemoprophylaxis & vaccination	N	Y	3	4	12
Management of viral coinfections such as Herpesviruses, HPV, Parvovirus, EBV, CMV, HHV8, JCV	N	Y	3	4	12
HIV Laboratory Testing					
Current diagnostic & monitoring techniques - clinical utility	Y	Y	3	4	12
Appropriate test selection at different stages of infection	Y	Y	3	4	12
Interpret tests, significance of results & limitations - False positive & negative results	Y	Y	3	4	12

HIV POCT	Y	Y	3	4	12
HIV ELISA	Y	Y	3	4	12
HIV PCR & EID	Y	Y	3	4	12
HIV VL	Y	Y	3	4	12
ART drug resistance testing	Y	Y	3	4	12

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Topics	P1	P2	Rel	Imp	IF
HIV Prevention					
Rationale & appropriate drug regimens for PREP/PEP	Y	Y	3	4	12
International & National guidance PEP/PREP	Y	Y	3	4	12
PEP/PREP in pregnant women, MSM, sex workers, sexual assault, occupational exposures	Y	Y	3	4	12
Occupational restrictions & risks associated with HIV-infected HCWs	N	Y	3	4	12
ARTs in PMTCT	Y	Y	3	4	12
ART resistance - possible source virus resistance to certain ARTs	N	Y	3	4	12
HIV ART					
SA DOH Guidelines	Y	Y	3	4	12
WHO Guidelines	Y	Y	3	4	12
Mechanism of action, dosage, dosing, toxicity	Y	Y	3	4	12
Pharmacokinetics & Pharmacodynamics	N	Y	3	4	12
Monitoring using viral load	Y	Y	3	4	12
Other tests used in monitoring response & in informing use of ARTs	N	Y	3	4	12
Mechanisms of resistance & cross resistance	Y	Y	3	4	12
Genotypic resistance testing - interpretation	Y	Y	3	4	12
Management of patients with virological failure & causes of failure	Y	Y	3	4	12
Management of ART drug interactions	Y	Y	3	4	12
HIV-Hepatitis Coinfection					
Epidemiology of viral hepatitis including hepatitis A, B,C,D,E	Y	N	3	4	12
Natural history of HBV in HIV infection - complications, morbidity, mortality, prognosis	Y	N	3	4	12
Screening & vaccination against HAV & HBV	Y	N	3	4	12

Problems with interpreting laboratory tests	N	Y	3	4	12
Initial assessment & monitoring of HBV	N	Y	3	4	12
Antiviral treatment of HBV & impact on ART	N	Y	3	4	12
Use resistance data resources to inform treatment decisions	N	Y	3	4	12
Side effects of treatment regimens	N	Y	3	4	12
Safely starting & stopping ART & therapy for HBV	N	Y	3	4	12
Viral Hepatitis					
Natural history of HAV, HBV, HDV, HCV HEV infections in immunocompetent & immunocompromised children &	Y	N	3	4	12
Epidemiology HBV & HAV in Africa & SA	Y	N	3	4	12
Effects of other viruses on chronic viral hepatitis	N	Y	3	4	12
Prevention - vaccination, PMTCT, HCW risk reduction, nosocomial spread of HBV & HCV - renal dialysis	Y	N	3	4	12
Approach to suspected acute viral hepatitis – differential diagnosis, investigations & management	Y	N	3	4	12
Topics	P1	P2	Rel	Imp	IF
Testing & Treating Chronic Viral Hepatitis B & C					
Laboratory tests used in diagnosis & monitoring of viral hepatitis - POCTs, ELISAs, PCRs	N	Y	3	4	12
Significance of test results & limitations.	N	Y	3	4	12
Interpret ELISAs & molecular tests including false positive & negative results	Y	N	3	4	12
Treatment of patients with chronic viral hepatitis	N	Y	3	4	12
Diagnostic work-up	N	Y	3	4	12
Current treatment options for HBV	N	Y	3	4	12
Antivirals - mechanism of action, dosage, dosing, toxicity, compliance	N	Y	3	4	12
Monitoring treatment responses using viral load & reasons for detectable viral loads	N	Y	3	4	12
Management of side effects & appropriate adjustments to treatment	N	Y	3	4	12
Management of antiviral interactions with other drugs especially ART	N	Y	3	4	12
Safely starting & stopping antivirals	N	Y	3	4	12
Treatment options for HBV & HCV in development, including immunomodulatory drugs, direct-acting antivirals	N	Y	3	4	12
Management of patient with a liver transplant & control of viral hepatitis in these patients	N	Y	3	4	12
Drug Resistance data in informing treatment decisions	N	Y	3	4	12
Management of HBV in immunocompromised - strategies for preventing & managing HBV reactivation	N	Y	3	4	12
Rabies					

Classification of Rabies & Rabies related viruses especially those isolated in SA	Y	N	3	4	12
Epidemiology of human rabies in SA - cycles in animal vectors, transmission to humans	Y	N	3	4	12
Pathogenesis & immune responses	N	Y	3	4	12
Exposure Management - wound care, RIG & vaccine - administration schedule, timing, dosage, route of administration & handling of source animal	Y	N	3	4	12
Clinical features & natural history of rabies in humans.	Y	N	3	4	12
Investigation of patient with suspected rabies - specimen types & available assays, interpretation of results.	Y	N	3	4	12
Management of a patient with suspected & confirmed rabies	Y	N	3	4	12
Post-mortem diagnosis of rabies in humans	Y	N	3	4	12
Prevention – PREP & PEP	Y	N	3	4	12
Polio					
Physical properties, structure, classification, genetics	N	Y	3	4	12
Epidemiology – transmission, age, SA, Global	Y	N	3	4	12
Clinical features – natural history, risk factors, post-polio syndrome, diagnosis, management	Y	N	3	4	12
Clinical approach to a child with AFP	Y	N	3	4	12
Pathogenesis	N	Y	3	4	12
Laboratory testing	N	Y	3	4	12

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Topics	P1	P2	Rel	Imp	IF
Polio Vaccines					
OPV – types – mOPV, bOPV, tOPV	Y	N	3	4	12
OPV – VAPP & reversion	N	Y	3	4	12
OPV – molecular basis of VDPVs (c,i,a)	N	Y	3	4	12
IPV	Y	N	3	4	12
Advantages vs disadvantages	Y	N	3	4	12
Safety & efficacy – vaccine immune responses	N	Y	3	4	12
Switching from OPV to IPV, using both vaccines	N	Y	3	4	12
Polio Eradication					
Elimination vs Eradication	Y	N	3	4	12
AFP surveillance, stool adequacy, vaccine coverage, uptake	Y	N	3	4	12

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Viral GE					
Classification of viruses which cause GE in Africa & SA	Y	N	3	4	12
Epidemiology of viral GE including patterns of outbreaks, patterns of endemic infections	Y	N	3	4	12
Prevention – rotavirus vaccine impact on incidence & prevalence patterns	N	Y	3	4	12
VHFs					
Classification of viruses which cause clinical spectrum of fever, arthritis, rash &/or encephalitis & VHFs common in Africa & SA	Y	N	3	4	12
Epidemiology - transmission routes, vectors, ecology, surveillance, outbreaks in Africa	Y	N	3	4	12
WHO, NICD & NDOH Guidelines	Y	N	3	4	12
Pathogenesis	N	Y	3	4	12
Patient screening in healthcare facilities during an outbreak, movement of suspected & confirmed cases	Y	N	3	4	12
Clinical presentation - suggestive clinical features & differential diagnosis	Y	N	3	4	12
Natural history, complications, morbidity & mortality, prognosis	Y	N	3	4	12
Reporting & notification of suspected VHF using Notifiable Medical Conditions (NMC)	Y	N	3	4	12
IPC - PPE, isolation, design of isolation units, disinfection, waste management & environmental hygiene	Y	N	3	4	12
Specimen handling - collection, packaging, transport	Y	N	3	4	12
Case Investigation	Y	N	3	4	12
Specimen handling in laboratory on site - precautions & performing clinical pathology essential testing	N	Y	3	4	12
Role of NICD & BSL-4 facility in laboratory diagnosis	N	Y	3	4	12
Patient Management	Y	N	3	4	12
Post-mortem	N	Y	3	4	12
Managing Exposures	N	Y	3	4	12
Staff Monitoring & surveillance of contacts	N	Y	3	4	12

Topics	P1	P2	Rel	Imp	IF
Viral RTIs					
Classification of viruses which cause RTIs in SA - influenza, RSV, coronaviruses	Y	N	3	4	12
Epidemiology - transmission routes, impact of vaccination on disease patterns	N	Y	3	4	12
Vaccines – Influenza, SARS CoV-2	N	Y	3	4	12
Outbreaks/Epidemics vs Pandemics	Y	N	3	4	12
Approach to upper & lower RTIs - clinical features, differential diagnosis, antiviral treatment	Y	N	3	4	12
Natural history, complications, morbidity & mortality, prognosis	Y	N	3	4	12
Pathogenesis	N	Y	3	4	12
Laboratory testing of Respiratory Tract specimens	N	Y	3	4	12
Skin & Mucous Membranes					
Classification of viruses which cause skin & mucous membrane Infections in SA	Y	N	3	4	12
Epidemiology including transmission routes, impact of vaccination on disease patterns	N	Y	3	4	12
Vaccines – measles, rubella, VZV	Y	N	3	4	12
Measles Outbreaks, Surveillance, Elimination & Eradication	N	Y	3	4	12
Outbreaks of skin rashes	N	Y	3	4	12
Approach to skin & mucous membrane lesions - natural history, clinical features, differential diagnosis, antivirals	Y	N	3	4	12
Pathogenesis	N	Y	3	4	12
Laboratory testing of skin &/or mucous membrane biopsy, blood & other specimens	N	Y	3	4	12
CNS Infections					
Classification of viruses which cause CNS diseases in Africa & South Africa	Y	N	3	4	12
Approach to meningitis, encephalitis - natural history, clinical features, differential diagnosis, antivirals, prognosis	Y	N	3	4	12
Pathogenesis	N	Y	3	4	12
Laboratory testing of CSF, blood & other specimens	N	Y	3	4	12
Classification & causes of chronic CNS diseases	N	Y	2	3	6
Gentital Infections					
Classification & Epidemiology of viruses which cause STIs in SA	Y	N	3	4	12
Approach to viruses which cause STIs such as HSV, HPV	Y	N	3	4	12

Pathogenesis of HPV infections such as warts & cervical carcinoma	N	Y	3	4	12
Pathogenesis of HSV	N	Y	3	4	12
Interaction of HIV & HSV	N	Y	3	4	12
Interaction of HIV & HPV	N	Y	3	4	12
Laboratory testing of genital specimens such LBC & other specimens	N	Y	3	4	12
Management including use of antivirals	N	Y	3	4	12
Topics	P1	P2	Rel	Imp	IF
Infections in pregnant women, fetus & neonate					
Classification of viruses which cause infections in Africa & SA	Y	N	3	4	12
Pathogenesis	N	Y	3	4	12
Epidemiology - prevalence & incidence, national surveillance	N	Y	3	4	12
Approach – differential diagnosis, investigations & management	N	Y	3	4	12
Natural history, complications, morbidity & mortality, prognosis	N	Y	3	4	12
Laboratory Testing	N	Y	3	4	12
Prevention - IPC, Vaccination	N	Y	3	4	12
Cardiac Infections					
Classification of viruses which cause infections in Africa & SA	Y	N	2	3	6
Pathogenesis	N	Y	2	3	6
Approach – differential diagnosis, investigations	N	Y	2	3	6
Natural history, complications, morbidity & mortality, prognosis	N	Y	2	3	6
Laboratory Testing	N	Y	2	3	6
Eye Infections					
Classification of viruses which cause infections in Africa & SA	Y	N	2	3	6
Pathogenesis	N	Y	2	3	6
Epidemiology - prevalence & incidence	N	Y	2	3	6
Approach – differential diagnosis, investigations & management	N	Y	2	3	6
Natural history, complications, morbidity, prognosis	N	Y	2	3	6
Laboratory Testing	N	Y	2	3	6

Infections in Immunocompromised Patients (not due to HIV)					
Classification of viruses which cause infections	N	Y	2	4	8
Causes of primary & secondary immune deficiencies	N	Y	2	4	8
Assays for diagnosis & monitoring viral infections	N	Y	2	4	8
Management of viral infections in patients with immunodeficiency	N	Y	2	4	8
Infection risks in immunocompromised & reducing risk - active & passive vaccination & antiviral prophylaxis	N	Y	2	4	8
Using antivirals & IGs - monitoring treatment response, antiviral adverse effects	N	Y	2	4	8
Preventing & treating viral infections in patients with: malignancy, organ transplants, bone marrow transplants, chronic diseases associated with immune deficits due to disease process &/or management with immunosuppressives	N	Y	2	4	8
Travel Related Infections					
Epidemiology - geographical patterns, risk factors	N	Y	2	4	8
Clinical features of imported diseases - VHF, zoonotic & arboviral infections	N	Y	2	4	8
Current guidelines & information resources e.g. vaccination guides, websites	N	Y	2	4	8

Topics	P1	P2	Rel	Imp	IF
Approach – travel history, differential diagnosis, investigations & management, individual traveller risk assessment, specific risk groups (e.g. elderly, immunosuppressed), hazards of specific types of travel	N	Y	2	4	8
Availability, benefits & limitations of specialised diagnostic tests - selection & interpretation	N	Y	2	4	8
Use, availability, efficacy & safety of relevant vaccines	N	Y	2	4	8
Guidelines - International & National	N	Y	2	4	8
Emerging & Re-emerging Viral infections - influenza, coronaviruses, arboviruses					
Classification of viruses which cause infections in Africa & SA	Y	N	3	4	12
Pathogenesis	N	Y	3	4	12
Epidemiology - prevalence & incidence	N	Y	3	4	12
Origins, Evolution, Diversity	N	Y	3	4	12
Ecology & environmental factors	Y	N	3	4	12
Human Factors	Y	N	3	4	12
Viral Factors	Y	N	3	4	12
Clinical approach – differential diagnosis, investigations & management	Y	N	3	4	12
Natural history, complications, morbidity & mortality, prognosis	Y	N	3	4	12
Laboratory Testing	N	Y	3	4	12
Prevention - IPC, Vaccination	N	Y	3	4	12
Occupational Health					
International & SA Guidelines - occupational health issues in virology (HBV, HCV, HIV, rubella & VZV)	Y	N	3	4	12
Recommendations for vaccination of healthcare workers	Y	N	3	4	12
Prevention in HCWs - standard precautions, prevention of sharps/splash exposures, safe injection practices, source & protective isolation, aseptic non-touch technique	Y	N	3	4	12
Management of HCWs following accidental exposure to blood borne viruses - PEP, follow-up protocols,	Y	N	3	4	12
Relevant legislation which focuses on HIV/AIDS	N	Y	3	4	12
Laboratory Health & Safety					
Laboratory bio-safety level criteria - principles of universal precautions, hazard groups & containment levels	Y	N	3	4	12
Laboratory hazards & precautions against them	Y	N	3	4	12
Handling of category 3 & 4 viruses	Y	N	3	4	12

Safe transport of infectious biological material & current requirements for specific diseases - hepatitis, HIV, VHF	N	Y	3	4	12
Principles of Biological safety cabinets - decontamination & monitoring air flow	N	Y	3	4	12
Procedures for virological waste disposal.	N	Y	3	4	12
Viral Serology					
Principles of ELISA antibody detection	Y	N	3	4	12
Principles of ELISA antigen detection	Y	N	3	4	12
ELISA performance characteristics, effect of different antigen types e.g. recombinant, whole virus lysate	N	Y	3	4	12

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Topics	P1	P2	Rel	Imp	IF
ELISA components - substrates, antigens, antibodies, enzymes	Y	N	3	4	12
Advantages & disadvantages of different ELISA formats	Y	N	3	4	12
Factors which influence ELISAs eg IgM assays	N	Y	3	4	12
Clinical utility of current diagnostic & monitoring techniques	Y	N	3	4	12
Selection of tests based on clinical profiles	Y	N	3	4	12
Significance of results & limitations including false positive & negative results	Y	N	3	4	12
Interpreting & integrating confirmatory assay results of antigen, antibody & combined antigen/antibody	N	Y	3	4	12
Interpreting & integrating additional serological &/or molecular assay results	N	Y	3	4	12
Assay verification - quality control parameters	N	Y	3	4	12
Molecular Virology					
Principles of amplification assays such as PCR, NASBA	Y	N	3	4	12
Qualitative PCR	Y	N	3	4	12
Quantitative PCR	Y	N	3	4	12
Differences between Qualitative & Quantitative PCR	Y	N	3	4	12
Optimizing PCR - design primers, set up & trouble shoot new PCR assays	N	Y	3	4	12
Components of PCR	Y	N	3	4	12
PCR performance characteristics	N	Y	3	4	12
Real time PCR	Y	N	3	4	12

Topics	P1	P2	Rel	Imp	IF
IPC					
Principles of IPC in healthcare settings applied to viral infections	Y	N	3	4	12
National & international guidelines for IPC in healthcare settings	Y	N	3	4	12
Principles of IPC in community eg nursing homes, hospices, child care facilities etc	N	Y	3	4	12
Principles of patient isolation including various sterilisation & disinfection processes	Y	N	3	4	12
IPC procedures required to contain viruses in healthcare settings	Y	N	3	4	12
Infection chain - virus, reservoir (patient, HCW, environment), portal of exit & entry, transmission route, host risk factors	Y	N	3	4	12
Principles of environmental control - cleaning, disinfection, sterilization of patient care equipment	N	Y	3	4	12
Potential for virus transmission in clinical settings - air circulation & ventilation in isolation facilities	N	Y	2	4	8
Advantages & disadvantages of different PCR formats	Y	N	3	4	12
Effect of different factors on quality of PCR results	N	Y	3	4	12
Laboratory design & workflow to minimise amplicon contamination	Y	N	3	4	12
Clinical utility of current diagnostic & monitoring techniques	Y	N	3	4	12
Selection of tests based on clinical profiles	Y	N	3	4	12
Significance of results & limitations including false positive & negative results	Y	N	3	4	12
Interpreting & integrating additional molecular &/or serology results	Y	N	3	4	12
Epidemiology					
Patterns - SA vs Global, Geographic, Climate, Age, Gender, Occupation, Medical Risk Factors	Y	N	3	4	12
Sero-epidemiology	N	Y	3	4	12
Molecular Epidemiology	N	Y	3	4	12
Reservoirs, sources, routes of transmission of viruses implicated in community acquired infections	Y	N	3	4	12
Reservoirs, sources, routes of transmission of viruses implicated in hospital acquired infections	Y	N	3	4	12
Interactions between host, environment & viruses	Y	N	3	4	12
Epidemiology of vaccine preventable viral diseases	N	Y	3	4	12

P1=Paper 1 P2=Paper 2 Rel=Relevance Score Imp=Implication Score IF=Impact Factor

Box 1: Impact Factor Criteria		
Relevance Score	Explanation	Score
Very relevant	Common (daily to weekly)	3
Relevant	Frequent (weeks to 6 months)	2
Not so relevant	Rare (more than 6 months)	1
Implication Score		
Essential	Immediate impact on patient care	4
Important	Delayed impact on patient care	3
Additional	Little impact on patient care	2
Nice to know	No impact on patient care	1

- Box 2: Calculation**
1. Impact Factor (IF) = Relevance Score x Implication Score
 2. Add up all IFs
 3. Divide IF of section by sum of IFs
e.g. $12/63 = 0.19$
 4. Decide on total number of MCQs in test e.g. 100
 5. Multiply relative weight of a section by total MCQs
(0.19×100).
 6. Contribution required: 19 Questions

JOHANNESBURG
January 2022