

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2025
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALISATION PAPER FOR NEUROLOGIST

Date	:	October 11, 2025
Total Marks	:	100
Writing Time	:	150 minutes (2.5 hours)
Reading Time	:	15 minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
 Part II - 4 Short Answer Questions
 All questions under SECTION A are **COMPULSORY**.
4. **SECTION B** consists of TWO Question. Answer Both.
5. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
6. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
7. Begin each Section and Part on a fresh page of the Answer Booklet.
8. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
9. Use of any other paper including paper for rough work is not permitted.
10. **You must hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
11. This paper has **11 printed pages**, including this instruction page.

GOOD LUCK

SECTION A

PART I: Multiple Choice Questions [30 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. A 72-year-old man is admitted to the ICU with a dense left hemiparesis and neglect from a large right MCA infarct. On day 3, his level of consciousness declines rapidly. His pupils become unequal (right > left) and he develops extensor posturing. A stat CT head shows significant mass effect with subfalcine and uncal herniation. What is the most urgent intervention?
 - a) Intravenous mannitol and hypertonic saline
 - b) Emergent decompressive hemicraniectomy
 - c) Increase ventilator settings to hyperventilate to a PaCO₂ of 25-30 mmHg
 - d) Insertion of an external ventricular drain (EVD)

2. A 22-year-old boxer is hit with a powerful hook to the head. He remains standing but appears momentarily dazed and confused, though he does not lose consciousness. Minutes later, he develops a severe headache, nausea, and then a rapidly declining level of consciousness. What is the most likely neuropathology?
 - a) Acute subdural hematoma
 - b) Diffuse axonal injury
 - c) Epidural hematoma
 - d) Cerebral contusion

3. A 64-year-old male with HIV (CD4 80), on no ART, presents with subacute headache, cranial nerve VI palsy, and low-grade fever for 2 weeks. CSF shows:
 - WBC 150 (lymphocytic predominance)
 - Protein 120 mg/dL
 - Glucose 30 mg/dL (serum glucose 90)
 - India ink stain positive.MRI reveals basilar meningeal enhancement and multiple small infarcts. What is the most likely causative organism?
 - a) *Cryptococcus neoformans*
 - b) *Mycobacterium tuberculosis*
 - c) *Treponema pallidum*
 - d) *Listeria monocytogenes*

4. A 35-year-old woman presents with recurrent episodes of encephalopathy, psychosis, and seizures. MRI shows T2 hyperintensities in the medial temporal lobes. Serum anti-NMDA receptor antibodies are positive. What is the most likely underlying tumor?
 - a) Ovarian teratoma
 - b) Small cell lung cancer
 - c) Thymoma
 - d) Hodgkin's lymphoma

5. A 25-year-old man presents with acute psychosis, catatonia, and orofacial dyskinesias. MRI shows bilateral basal ganglia necrosis. Serum ceruloplasmin is low. What is the most likely copper metabolism defect?
 - a) Impaired copper incorporation into apoceruloplasmin
 - b) Defective ATP7A-mediated copper transport
 - c) Mutation in COMMD1 (Bedlington terrier mutation)
 - d) Zinc-induced metallothionein sequestration

6. A 48-year-old woman presents with subacute onset of diplopia, dysarthria, and gait instability. Examination reveals bilateral horizontal gaze palsy, facial diplegia, and ataxia. MRI brain shows hyperintensity in the dorsal pons (central pontine myelinolysis pattern), but serum sodium was never deranged. CSF shows elevated protein without pleocytosis. What is the most likely diagnosis?
 - a) Wernicke's encephalopathy
 - b) Osmotic demyelination syndrome
 - c) Pontine autosomal dominant microangiopathy with leukoencephalopathy
 - d) CLIPPERS (Chronic Lymphocytic Inflammation with Pontine Perivascular Enhancement Responsive to Steroids)

7. 25-year-old woman presents with acute-onset quadriplegia, areflexia, and respiratory failure. CSF shows albumin-cytologic dissociation. Nerve conduction studies reveal absent sensory responses and prolonged distal motor latencies. What is the most likely diagnosis?
 - a) Classic Guillain-Barré syndrome (AIDP)
 - b) Acute motor axonal neuropathy (AMAN)
 - c) Bickerstaff brainstem encephalitis
 - d) Acute Motor-Sensory Axonal Neuropathy (AMSAN)

8. A 55-year-old man presents with progressive bulbar palsy, fasciculations, and respiratory failure. EMG shows chronic neurogenic changes. Genetic testing reveals a hexanucleotide repeat expansion in C9ORF72. Which histopathological finding is most expected on autopsy?
 - a) TDP-43 inclusions
 - b) Tau-positive neurofibrillary tangles
 - c) Lewy bodies
 - d) Amyloid plaques

9. A 30-year-old woman presents with bilateral ptosis, ophthalmoplegia, and fatigable weakness. Repetitive nerve stimulation shows decrement. However, anti-AChR/MuSK antibodies are negative. What is the next best diagnostic test?
 - a) Anti-LRP4 antibodies
 - b) Anti-VGCC antibodies
 - c) Anti-GAD65 antibodies
 - d) Anti-GQ1b antibodies

10. A 65-year-old man presents with progressive dysphagia, dysarthria, and tongue atrophy. EMG shows fibrillations and fasciculations in the tongue. MRI brain reveals bilateral T2 hyperintensities in the corticospinal tracts. What is the most likely genetic mutation?
 - a) SOD1
 - b) C9ORF72
 - c) FUS
 - d) TARDBP
11. A 6-year-old with VP shunt for congenital hydrocephalus develops fever, shunt malfunction, and abdominal pain. CSF from shunt tap grows coagulase negative *Staphylococcus* (methicillin-resistant, biofilm producer). What is the most definitive management?
 - a) Vancomycin + rifampin for 14 days
 - b) Shunt removal + EVD placement + IV vancomycin
 - c) Intra-shunt vancomycin flushes + oral linezolid
 - d) Shunt externalization + intraventricular daptomycin
12. A 60-year-old man presents with progressive dysphagia, ptosis, and fatigable weakness. EMG shows decrement on RNS. However, edrophonium test is negative. What is the most likely diagnosis?
 - a) Lambert-Eaton myasthenic syndrome (LEMS)
 - b) Congenital myasthenic syndrome
 - c) Botulism
 - d) Mitochondrial myopathy
13. A 30-year-old man with HLA-B27+ ankylosing spondylitis develops acute bilateral optic neuritis and longitudinally extensive transverse myelitis (LETM). CSF shows neutrophilic pleocytosis. What is the most likely antibody?
 - a) Anti-AQP4
 - b) Anti-MOG
 - c) Anti-GFAP
 - d) Anti-NF155
14. A 50-year-old man with smoldering multiple myeloma develops progressive polyneuropathy, organomegaly, and endocrinopathy. Serum VEGF is elevated. Nerve biopsy shows microvascular endothelial hyperplasia. What is the most likely diagnosis?
 - a) POEMS syndrome
 - b) AL amyloidosis
 - c) CIDP associated with paraproteinemia
 - d) Light chain deposition disease
15. A 35-year-old woman with SLE develops refractory status epilepticus. MRI shows bilateral mesial temporal lobe T2 hyperintensities. CSF reveals lymphocytic pleocytosis and anti-NMDA receptor antibodies. What is the most appropriate treatment?
 - a) High-dose steroids + IVIg
 - b) Rituximab + cyclophosphamide
 - c) Plasmapheresis + anakinra
 - d) Tocilizumab + bortezomib

16. A 50-year-old man presents with subacute dementia, myoclonus, and cortical blindness. EEG shows periodic sharp waves. CSF neurofilament light chain (NfL) is markedly elevated. What is the most likely diagnosis?
- Sporadic CJD
 - Limbic encephalitis
 - Paraneoplastic encephalomyelitis
 - Primary CNS lymphoma
17. A 45-year-old man with chronic alcoholism develops ophthalmoplegia, ataxia, and confusion. MRI shows bilateral medial thalamic and periaqueductal gray matter hyperintensities. Thiamine supplementation leads to partial improvement. What is the most likely underlying biochemical defect?
- Impaired thiamine pyrophosphokinase (TPK) activity
 - Defective transketolase enzyme binding affinity
 - Mitochondrial pyruvate carrier (MPC) dysfunction
 - Glucose transporter 1 (GLUT1) deficiency
18. A 54 years old chronic alcoholic man from Samtse presented with acute onset mental state change and double vision. Physical examination revealed disorientation to time place and person, decreased attention span and memory loss. Neurological examination revealed horizontal nystagmus and ataxia. Which of the following neurological findings is most likely to persist despite Thiamine replacement?
- Ataxia
 - Memory loss
 - Ophthalmopathy
 - Disorientation
19. A 55-year-old renal transplant recipient on long-term tacrolimus and prednisone presents with subacute cognitive decline, multifocal neurological deficits, and ring-enhancing periventricular lesions on MRI showing partial regression after high-dose dexamethasone. Immunohistochemistry reveals a CD20+ neoplasm with prominent angiocentric growth patterns. Given the tumor's predilection for immunocompromised hosts, periventricular tropism, and steroid-responsive biology, which of the following is the most likely diagnosis?
- Ependymoma (WHO Grade II/III)
 - Medulloblastoma (WHO Grade IV)
 - Primary CNS Lymphoma (Diffuse Large B-Cell Type)
 - Glioblastoma (IDH-wildtype)
20. All of the following regarding CJD are true except?
- It is a neuro degenerative disease
 - It is caused by infectious prions
 - Myoclonus is rarely seen
 - Brain biopsy is specific for diagnosis.

21. A 68-year-old woman with Parkinson's disease presents with new-onset dream-enactment behavior, including yelling and thrashing at night. Her motor symptoms are controlled. What is the most accurate statement regarding the cause of this symptom?
- a) It is an adverse effect of high-dose dopaminergic therapy and will resolve if the levodopa dose is reduced.
 - b) It is a precursor to the development of Parkinson's disease dementia and should be treated with an acetylcholinesterase inhibitor.
 - c) It is a core feature of a synucleinopathy and predicts a more rapid overall disease progression.
 - d) It is caused by the degeneration of the pedunculopontine nucleus and is best treated with clonazepam.
22. Distant systemic cancer most likely would produce which of the following neurologic syndrome?
- a) Myasthenia gravis
 - b) Generalised neuropathy
 - c) Non-inflammatory myopathy
 - d) Cranial nerve palsies
23. Cataracts, frontal baldness, testicular atrophy and muscle weakness and wasting occur in association with which condition?
- a) Myotonia congenital
 - b) Fascioscapulohumeral dystrophy
 - c) Pseudohypertrophic dystrophy
 - d) Myotonic dystrophy
24. A man has dyslexia without dysgraphia. Auditory comprehension is only slightly impaired. This man's symptoms most likely are due to a lesion or lesions in
- a) The left parietooccipital region
 - b) The left temporal lobe, near Wernicke's area
 - c) The left frontal lobe, posterior to Broca's area
 - d) Both temporal lobes
25. A 60-year-old mildly obese lady complains of a very bothersome burning pain on the anterolateral aspect of the right thigh from the groin almost as far distally as the knee. Examination shows reduction of sensation to touch and pin prick in the affected area. There is no loss of muscle strength and reflexes are normal. What is the most likely diagnosis?
- a) Prolapsed intervertebral disc
 - b) Disruption of lumbosacral plexus
 - c) Compression of the lateral femoral cutaneous nerve
 - d) Nutritional neuropathy
26. A 30-year-old man with a history of Hodgkin's lymphoma presents with acute confusion and focal seizures. MRI shows numerous punctate foci of diffusion restriction throughout the cerebral hemispheres. MRA of the intracranial vessels is normal. CSF is significant for 45 white blood cells/ μ L (predominantly lymphocytes) and elevated IgG index. What is the most likely underlying pathophysiology?
- a) Direct neoplastic infiltration of the meninges
 - b) Paraneoplastic angiitis of the CNS
 - c) Chemotherapy-induced neurotoxicity
 - d) Progressive multifocal leukoencephalopathy (PML)

27. A 45-year-old man with chronic alcohol use disorder is brought in with generalized tonic-clonic seizures. His initial labs show a serum magnesium level of 0.9 mg/dL (severely low) and a calcium level of 6.8 mg/dL (low). Despite receiving IV calcium gluconate, his seizures persist. Which electrolyte replacement is most critical to stop his seizures?
- a) Intravenous potassium chloride
 - b) Intravenous magnesium sulphate
 - c) Vitamin D supplementation
 - d) Intravenous hypertonic sodium chloride
28. A 12-year-old boy is brought for evaluation of worsening handwriting and a tendency to drop things with his right hand. On examination, he has a slow, twisting posture of his right arm that increases when he walks and disappears completely when he is asleep. His neurological exam is otherwise normal, including sensation. What is the most likely diagnosis?
- a) Tardive dyskinesia
 - b) Juvenile Parkinson's disease
 - c) Focal dystonia
 - d) Conversion disorder
29. A 28-year-old woman presents with a 6-month history of a continuous, unilateral, boring headache located behind her right eye. The pain is associated with ipsilateral conjunctival injection, lacrimation, and nasal congestion. Each attack lasts 45 minutes and occurs like clockwork at 2:00 AM, waking her from sleep. What is the most appropriate acute treatment?
- a) Oral sumatriptan
 - b) High-flow inhaled oxygen
 - c) Oral naproxen sodium
 - d) Paracetamol, caffeine and Ergotamine containing analgeic
30. A 45-year-old teacher describes brief episodes of vertigo (< 1 minute) that occur exclusively when she rolls over in bed to her left side or looks up to write on a whiteboard. The Dix-Hallpike test performed with her head turned to the left reproduces her symptoms with upbeat-torsional nystagmus. What is the first-line management?
- a) Prescription of Betahistine/ Cinnarizine for symptomatic relief
 - b) A course of high-dose oral corticosteroids
 - c) The Epley maneuver
 - d) MRI brain with contrast to rule out a cerebellopontine angle tumor

PART II – Short Answer Questions [20 marks]

This part has Short Answer Questions. Answer ALL the questions. Mark for each sub-question is indicated in the brackets.

Question 1

- a) Name the two core neurological components required for normal consciousness. **(1 mark)**
- b) Which ascending subcortical network is primarily responsible for arousal? **(1 mark)**
- c) Which widespread cortical network is primarily responsible for awareness? **(1 mark)**
- d) A lesion in which specific brainstem region is most classically associated with causing coma? **(1 mark)**
- e) What is the key clinical feature that distinguishes a *persistent vegetative state* from *minimally conscious state*? **(1 mark)**

Question 2.

- a) What is the term for diabetic autonomic neuropathy affecting the gastrointestinal tract, leading to delayed gastric emptying? **(1 mark)**
- b) Name one specific test used to assess for cardiovascular autonomic reflex dysfunction. **(1 mark)**
- c) What abnormality in sweating is a common manifestation of diabetic autonomic neuropathy? **(1 mark)**
- d) What urological complication commonly arises from autonomic neuropathy? **(1 mark)**
- e) Why is hypoglycemic unawareness a dangerous consequence of autonomic neuropathy? **(1 mark)**

Question 3.

In Duchenne Muscular Dystrophy (DMD):

- a) What is the pattern of inheritance? **(1 mark)**
- b) Which specific protein is absent from the sarcolemma? **(1 mark)**
- c) What is a classic early clinical sign noted on physical examination? **(1 mark)**
- d) What is the pathological significance of a markedly elevated serum creatine kinase (CK) level? **(1 mark)**
- e) Name one common and serious cardiac manifestation of DMD. **(1 mark)**

Question 4.

72-year-old man presents to the Emergency Department with acute vertigo, and gait instability. MRI confirms an acute ischemic stroke affecting the superior cerebellar artery (SCA) territory.

- a) His examination reveals a striking intention tremor in his left arm during finger-nose testing. Which deep cerebellar nucleus, typically infarcted in SCA territory strokes, is primarily responsible for this type of tremor? **(1 mark)**
- b) He also demonstrates profound dysdiadochokinesia. Describe the neuroanatomical pathway (including the specific cerebellar peduncle) that is disrupted, preventing the smooth execution of this motor action. **(1 mark)**

- c) The patient's ocular examination shows ipsilesional gaze-evoked nystagmus. Explain the failure of the neural integrator (a cerebellar function) that causes this specific finding. **(1 mark)**
- d) Despite the vertigo, his gait is only mildly wide-based. Contrast this presentation with the expected gait disturbance if the stroke had occurred in the anterior inferior cerebellar artery (AICA) territory instead, and provide the reason for this difference. **(1 mark)**
- e) Given the SCA territory involvement, the motor deficits are expected on the ipsilateral side. What unique pathological finding, often associated with large cerebellar strokes, could subsequently cause contralateral motor deficits and why? **(1 mark)**

SECTION B: [50 marks]

Write an answer for the both questions. Each questions carries 25 marks. Mark for each sub-question is indicated in the brackets.

Question 1

(25 marks)

As a Neurologist at Jigme Dorji Wangchuck National Referral hospital, you are consulted by a medical officer from a Primary Health Centre calls to discuss a case. The patient is a 60-year-old male who has presented with a headache for more than two months. He also complains of a change in personality, neck and back pain, double vision, and clumsiness while walking. The patient is suspected to be suffering from chronic meningitis. Based on the above scenario answer the following questions:

- a. How do you define chronic meningitis? What are other symptoms and signs of chronic meningitis? **(3 marks)**
- b. What two different classic signs of meningeal irritation will you ask the medical officer to elicit? Describe how to elicit each of them. **(4 marks)**
- c. Name at least five categories of disease that account for most cases of chronic meningitis. **(3 marks)**
- d. How will you approach this case once he is referred to you to JDWNRH? **(5 marks)**

On further inquiry, you learn the patient has a past history of significant unprotected sexual exposure and treatment for genital sores many years back. You suspect Neurosyphilis in him. In this context:

- e. What are the different types of serologic tests for syphilis? Describe them. **(2 marks)**
- f. What other co-infections would you like to rule out in this case? **(2 marks)**
- g. What different CSF studies would you ask for and what findings do you expect in the CSF? **(2 marks)**
- h. How will you treat this case? **(1 mark)**
- i. Describe the clinical manifestations of general paresis and Tabes dorsalis. **(3 marks)**

Question 2

(25 marks)

A 32-year-old woman from Tsirang presents with a 5-day history of a rapidly ascending sensory and motor deficit, now involving all four limbs, accompanied by urinary retention. She reports a similar, but less severe, episode of unilateral visual loss 18 months ago that resolved partially with a course of oral steroids. She has a history of well-controlled Systemic Lupus Erythematosus (SLE) for which she takes hydroxychloroquine.

Examination:

- **Mental Status:** Alert, oriented.
- **Cranial Nerves:** on the Relative Afferent Pupillary Defect right. Fundoscopy reveals pale optic discs bilaterally.
- **Motor:** Flaccid quadriparesis (power 2/5 in legs, 3/5 in arms).
- **Sensory:** A sensory level to pinprick is noted at C5. Profound loss of proprioception and vibration in all limbs.
- **Reflexes:** Absent throughout. Plantar responses are mute.

Initial Investigations:

- **ESR/CRP:** Elevated.
 - **MRI Cervico-Thoracic Spine:** Shows a T2-hyperintense, gadolinium-enhancing lesion extending from the medulla to the T3 vertebral level.
 - **CSF Analysis:**
 - White Cell Count: 45/ μ L (80% lymphocytes)
 - Protein: 1.2 g/L (elevated)
 - Glucose: Normal
 - **Oligoclonal Bands (OCB):** Negative
 - **Serum AQP4-IgG:** Pending (sample sent to India).
 - **Myelin Oligodendrocyte Glycoprotein (MOG) IgG:** Negative.
- a. List **three** distinct neuro-immunological mechanisms that could explain this presentation, citing a specific condition for each. **(3 marks)**
 - b. Given the MRI finding of a longitudinally extensive transverse myelitis (LETM), which single specific test result would you deem most critical to await before initiating long-term immunotherapy? Justify your answer. **(2 marks)**
 - c. What is the fundamental immunopathological process that OCBs represent in MS? **(1 mark)**
 - d. Discuss the prognostic significance of a *negative* OCB result in this specific clinical context. **(2 marks)**
 - e. While awaiting the AQP4-IgG result, you are to decide on acute management. Argue for and against the use of Plasma Exchange (PLEX) in this patient *at this moment*. **(3 marks)**

- f. Would your argument change if the patient were AQP4-IgG positive? Explain the pathophysiological basis for the efficacy of PLEX in that scenario. **(2 marks)**
- g. Contrast the typical histopathological findings on biopsy of an MS plaque versus an NMOSD lesion, focusing on the roles of complement, astrocytes, and eosinophils. **(3 marks)**
- h. How does the mechanism of action of Eculizumab directly counter the specific pathophysiology you described for NMOSD? **(2 marks)**
- i. This patient's first event was optic neuritis (ON). Describe the key differentiating features on **Optical Coherence Tomography (OCT)** between post-acute optic neuritis in MS versus NMOSD. **(2 marks)**
- j. A different patient presents with bilateral ON and a negative AQP4-IgG. What clinical and MRI feature of the optic nerves would strongly suggest a diagnosis of MOGAD over NMOSD? **(1 mark)**
- k. Name **two** evidence-based long-term immunosuppressive agents for NMOSD that are considered first-line, specifying their primary mechanism of action. **(2 marks)**
- l. The patient's SLE is currently managed with hydroxychloroquine. Explain the potential challenges and considerations in layering an additional powerful immunosuppressant on top of her existing autoimmune condition and its treatment. **(2 marks)**

TASHI DELEK