

CCE(M)/MDS-I/10/2024

MEDICAL SCIENCE

(PAPER—I)

Time : 3 hours]

[Full Marks : 250

Please read each of the following instructions carefully before attempting the questions :

- (i) There are **eight** questions divided in **two Sections**.
- (ii) Candidate has to attempt **five** questions in all.
- (iii) Question Nos. 1 and 5 are compulsory and out of the remaining, **three** are to be attempted choosing at least **one** question from each Section.
- (iv) The number of marks carried by a question/part is indicated against it.
- (v) Word limit in questions, wherever specified, should be adhered to.
- (vi) Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

SECTION—A

ESTD : 1988

1. Answer **any five** of the following questions :

10×5=50

- (a) Describe the origin, course and distribution of Median nerve in the arm, forearm and hand.
- (b) Describe the embryological development of the interatrial septum and explain the role of the foramen ovale and the fossa ovalis in the development of interatrial septum.
- (c) What are the materials to be preserved in a case of victim of sexual assault?
- (d) What is the normal serum calcium level? How is calcium homeostasis maintained inside our body? Describe briefly any one condition arising out of hypocalcaemia.

- (e) Discuss the classification, mechanism of action, indications and adverse effects of immunosuppressant drugs with a focus on their role in autoimmune diseases and organ transplantation.
- (f) Describe the hormonal regulation and physiological changes during pregnancy.
- (g) Explain the physiological roles, dietary sources and deficiency manifestations of vitamin D.

2. Answer the following questions :

- (a) Describe the anatomy of the brainstem, including its divisions, nuclei and functions. Discuss its clinical significance with reference to brainstem lesions and associated syndromes. 20
- (b) Discuss the pharmacology of antiviral drugs, including their classification, mechanism of action, therapeutic uses and challenges in antiviral therapy. 15
- (c) Describe the physiology of the renal system, including glomerular filtration, tubular reabsorption and secretion and their role in maintaining homeostasis. 15

3. Answer the following questions :

- (a) Discuss the pathology of Systemic Lupus Erythematosus (SLE), including its immunopathogenesis, organ involvement and clinical implications. 20
- (b) Discuss the classification, pathogenesis and laboratory diagnosis of viral hepatitis. 15
- (c) What is Restriction Fragment Length Polymorphism? Write its clinical application. 15

4. Answer the following questions :

- (a) Explain the medico-legal aspects of hanging, including its types, autopsy findings and differentiation from strangulation. 20
- (b) Discuss the pathogenesis, clinical stages, opportunistic infections and laboratory diagnosis of AIDS. 15
- (c) Explain the molecular mechanisms and pathology of carcinogenesis, including the role of oncogenes and tumor suppressor genes. 15

SECTION—B

5. Answer *any five* of the following questions :

10×5=50

- (a) Describe the corticospinal tract under the headings : origin, course, termination and applied aspects.
- (b) Discuss inborn errors of metabolism, with examples of disorders affecting carbohydrate, protein and lipid metabolism.
- (c) Describe the neuromuscular junction, including the mechanism of synaptic transmission and clinical disorders associated with it.
- (d) Define neoplasia. Discuss the differences between benign and malignant tumors with examples.
- (e) Classify hypersensitivity reactions and explain their pathogenesis with examples.
- (f) Classify anticancer drugs and describe the mechanism of action of alkylating agents.
- (g) Describe the Rule of Nines and Lund & Browder chart in estimating the percentage of burns.

6. Answer the following questions :

- (a) A 35-year-old male presents with persistent joint pain, fever and breathlessness. On examination, a mid-diastolic murmur is heard. Investigations reveal elevated ASO titers and mitral valve regurgitation.

10+5+5=20

- (i) Explain the pathogenesis and histopathology of rheumatic heart disease.
 - (ii) Discuss the role of autoimmunity and cross-reactivity in its development.
 - (iii) Describe the long-term complications and management strategies.
- (b) Discuss Thyroid Function Tests (TFTs) and their clinical relevance in thyroid disorders.
- (c) Describe the pharmacology of Artemisinin-based combination therapy (ACT) in malaria treatment.

15

15

7. Answer the following questions :

(a) A neonate is diagnosed with congenital diaphragmatic hernia. 10+5+5=20

- Explain the development of the diaphragm and its congenital anomalies.
- Describe the gross anatomy and applied anatomy of the diaphragm.
- Discuss the clinical significance of diaphragmatic hernias and their management.

(b) A victim is found with gunshot wounds at a crime scene. 5+5+5=15

- Explain the forensic examination of firearm injuries.
- Differentiate between entry and exit wounds in gunshot injuries.
- Discuss the role of gunpowder residue analysis in forensic investigation.

(c) Describe the process of protein synthesis, including transcription, translation and post-translational modifications. 15

8. Answer the following questions :

(a) A child presents with chronic cough, fever and weight loss. Chest X-ray suggests pulmonary tuberculosis. 5+5+10=20

- Discuss the pathogenesis of tuberculosis.
- Explain the histopathological features of tuberculosis, including caseating granulomas.
- Describe the complications of tuberculosis, including miliary TB.

(b) Describe the auditory pathway and explain the tuning fork tests for hearing. 15

(c) Describe the anatomy of the ventricles of the brain and the circulation of cerebrospinal fluid (CSF). Discuss the clinical conditions associated with CSF obstruction. 15



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(PAPER—II)

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SECTION—A

ESTD : 1988

1. Answer **any five** of the following questions :

10×5=50

- (a) Explain the etiology, clinical features, diagnosis and management of Japanese encephalitis, with a focus on vaccination and preventive strategies.
- (b) Classify protein-energy malnutrition (PEM) based on WHO and IAP grading and describe its management principles.
- (c) Describe varicose veins, including causes, clinical presentation, complications and treatment options.
- (d) Describe the clinical presentation, complications and management of Stevens-Johnson syndrome (SJS).
- (e) Discuss postpartum hemorrhage (PPH), its causes, prevention and management.

- (f) Describe briefly Revised National Tuberculosis Control Programme (RNTCP).
- (g) Describe schizophrenia, its symptoms and pharmacological/non-pharmacological management.

2. Answer the following questions :

- (a) A 65-year-old diabetic male, known smoker for 20 years presented in Emergency department with severe central chest pain for two hours, shortness of breath. Write the differential diagnosis. Write in brief how to evaluate and manage a case of acute myocardial infarction. 10+10=20
- (b) A 60-year-old male patient presents with a history of progressive weight loss, early satiety and persistent epigastric discomfort for six months. On examination, he appears pale, with a palpable epigastric mass and left supraclavicular lymphadenopathy. Upper GI endoscopy shows an ulceroproliferative growth in the antrum. A biopsy confirms adenocarcinoma of the stomach. Discuss the clinical presentation, diagnostic workup and surgical management of this patient. 15
- (c) Discuss the Health Care Delivery System in India, highlighting its structure, strengths, challenges and potential reforms for improvement. Discuss how Government initiatives and technological advancements can enhance healthcare accessibility and quality. 15

3. Answer the following questions :

- (a) A 65-year-old hypertensive and diabetic male was brought to the emergency department with a sudden onset of right-sided weakness and slurred speech for the past 3 hours. On examination, he had right-sided hemiplegia, facial asymmetry and dysarthria. His blood pressure was 180/100 mmHg and his blood glucose was 250 mg/dL. A non-contrast CT scan of the brain showed no hemorrhage and an MRI revealed an acute infarct in the left middle cerebral artery (MCAS) territory.

Based on this scenario, answer the following :

5+5+5+5=20

- Discuss the etiology, risk factors and pathophysiology of Cerebrovascular Accidents (CVA).
- Outline the diagnostic approach and the role of imaging in stroke evaluation.
- Explain the acute management of ischemic stroke, including thrombolysis and supportive care.
- What are the complications associated with CVA and how can they be managed?

(b) What are the major causes of maternal mortality in India? List the key Government schemes aimed at reducing maternal mortality. 15

(c) Discuss the etiology, clinical features, diagnosis and management of psoriasis. 15

4. Answer the following questions :

(a) A 30-year-old male is brought to the emergency department after a road traffic accident (RTA). He complains of severe chest pain and breathlessness. On examination, he is tachycardic, hypotensive and has decreased breath sounds on the left side of the chest. A chest X-ray reveals blunting of the costophrenic angle and a dense opacity on the left side.

Answer the following :

5+5+5+5=20

- What are the common causes of hemothorax?
- Describe the clinical presentation and diagnostic approach for hemothorax.
- Discuss the management of hemothorax, including indications for chest tube drainage and surgery.
- What are the potential complications of hemothorax and their management?

(b) Explain the Medical Termination of Pregnancy (MTP), its indications, methods and legal aspects in India. 15

(c) Explain the types, causes and management of diarrhea in children, including ORS therapy and zinc supplementation. 15

SECTION—B

5. Answer any five of the following questions :

10×5=50

(a) Describe the causes, laboratory investigations and treatment of Disseminated Intravascular Coagulation (DIC).

(b) Explain Electroconvulsive Therapy (ECT), including its indications, mechanism and side effects.

(c) Describe the objectives, components and impact of the Reproductive and Child Health (RCH) programme.

(d) Define infertility. Discuss the etiological factors, investigations and management of female infertility.

- (e) Describe Colles' fracture, including its mechanism, clinical features, diagnosis and treatment.
- (f) Explain the Baby-Friendly Hospital Initiative (BFHI), its key steps and its impact on neonatal and maternal health.
- (g) Describe the clinical features, causes, diagnosis and principles of management of cleft lip and cleft palate.

6. Answer the following questions :

- (a) A 55-year-old male with a history of hypertension and type 2 diabetes mellitus presents to the emergency department with decreased urine output, swelling of the legs and confusion for the past two days. He had a recent episode of severe diarrhea and vomiting due to food poisoning. On examination, he is hypotensive (BP : 90/60 mmHg), tachycardic and has dry mucous membranes. Laboratory investigations show elevated serum creatinine (3.5 mg/dL from a baseline of 1.0 mg/dL).

Answer the following :

5+5+5+5=20

- Define Acute Kidney Injury (AKI) and classify its types.
- Discuss the possible causes of AKI and how to differentiate among prerenal, intrinsic and postrenal AKI.
- Describe the clinical features and diagnostic approach to AKI, including the role of blood tests, urinalysis and imaging.
- Outline the management strategies for AKI, including fluid resuscitation, electrolyte correction and indications for dialysis.

- (b) Discuss preeclampsia and eclampsia, their pathophysiology, clinical features and management.

15

- (c) Explain the objectives, target population and challenges in implementing the Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (AB-PMJAY).

15

7. Answer the following questions :

- (a) A 38-year-old woman presents with complaints of irregular and heavy menstrual bleeding for the past six months. She reports prolonged bleeding lasting 8-10 days with excessive flow. She has no history of pain but experiences fatigue and dizziness. There is no significant weight gain, acne or hirsutism. On examination, she appears pale and a bedside hemoglobin test shows 9 g/dL. Pelvic ultrasound reveals a normal uterus with no obvious structural abnormalities.

2+3+5+5+5=20

- Define Dysfunctional Uterine Bleeding (DUB).
- Explain the pathophysiology of DUB.

- Classify Abnormal Uterine Bleeding (AUB) based on the FIGO PALM-COEIN system.
 - Outline the diagnostic approach for this patient.
 - Discuss the treatment options based on the severity of symptoms and the patient's reproductive wishes.
- (b) Discuss the role and impact of the Janani Suraksha Yojana (JSY) in promoting institutional deliveries in India. 15
- (c) Describe the pathophysiology, clinical features and management of Tetralogy of Fallot (TOF), a common congenital cyanotic heart disease. 15
8. Answer the following questions :
- (a) A 45-year-old male presents to the surgical OPD with severe perianal pain, swelling and fever for the past three days. He reports difficulty in sitting and painful defecation. On examination, there is a tender, erythematous and fluctuant swelling near the anal verge, with signs of local inflammation.
- Answer the following : 5+5+5+5=20
- Describe the etiology and risk factors associated with rectal abscess formation.
 - Discuss the clinical presentation and diagnostic approach for rectal abscess.
 - Outline the principles of management, including surgical intervention and postoperative care.
 - What are the possible complications of an untreated rectal abscess?
- (b) Define epidemiology and discuss its principles in disease prevention and control. Explain the different study designs used in epidemiology, highlighting their advantages and limitations. 15
- (c) Define Artificial Intelligence (AI) and its role in healthcare. 15

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