UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION

MARCH 2025 SEMESTER

COURSE CODE	:	HDB21004
COURSE TITLE	:	BASIC AND SYSTEMIC PATHOLOGY
PROGRAMME NAME	:	BACHELOR OF BIOMEDICAL SCIENCE (HONOURS)
DATE	:	01 JULY 2025
TIME	:	9:00AM - 12:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

THERE ARE 16 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. A patient with a history of lymphoma achieves remission after chemotherapy. However, a few months later, the patient experience a recurrence of the lymphoma whereby cancer cells begin to proliferate again, leading to the reappearance of detectable disease. This recurrence would be best described as a _____.

   A. recovery

   B. refractory disease

   C. relapse

   D. complication

2. A 45-year-old man with a long history of alcoholism presents with severe epigastric pain, nausea, vomiting, fever and an increase in serum amylase. During a previous hospitalization for a similar episode, CT scanning demonstrated calcifications of the pancreas. A diagnosis of acute pancreatitis superimposed of chronic pancreatitis was made. In this condition, which of the following types of necrosis is MOST characteristic?

   A. Caseous necrosis

   B. Coagulative necrosis

   C. Fat necrosis

   D. Liquefactive necrosis

3. Apoptosis causes the following EXCEPT

   A. Condensation of chromatin.

   B. Activation of caspases.

   C. Phagocytosis of cell fragment by local macrophages.

   D. Local inflammatory response.

4. A 70-year-old man presents with sudden onset of left-sided weakness, spasticity and hyperactive pathologic reflexes. The most serious consequences of this disorder are the result of damage to neuronal cells which are _____ cells.

   A. stable

   B. permanent

   C. multipotent progenitor

   D. labile

5. What is the primary mechanism by which a transudate forms?

   A. Increased capillary permeability due to inflammation.

   B. Imbalance of hydrostatic and oncotic pressure.

   C. Localized tissue damage and cellular injury.

   D. Bacterial infection.

6. A 55-year-old male with a history of chronic obstructive pulmonary disease (COPD) presents with worsening shortness of breath and ankle swelling. A liver biopsy reveals a characteristic 'nutmeg liver' on gross examination. Which of the following is the MOST likely underlying cause of this liver appearance?

   A. Budd-Chiari syndrome.

   B. Hepatic artery thrombosis.

   C. Acute hepatocellular necrosis.

   D. Chronic venous congestion due to right-sided heart failure.

7. A 'cytokine storm' in septic shock is characterized by high levels of inflammatory cytokines such as TNF, IL-1, and IL-6, leading to a cascade of pathological events. These cytokines can directly result in the following EXCEPT

   A. Systemic vasoconstriction.

   B. Widespread endothelial injury and activation.

   C. Disseminated Intravascular Coagulation (DIC).

   D. Reduced cardiac contractility.

8. A 66-year-old woman presents with a new lung nodule on imaging, and she also has a history of breast cancer. Which of the following is the MOST likely explanation for the lung nodule?

   A. Primary lung cancer.

   B. Metastatic breast cancer.

   C. Fungal infection.

   D. Benign lung tumor.

9. Which of the following is the first stage in the process of carcinogenesis?

   A. Initiation

   B. Progression

   C. Promotion

   D. Regression

10. Which of the following is NOT a hallmark of cancer?

    A. Inducing angiogenesis.

    B. Activating immune responses.

    C. Evading growth suppressors.

    D. Sustaining proliferative signalling.

11. A 60-year-old male presents with a sudden onset of severe headache, fever, and neurological deficits. Imaging reveals a focal area of necrosis in the brain. What is the MOST likely cause of this finding?

    A. Liquefactive necrosis due to bacterial infection.

    B. Fat necrosis due to pancreatitis.

    C. Caseous necrosis due to tuberculosis.

    D. Coagulative necrosis due to ischemia.

12. A 28-year-old woman presents to the clinic with complaints of intense itching, particularly at night. She noticed small red bumps and linear burrows on her fingers, wrists, and between her toes. Her husband and 2-year-old child also have similar symptoms. Based on the clinical presentation, which of the following is the MOST likely diagnosis?

    A. Psoriasis

    B. Verruca plantaris

    C. Urticaria

    D. Scabies

13. A patient presents with scaling and itching between the toes, and the doctor suspects tinea pedis. Which of the following methods would be MOST helpful in confirming the diagnosis?

    A. KOH preparation of skin scrapings.

    B. Biopsy of the affected skin.

    C. Gram stain of skin scrapings.

    D. Bacterial culture of the affected area.

14. Which of the following best describes the role of *Campylobacter jejuni* in Guillain-Barré syndrome (GBS)?

    A. *Campylobacter jejuni* triggers an allergic reaction that leads to nerve damage.

    B. *Campylobacter jejuni* contains surface structures that mimic nerve components, leading to an immune response that damages nerves (molecular mimicry).

    C. *Campylobacter jejuni* produces toxins that directly affect nerve function.

    D. *Campylobacter jejuni* directly destroys nerve cells.

15. Which of the following is the gold standard for confirming the diagnosis of Alzheimer's disease (AD)?

    A. The presence of amyloid plaques and neurofibrillary tangles in brain tissue obtained post-mortem.

    B. A positive result on a cognitive test, such as the Mini-Mental State Examination (MMSE).

    C. A brain scan showing reduced glucose metabolism in specific areas.

    D. A positive blood test for the presence of amyloid beta protein.

16. A 28-year-old woman presents with irregular periods, hirsutism, and acne with oily skin. An ultrasound reveals 'string of pearls' appearance in both ovaries. Based on the clinical presentation and ultrasound findings, which of the following is the most likely diagnosis?

    A. Polycystic ovarian syndrome (PCOS)

    B. Ectopic pregnancy

    C. Endometriosis

    D. Eclampsia

17. Which of the following is the most common etiology of acute pancreatitis?

    A. Idiopathic

    B. Hypertriglyceridemia

    C. Drug abuse

    D. Gallstones

18. Which of the following is a common finding in urinalysis of a patient with nephrotic syndrome?

    A. Proteinuria > 3.5g/day

    B. Hematuria (blood in the urine)

    C. Hypertension with oliguria

    D. Pyuria (pus in the urine)

19. Which of the following is the most common type of renal calculus?

    A. Calcium oxalate

    B. Cystine

    C. Uric acid

    D. Ammonium phosphate

20. A patient has kidney stones that are too large to pass on their own. Which of the following non-surgical procedures uses shock waves to break down the stones into smaller pieces for easier passage?

    A. Percutaneous nephrolithotomy

    B. Extracorporeal shock wave lithotripsy (ESWL)

    C. Cystoscopy

    D. Ureteroscopy

21. A urinalysis reveals the presence of refractile, envelope-shaped crystals in the urine sediment. What is the most likely type of kidney stone this patient has?

    A. Cystine stones

    B. Calcium oxalate stones.

    C. Struvite stones

    D. Uric acid stones

22. A 6-year-old child presents with nephrotic syndrome. A renal biopsy reveals normal glomeruli under light microscopy and no immune deposits. However, electron microscopy shows effacement of podocyte foot processes. What is the most likely diagnosis?

    A. Minimal change disease (MCD)

    B. IgA nephropathy

    C. Focal segmental glomerulosclerosis (FSGS)

    D. Membranous nephropathy

23. What is the most likely cause of edema in nephrotic syndrome?

A. Reduced lymphatic drainage.

B. Decreased colloid osmotic pressure.

C. Increased blood volume.

D. Increased capillary permeability.

24. A 2-year-old child presents with a barking cough, hoarse voice, and noisy breathing (inspiratory stridor). These symptoms are most suggestive of _____.

A. asthma

B. bronchiolitis

C. croup (Laryngotracheobronchitis)

D. pneumonia

25. Which of the following is the primary cause of emphysema?

A. Viral or bacterial infections.

B. Alpha-1 antitrypsin deficiency.

C. Air pollution.

D. Cigarette smoking.

26. Which of the following best describes Curschmann's spirals in the context of asthma pathology?

A. Spiral-shaped crystals formed from eosinophil breakdown products.

B. Clusters of ciliated bronchial epithelial cells.

C. Fungal hyphae found in the airways.

D. Spiral-shaped mucus plugs from subepithelial mucous glands.

27. A patient with cirrhosis presents with jaundice, ascites, and swollen veins in the esophagus. Which of the following is the most likely underlying cause of these symptoms?

    A. Acute hepatitis

    B. Gallstones

    C. Alcoholic pancreatitis

    D. Portal hypertension

28. What is the first-line treatment for uncomplicated gonorrhea infections in adults and adolescents?

    A. Azithromycin

    B. Cefixime

    C. Doxycycline

    D. Ceftriaxone

29. Which of the following best describes the characteristic distribution of Crohn's disease in the gastrointestinal tract?

    A. Inflammation limited to the rectum and sigmoid colon.

    B. Inflammation primarily affecting the stomach and esophagus.

    C. Patchy inflammation with areas of normal mucosa interspersed with diseased areas (skip lesions).

    D. Continuous inflammation involving the entire colon.

30. Which of the following is the most common cause of peptic ulcers?

    A. *Helicobacter pylori* infection

    B. Excessive alcohol consumption

    C. Frequent use of NSAIDs

    D. Stress

31. Celiac disease is best described as _____.

A. an autoimmune disorder triggered by gluten in genetically susceptible individuals

B. a bacterial infection of the small intestine leading to severe fluid loss

C. an allergy to wheat, barley, and rye

D. a purely genetic condition

32. Which of the following best describes the key histological feature of red hepatization in pneumonia?

A. Alveolar spaces filled with neutrophils, red blood cells, and fibrin.

B. Alveolar spaces filled with mucus and inflammatory cells.

C. Alveolar spaces filled with serous exudate and few neutrophils.

D. Alveolar spaces filled with macrophages and lymphocytes.

33. Which type of pneumonia is most commonly associated with contaminated water sources like cooling towers and air conditioning systems?

A. Mycoplasma pneumonia

B. Pneumococcal pneumonia

C. Viral pneumonia

D. Legionella pneumonia

34. Which of the following is NOT a common symptom of rhinitis?

A. Nasal congestion

B. Chest pain

C. Sneezing

D. Runny nose

35. Which of the following is a common treatment for aortic coarctation?

A. Aortic valve replacement

B. Mitral valve repair

C. Balloon angioplasty

D. Coronary artery bypass grafting

36. What is the primary mechanism by which stable angina causes chest pain?

A. Increased myocardial contractility.

B. Increased oxygen consumption by the heart.

C. Inflammation of the heart muscle.

D. Reduced blood flow to the heart muscle.

37. Tetralogy of Fallot is characterized by which of the following typical pathological features?

I. Ventricular septal defect
II. Pulmonary valve stenosis
III. Overriding aorta
IV. Right ventricular hypertrophy
V. Left ventricular hypertrophy

A. I, III, IV and V only.

B. I and II only.

C. I, II, III and IV only.

D. II, III and V only.

38. Dilated cardiomyopathy is characterized by _____.

A. enlargement of the heart's chambers

B. thickening of the ventricular walls

C. stiffening of the heart muscle

D. replacement of muscle tissue with fat

39. Which of the following is the most common cause of stable angina?

    A. Pericarditis

    B. Coronary artery spasm

    C. Aortic valve stenosis

    D. Atherosclerotic plaque buildup in coronary arteries

40. What is the primary mechanism of action for proton pump inhibitors (PPIs) in treating gastroesophageal reflux disease (GERD)?

    A. Reducing gastric acid production.

    B. Neutralizing stomach acid.

    C. Increasing LES pressure.

    D. Promoting gastric emptying.

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

A 42-year-old male lecturer at a university presented with muscle weakness affecting mainly his upper limbs, drooping of the left upper eyelid (ptosis), and mild intermittent oropharyngeal symptoms. Over time, there was further worsening of the above complaints, especially after any physical activity. The patient decided to visit a neurology outpatient clinic to address the disabilities. During his appointment with the neurologist, one his blood test findings include presence of high levels of acetylcholine receptor antibodies.

(a) Identify the diagnosis of this patient's disease ('Disease X').

(2 marks)

(b) Identify TWO (2) other symptoms of patients afflicted with 'Disease X'.

(2 marks)

(c) In pathology, differential diagnosis refers to the process of distinguishing between diseases or conditions that share similar signs and symptoms. List TWO (2) differential diagnosis for 'Disease X'.

(2 marks)

(d) Discuss the pathogenesis of 'Disease X'.

(8 marks)

(e) Suggest TWO (2) diagnostic tests for 'Disease X'. Include the purpose and significance of the diagnostic test suggested in your answer.

(6 marks)

Question 2

A 22-year-old woman with a history of childhood fractures and a family history of osteoporosis, including a father with multiple fractures and a sister with osteoporosis, was diagnosed with Osteogenesis Imperfecta (OI) after presenting with low back pain and an L1 vertebral compression fracture. Further investigation revealed severe osteoporosis (OP) in her lumbar spine and femoral neck, and a diagnosis of OI was pursued due to the unusual presentation and family history.

(a) Differentiate between OI with OP in terms of the following:

i. Pathogenesis.

(6 marks)

ii. Lab diagnosis.

(4 marks)

iii. Management & treatment.

(4 marks)

(b) Rheumatoid arthritis (RA) and osteoporosis, while distinct conditions, are closely linked. People with RA are at a significantly higher risk of fractures due to osteoporosis, with studies showing a 30% higher fracture rate compared to the general population.
Describe the pathophysiology of rheumatoid arthritis. Include the role of the synovium, immune cells, and the formation of pannus in your description.

(6 marks)

Question 3

A 32-year-old female experiencing severe pelvic pain, particularly during menstruation, and also exhibiting symptoms like fatigue, weight gain, and sensitivity to cold, potentially indicating both endometriosis and hypothyroidism. Further investigation might reveal a history of infertility, and laboratory tests suggesting Hashimoto's thyroiditis, along with findings of endometrial lesions during a laparoscopy for endometriosis diagnosis.

(a) The pathogenesis of endometriosis is complex and not fully understood, but several theories attempt to explain how it develops. Identify FOUR (4) of the theories.

(4 marks)

(b) Compare Hashimoto thyroiditis with Graves' disease.

(16 marks)

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