

Semester II Biomedicine Exam

TIME ALLOWED: 120 minutes

Please read each question carefully.

If you do not understand a term or a question please ask your supervisor.

Always keep exam papers and clinic sheets in your file.

All marks are provisional until ratified by the CNM Exam Board

Student name:	
Campus location:	
Date:	
Student signature:	

Grade awarded:	/ 100
Comments:	
Marker (1):	
Marker (2):	

1) a) List FOUR functions of the kidneys (2 marks)

b) Explain what is meant by the 'renal hilum' (1 mark)

2) a) Describe the function of the 'renal corpuscle' (1 mark)

**b) In the space below, draw a simple diagram of a nephron (1 mark).
You should then label the: Collecting duct (1/2 mark), glomerulus (1/2 mark),
proximal convoluted tubule (1/2 mark)**

c) Through what investigation procedure would the GFR be calculated? (1/2 mark). What would be considered an average GFR in females? (1/2 mark)

3) Explain how 'Angiotensin II' elevates blood pressure (1 mark)

4) A 50 year old female patient presents to you complaining of recurrent cystitis.

a) Explain why cystitis is more common in women (1 mark)

b) List FOUR symptoms of cystitis (2 marks)

c) List TWO substances that might be elevated on a urine dipstick analysis in cystitis (1 mark)

5) Name the THREE main layers of the uterine wall (1.5 marks)

b) Explain the hormonal changes that occur to induce ovulation (1 mark)

c) Describe the role of the corpus luteum (2 marks)

6) a) One hormone produced by the placenta is 'progesterone'. Name TWO other hormones produced by the placenta and explain their functions during pregnancy (1 mark)

b) Explain what is meant by a 'placenta praevia' (1 mark)

7) a) Other than their flagella (tail), describe how 'spermatozoa' are designed to enable their 'movement' through the female reproductive system (1 mark)

b) Name the structure in the testes that act as the site of spermatogenesis (1 mark)

8) A 26 year old female patient presents to you complaining of heavy menstrual bleeding and dyspareunia. The patient reports that her sister suffers from polycystic ovarian syndrome (PCOS).

a) Explain what is meant by 'dyspareunia' (1 mark)

b) You consider endometriosis in your differential diagnosis. Explain why women experience symptoms in endometriosis (1 mark)

c) List FOUR symptoms of PCOS (1 mark)

d) List TWO findings on a blood test that would indicate PCOS (1 mark)

9) a) Explain what is meant by the Central Nervous System (1 mark)

b) Complete the following table describing the effects of sympathetic nervous system stimulation on different anatomical structures (1.5 marks)

Structure	Sympathetic Nervous System activity
Adrenal glands	Releases adrenaline & Noradrenaline
Bronchioles	
Pupils	
Digestive tract	

10) a) In the space below, draw a 'neuron' and label FOUR key components (2 marks)

b) Explain what is meant by the 'resting potential'. You should consider any relevant ions and charges in your response (2 marks)

c) Describe the movement of ions that occurs in 'depolarisation' (1 mark)

11) A 40 year old female patient presents to you in the CNM clinic. She reveals that she is undergoing investigations by a neurologist for suspected multiple sclerosis (MS). The patients grandfather suffers from Parkinson's disease.

a) Describe what happens pathologically in MS (1 mark)

b) List FOUR symptoms of MS (2 marks)

c) Name the region of the brain affected by Parkinson's disease (1 mark)

d) Compare the common distribution (*location and progression*) of weakness and paralysis as seen in Motor Neuron Disease (MND) and Guillain-Barre Syndrome (1 mark)

12) a) Name the THREE layers of the meninges (1.5 marks)

b) Describe where cerebrospinal fluid (csf) is located within the layers of the meninges (1 mark)

c) List TWO functions of cerebrospinal fluid (1 mark)

13) a) Describe the main function of the ‘thalamus’ (1 mark)

c) Describe what information is carried by the ‘spinothalamic tract’ (1 mark)

c) Explain what you might observe about a patient with cerebellar disease (1 mark)

14) For each cranial nerve, state ONE function (2 marks)

Cranial Nerve	Function
Optic Nerve	
Hypoglossal Nerve	
Trigeminal Nerve	
Oculomotor Nerve	

15) A 46 year old male patient presents to you complaining of a headache that is gradually worsening. The patient has suffered from associated vomiting over the last couple of days. You are initially concerned about the possibility of raised intracranial pressure.

a) List TWO possible causes of raised intracranial pressure (1 mark)

b) State ONE question you could ask the patient about the headaches aggravating factors, to determine the likelihood of raised intracranial pressure. Explain what response you would be looking to receive if this was the case (1 mark)

c) Explain how ophthalmoscopy might assist in assessing the potential presence of raised intracranial pressure (1 mark)

d) You decide to perform a plantar (cutaneous) response on the patient. Describe the response you might observe if the patient has raised intracranial pressure (1 mark)

16) a) List FOUR features of the first line of immune defence (2 marks)

b) Explain the general difference between the second and third line of defence (1 mark)

c) Describe the function of the following: (3 marks)

Defence	Function
Interferons	
Transferrin's	
Fever	

17) 'Heat' and 'pain' are common signs of inflammation. List TWO other cardinal signs of inflammation (1 mark)

18) Explain how 'antigen presentation' leads to the formation of immunological memory. You should consider all relevant physiology in your response (3 marks)

19) A 39 year old female patient presents to you at the CNM clinic complaining of fatigue, malaise and joint pains. You consider systemic lupus erythematosus in your differential diagnosis.

a) List TWO other signs and/or symptoms of systemic lupus erythematosus (1 mark)

b) Compare the joint involvement as seen in systemic lupus erythematosus and rheumatoid arthritis (1 mark)

c) Name the gene that is present in 95% of patients with ankylosing spondylitis (1 mark)

20) a) Explain what is meant by a 'commensal' microbial relationship (1 mark)

b) "All microbes are pathogenic" – discuss whether you agree with this statement and explain your reasons why (1 mark)

c) Explain what is meant by a 'nosocomial infection' (1 mark)

21) Describe how viruses replicate themselves (1 mark)

b) Explain why viruses are difficult for our bodies to identify and destroy (2 marks)

c) State the cell/s that are targeted by the Human Immunodeficiency Virus (HIV) (1 mark)

22) A 45 year old male patient presents to you complaining of white plaques around the oral cavity. The patients father has previously suffered from diphtheria.

a) You suspect the patient might have oral candidiasis. Name the microbe that frequently causes oral candidiasis (1 mark)

b) Explain TWO reasons a patient might develop a candida infection (1 mark)

c) What might you observe when looking inside a patients oral cavity with diphtheria (1 mark)

23) Explain the difference between chicken pox and shingles. You should consider the cause and presentation in your response (2 marks)

24) a) Describe FOUR features of a malignant tumour (2 marks)

b) Explain why a malignancy with a TNM score of T1 N1 M0 will likely have a better prognosis than a TNM score of T1 N1 M1 (1 mark)

c) Explain what is meant by 'palliative care' (1 mark)

25) Name one tumour marker that might be useful in diagnosing the following pathologies:

a) Ovarian cancer (1 mark):

b) Prostate cancer (1 mark):

26) Describe the appearance of each of the following skin cancer lesions (1 mark)

Type of skin cancer	Appearance of lesion
Basal cell carcinoma	
Melanoma	

27) A 68 year old male patient presents to you complaining of a worsening cough that has not yet been medically investigated. The patient has smoked heavily for 40 years. You initially consider the possibility of lung cancer.

a) State FOUR other signs and/or symptoms of lung cancer (2 marks)

b) Lung cancer is often treated in conventional medicine with chemotherapy. Explain why these patients might experience recurrent infections and suffer with fatigue (1 mark)

c) Name ONE malignancy that often presents as painless haematuria and has a prominent association with cigarette smoking (1 mark)

28) a) Indicate the age group most commonly affected by primary osteosarcomas (1 mark)

b) Describe the character/nature of symptoms that patients may experience with an osteosarcoma (1 mark)

29) a) Describe the function of the tympanic membrane (1 mark)

b) Name the cranial nerve involved in providing information about hearing and balance (1 mark)

c) Name the bones of the inner ear that play a role in balance (1 mark)

d) List TWO causes of otitis externa (1 mark)

30) a) The eyeball is formed of three layers. The outer layer of the eyeball is formed of the 'sclera' and 'cornea'. Name the inner TWO layers (1 mark)

b) Briefly describe the function of the 'lacrimal gland' (1 mark)

c) Name TWO structures of the eye that assist in refraction of light (1 mark)

d) Explain what the 'optic disc' is formed of (1 mark)

e) Name the location where most cone cells are located (1 mark)

31) A patient presents to you and reports that they are currently undergoing investigations for glaucoma. The patient has been experiencing worsening eye pain. The patient is particularly concerned about her eye symptoms after her husband suffered a retinal detachment last year.

a) Explain what is meant by 'glaucoma' (1 mark)

b) List TWO other symptoms of glaucoma (1 mark)

c) Describe the symptoms associated with a retinal detachment (1 mark)

**THE END
Total 100 marks**