

Section A- All questions in this section are multiple choice questions.
Pick one best answer. (60marks marks)

Answer all Questions

1. The anatomical landmark for performing lumbar puncture in an adult is:

- a. L1/L2
- b. L2/L3
- c. L4/L5
- d. L5/S1

• lumbar puncture in infants = L4/L5.
* Tuffier's line = L4.

2. Light is shone into the left eye of Jane Banda and elicits a direct pupillary reflex but no consensual reflex. Jane has a lesion in which of the following structures to account for this deficit?

- a. Optic nerve, left eye
- b. Optic nerve, right eye *
- c. Oculomotor nerve, right side
- d. Oculomotor nerve, left side

* left eye reflex due to light
But Right eye does not, however
it should

* Section of the oculomotor nerve
produces a non reactive pupil in the ipsilateral
side

A 30-year-old boy is hit on the temple with a baseball and becomes unconscious. After about 10 minutes, he regains consciousness, but he soon becomes lethargic, and over the next 2 hours, he becomes stuporous. His pupils are unequal. Intracranial hemorrhage is suspected. Which of the following vessels is most likely to be the source of the hemorrhage?

- a. Anterior cerebral artery
- b. Basilar artery
- c. Middle cerebral artery
- d. Middle meningeal artery

4. The following is not true regarding the external features of the cerebrum:

- a. Has gyri and fissures
- b. Has three surfaces
- c. Has four lobes
- d. Has four poles

→ The external Features of the
Cerebrum

- 3 poles.

can occur as a result of sport
related injuries.

5. Which of the following is true about the precentral gyrus?
 - a. Is the primary somatosensory cortex
 - ☒ b. According to Brodmann is area 4
 - c. Has cognitive capacity as its main function
 - d. Located in the parietal lobe
6. The cuneus is separated from the lingual gyrus by the:
 - a. Rhinal sulcus
 - ☒ b. Calcarine sulcus
 - c. Parietooccipital sulcus
 - d. Collateral sulcus
7. The following is correctly matched:

<input checked="" type="radio"/> a. Calcarine sulcus	occipital lobe	(Frontal lobe (temporal lobe) (temporal lobe) -> Speech Area.
b. Broca's area	temporal lobe	
c. Wernicke's area	frontal lobe	
d. Primary auditory cortex	parietal lobe	
8. The following layer of the cerebral cortex is correctly indicated by its number:
 - ☒ a. Outer granular layer II
 - b. Multiform layer V
 - c. Fusiform layer III
 - d. Molecular layer VI
9. The following commissure is located in the epithalamus:
 - a. Hippocampal commissure
 - ☒ b. Posterior commissure A.K.A Epithalamic Commissure
 - c. Habenular commissure
 - d. Corpus callosum
10. Baby of Sarah Mwanza has had a computed tomography (CT) scan of the head which has revealed an enlargement of the lateral ventricles and the third ventricle. The cause of this hydrocephalus is most likely which of the following?
 - ☒ a. aqueductal stenosis
 - b. Choroid plexus papilloma

* Aqueduct of Sylvius is the channel which connects the 3rd Ventricle to the 4th Ventricle.

c. Calcification of the arachnoid granulations

d. Stenosis of the median foramen

11. Which part of the corpus callosum continues with the lamina terminalis?

a. Splenium

☒ b. Rostrum

c. Body

d. Genu

12. The isthmus of the corpus callosum is located between:

a. Body and rostrum

☒ b. Splenium and body

c. Genu and rostrum

d. Rostrum and splenium

13. Which of the following structure contains reciprocal connections between the hippocampus and the septal nuclei?

a. Corpus callosum

☒ b. Fornix

c. Caudate nucleus

d. Septum pellucidum

14. A 70-year-old hypertensive woman complains of numbness and weakness in her left

leg and foot. Occlusion of which of the following vessels may account for this complaint?

a. Anterior choroidal artery

b. Anterior cerebral artery

c. Interior carotid artery

d. Middle cerebral artery

15. Regarding relations of the corpus callosum:

☒ a. Fibres radiating from the splenium into the occipital lobe make the forceps major

b. Fibres radiating from the genu into the frontal lobe make the tapetum X

c. Fibres radiating from the body into the temporal lobe make the forceps minor

d. The middle cerebral arteries run under surface of the rostrum

• Corpus callosum = connects the two Hemispheres except the temporal lobes, that are connected by the Anterior Commissure

- The callosal fibres linking the frontal poles curve forward terminating = anterior forceps (Forceps minor)

- The callosal fibres linking the occipital poles curve backward terminating = posterior forceps (Forceps major)

16. Regarding the insula cortex, the following is true:
- Is hidden in the central sulcus
 - Occipital lobe does not form its opercula
 - Posterior insula is bigger than the anterior insula
 - Posterior insula has three short gyri
17. True about the lateral sulcus of Silvius:
- Separates the middle frontal gyrus from the superior temporal gyrus
 - Its posterior ramus separates the temporal lobe from the occipital lobe
 - Its anterior ramus separates the pars orbitalis from the pars triangularis
 - Only separates the frontal lobe from the temporal lobe
18. Concerning the inferior frontal gyrus, the following is true:
- Pars opercularis is Brodmann area 47
 - Pars triangularis is Brodmann area 45
 - Areas 44 and 45 is the Wernicke's area
 - Posterior to it is the frontal eye field area
19. The optic chiasm is supplied by all of the following arteries except the:
- Internal carotid artery
 - Anterior communicating artery
 - Anterior choroidal artery
 - Posterior communicating artery
20. The frontal lobe includes all of the following areas except:
- Wernicke speech area
 - Motor strip (area 4)
 - Broca speech area
 - Center controlling eye movements
21. All of the following statements concerning the dura mater are correct except:
- Forms the periosteum of the vertebral canal
 - Forms the walls of the venous sinuses
 - Forms the roof of the pituitary fossa
 - Is continuous with the sclera of the eyeball
22. False concerning the internal capsule:
- Is a continuation of the corona radiata
 - Continues as the crus cerebri inferiorly
 - Anterior limb has somatotopic mapping for the trunk and lower limbs

- d. Posterior limb separates thalamus medially from lentiform nucleus laterally
23. Which part of the internal capsule is not seen on horizontal section of the brain?
- a. Genu
 - b. Anterior limb
 - c. Retrolentiform
 - d. Sublentiform
24. Regarding the blood supply to the internal capsule:
- a. Recurrent artery of Heubner supplies mainly the posterior and retrolentiform parts
 - b. Striate artery of middle cerebral supplies anterior and posterior limbs and genu
 - c. Striate artery of the anterior cerebral artery supplies the posterior limb
 - d. Anterior choroidal artery supplies the anterior limb and genu
25. Most of the structures of the limbic system are located in which part of the brain?
- a. Ventral and medial regions of the cerebrum
 - b. Medial and ventral regions of the cerebrum
 - c. Superolateral regions of the cerebrum
 - d. Inferior tentorial regions of the cerebrum
26. All are components of the hippocampal formation except:
- a. Parahippocampal gyrus
 - b. Dentate gyrus
 - c. Hippocampus
 - d. Subiculum
27. Regarding examination of cranial nerves:
- a. Cranial nerves III, IV and ophthalmic are examined for eye movements
 - b. Vagus nerve is tested by asking the patient to say 'aah' and assessing the uvula position which deviates to the contralateral side if there is paralysis of one nerve
 - c. Cranial accessory nerve is tested by asking the patient to move head sideways
 - d. Paralysis of the abducent nerve will cause medial strabismus

28. Examination of the vestibulocochlear nerve:

- a. Weber test is done by placing the base of a vibrating tuning fork on the mastoid process until subject no longer hears it, then placed next to the ipsilateral ear
- b. In sensorineural deafness, the subject will hear the sound louder in the normal ear during Weber test
- c. In conductive deafness, the subject will hear the vibrations in air after bone conduction is over during Rinne's test
- d. Bone conduction is twice greater than air conduction

29. Termination of the lumbar cistern is at what vertebral level?

- a. L2
- b. L5
- c. S2
- d. S4

30. About the blood supply to the cerebellum:

- ☒ a. Posterior inferior cerebellar artery (PICA) is a branch of the vertebral artery
- b. Superior cerebellar artery (SCA) is branch of the posterior cerebral artery
- c. Anterior inferior cerebellar artery (AICA) is a branch of anterior cerebral artery
- d. Lateral medullary syndrome is caused by blockage in AICA

31. Which fold of dura mater encloses the superior petrosal sinuses?

- a. Falx cerebelli
- b. Falx cerebri
- c. Tentorium cerebelli
- d. Diaphragma sellae

32. All belong to the limbic system except:

- a. Diencephalon
- b. Basal ganglia
- c. Corpus callosum
- d. Hippocampus

33. Amygdala's main function is:
- a. Homeostasis
 - b. Olfaction
 - c. Memory
 - d. Emotions and drives
34. The following is false about the relations of the cingulate gyrus:
- a. No sulcus separates it from the corpus callosum
 - b. Continues anteriorly and inferiorly as the subcallosal and paraterminal gyri
 - c. Joins with the parahippocampal gyrus posteriorly at the isthmus
 - d. Cingulate sulcus separates it from the superior, medial and inferior frontal gyri
35. About the uncus, the following is correct:
- a. Is a bump in the hippocampus
 - b. Has gustatory function
 - c. Herniation is likely to compress trochlear nerve
 - d. Uncal herniation results in ipsilateral pupil dilatation
36. The septum pellucidum connects the corpus callosum to which part of the fornix?
- a. Body
 - b. Crura
 - c. Hippocampal commissure
 - d. Alveus
37. Which thalamic nucleus relays somatosensory cranial nerve inputs to cortex?
- a. Ventral posterior lateral nucleus (VPL)
 - b. Ventral posteromedial nucleus (VPM)
 - c. Ventral lateral nucleus (VL)
 - d. Ventral anterior nucleus (VA)
38. Which thalamic nucleus relays auditory input to the cortex?
- a. Anterior nucleus
 - b. Lateral geniculate body
 - c. Medial geniculate body
 - d. Intra-laminar nuclei

39. Uveitis is inflammation of the uveal tract. The following are components of this tract:

- a. Sclera, iris, cornea
- b. Iris, retina, choroid
- c. Choroid, iris, ciliary body
- d. Sclera, retina, ciliary body

Components of the uveal tract.

40. All are characteristic features of the cornea except:

- a. Transparent
- b. Adequate blood supply
- c. Separated from iris by anterior chamber
- d. Corneal ulceration may lead to perforation

41. True concerning the macula lutea:

- a. Is located medial to the optic disc
- b. Contains fovea centralis which has both rods and cones
- c. Mainly is supplied by the superior and inferior temporal retinal branches
- d. Mainly supplied by the superior nasal and superior temporal retinal branches

42. The normal intra-ocular pressure is:

- a. 10-21 mmHg
- ☒ b. 10-21 mmH₂O
- c. 20-31 mmHg
- d. 20-31 mmH₂O

43. True regarding the lens of the eye:

- a. Has no capsule
- b. Opacification leads to glaucoma
- c. Contributes about 60 dioptres to the eye
- d. Rubella commonly causes congenital cataracts

44. Medial squint is caused by paralysis of which extra-ocular muscle?

- a. Medial rectus
- b. Lateral rectus
- c. Superior oblique
- d. Inferior rectus

45. The normal range of cerebrospinal fluid pressure is:
- 60-150 cm of Hg
 - 60-150 mm of Hg
 - 60-150 mm of H₂O
 - 60-150 cm of H₂O
46. The following is correct about cerebrospinal fluid (CSF):
- Only produced in the lateral ventricles
 - Most of it is in ventricular system than in cranial subarachnoid space
 - Drains via arachnoid granulations of the inferior sagittal sinus
 - CSF otorrhea is a sign of basal skull fractures
47. Regarding the spiral organ of Corti, the following is true:
- Has three (3) inner and one (1) outer hair cells
 - Hair cells receive both sensory and motor nerve impulses
 - Has no sustentacular cells
 - Otoliths may deposit on the basilar membrane
48. True regarding the cochlea of the internal ear:
- Scala vestibuli is separated from the scala media by the tectorial membrane
 - There is no continuity between the scala tympani and the scala vestibuli
 - The spiral ligament attaches the cochlear duct to the lamina of modiolus
 - Oval window separates the scala tympani from the middle ear
49. All the following consists of membranous labyrinth of the internal ear except:
- Utricle
 - ☒ Cochlea
 - Ductus reuniens
 - Sacculle
- * Ductus reuniens
- Connects the lower part of the Sacculle to the cochlear duct.
50. All the following are potential intra-temporal complications of otitis media except:
- Dural venous thrombosis
 - Mastoiditis
 - Cholesteatoma
 - Labyrinthitis

51. A 3-year-old boy was brought to the emergency department with dilated pupils, dry mouth, red and dry skin, and body temperature 39.7°C . Vital signs were blood pressure 90/50 mm Hg, pulse 122 bpm, respirations 24/min. The central and peripheral symptoms of this patient were most likely mediated by the blockade of which of the following receptors?
- A. Noradrenergic
 - B. Nicotinic
 - C. Muscarinic
 - D. Dopaminergic
52. A 54-year-old woman suffering from initial insomnia was prescribed a hypnotic drug that increases the activity of a major neurotransmitter system in the brain. Which of the following neurotransmitter systems was most likely involved in the therapeutic action of that drug?
- A. Cholinergic
 - B. Noradrenergic
 - C. Glutamatergic
 - D. GABAergic
53. A 35-year-old woman with a history of episodic feelings of sadness since adolescence, but she had noticed a gradual worsening in her mood over the past 3 weeks. She had depressed mood most of the day, had lost interest in any leisure activity, and had difficulty sleeping, poor appetite, low energy, feelings of guilt, and recurrent thoughts of death. Which of the following pairs of neurotransmitters were most likely involved in the patient's disorder?
- A. Glutamate and serotonin
 - B. Glutamate and acetylcholine
 - C. Serotonin and acetylcholine
 - D. Serotonin and norepinephrine
54. A 32-year-old woman was brought to the emergency department because of a generalised tonic-clonic seizure. Her husband stated that his wife had been suffering from epilepsy since childhood, but the seizures were only partially controlled by medication. Which of the following pairs of neurotransmitters are thought to be most involved in seizure disorders?
- A. GABA and serotonin
 - B. GABA and glutamate
 - C. GABA and acetylcholine
 - D. Serotonin and acetylcholine

55. A 41-year-old woman is diagnosed with generalized anxiety disorder was made, and therapy was prescribed that included a drug with pronounced anxiolytic activity. Which of the following neurophysiological actions most likely mediated the therapeutic effect of that drug?
- A. Increased serotonergic transmission
 - B. Decreased serotonergic transmission
 - C. Increased dopaminergic transmission
 - D. Decreased dopaminergic transmission
56. A 44-year-old man was admitted for status epilepticus, and he was treated with a drug that increased the activity of a central neurotransmitter able to generate only inhibitory postsynaptic potentials (IPSPs) by increasing Cl^- or K^+ conductance. Which of the following neurotransmitters was most likely affected by the drug treatment?
- A. Glutamate
 - B. Norepinephrine
 - C. GABA
 - D. Dopamine
57. A 67-year-old woman complained to her physician of obstinate constipation. The woman, who was suffering bone pain from metastatic breast cancer, had started therapy with morphine 2 weeks previously. Which of the following actions most likely mediated the adverse effect of the drug in this patient?
- A. Decreased anal sphincter tone
 - B. Increased colonic tone
 - C. Increased intestinal peristalsis
 - D. Increased softening of faeces
58. A 36-year-old man was prescribed an intramuscular analgesic drug for severe pain. Shortly after the administration, an itchy wheal developed at the injection site, along with generalised pruritus. Which of the following drugs was most likely given to the patient?
- A. Acetaminophen
 - B. Indomethacin
 - C. Ibuprofen
 - D. Morphine

59. A 42-year-old woman who was resident in a psychiatric hospital for a chronic mental illness had been mute and immobile for the past week. She actively resisted any attempt to be moved. Occasionally, she had brief periods of unprovoked agitated and aggressive behaviour. Which of the following drugs should be avoided in this patient?

- A. Lorazepam
- B. Haloperidol
- C. Olanzapine
- D. Valproic acid

60. A 28-year-old man found wandering half-dressed in the streets complained of hearing voices cursing him, and his reported thoughts were bizarre. Upon admission to the psychiatric ward, his behaviour became disruptive. He refused to cooperate and started verbal assaults that included threats of physical violence. A therapy was planned that include the intravenous injection of a drug. Which of the following drugs was most likely administered?

- A. Lithium
- B. Imipramine
- C. Risperidone
- D. Fluoxetine

Section B (20marks). Answer all questions

Match the statement in the first column to the corresponding answer in column C. Use the answer sheet provided or middle column to write the letter matching the number on the left if answer sheets are not provided.

Answer all questions.

Example: Neuroleptic Drugs

Drug property	Answers	Drug
1. A drug with high affinity for dopamine D4 receptors	1. D	A. Thioridazine and chlorpromazine

2. A phenothiazine that frequently causes extrapyramidal adverse effects	2. C	B. Aripiprazole
3. A partial agonist at central dopaminergic receptors	3. B	C. Fluphenazine
4. Have lower extrapyramidal symptoms (EPS) potential because of high anticholinergic activity.	4. A	D. Clozapine

Opioid Analgesics and Antagonists

Drug	Answers	Mechanism of Action
1. Methadone		A. A drug with very weak opioid activity used in the treatment of diarrhoea
2. Loperamide		B. A full opioid agonist with the highest oral bioavailability
3. Pentazocine		C. A drug with high affinity but no intrinsic activity at opioid receptors
4. Naloxone		D. A partial agonist at μ (mu) opioid receptors and full agonist at κ (kappa) opioid receptors

Pain management

Description of pain	Answers	Drugs of choice
5. Stage/ step 2 WHO pain management		A. Tricyclic Antidepressants or Serotonin-norepinephrine Reuptake Inhibitors
6. Stage/step 1 WHO pain management		B. Fentanyl
7. Neuropathic pain		C. Codeine/ tramadol
8. Breakthrough pain despite opioid and non-opioid drugs		D. Paracetamol/ Aspirin

Side effects of antipsychotic agents

Side effect	Answers	Description of Side effect
9. Tardive dyskinesia (TD)		A. Dry mouth
10. Xerostomia		B. Inappropriate movements of the tongue, neck, trunk, and limbs
11. A potentially life-threatening adverse effect of antipsychotic medications		C. Neuroleptic malignant syndrome (NMS)
12. A major dose-limiting side effect of clozapine		D. Agranulocytosis

Mechanism of actions Neuroleptics

Drug description	Answers	Mechanism of actions
13. Typical antipsychotic agents		A. Inhibition of DA receptors in the anterior pituitary

14. Atypical antipsychotic agents		B. Inhibition of DA receptors in the nigrostriatal pathway
15. How antipsychotics cause parkinsonian-like symptoms		C. Inhibition of 5-HT ₂ receptors (D ₂ receptors are still involved to some extent)
16. How antipsychotics cause prolactinemia		D. Inhibition of D ₂ receptors in the mesolimbic system of the brain

Neurotransmitters

Description	Answers	Chemical mediator
17. Gamma aminobutyric acid (GABA)		A. The major inhibitory neurotransmitter in the CNS
18. Glutamate		B. The primary excitatory amino acid neurotransmitter in the CNS
19. Dopamine		C. Involved in attention, blood pressure and heart rate regulation
20. Epinephrine (adrenaline)		D. Involved in the control of movement, emotion and visceral function and inhibits release of prolactin

Section C (Answer all questions)

Very short notes (No more than one sentence)

Question 1 (10marks)

- A. What is the prototype opioid analgesic?
- B. Why must caution be taken when using opioids in patients with head injuries?
- C. What is the mechanism of morphine-induced hypotension and pruritus?
- D. Do opioid analgesics increase or decrease gastrointestinal (GI) peristalsis?
- E. Which synergistic pain medication is commonly given in combination with codeine for the treatment of pain?

Question 2 (10marks)-Brief notes on the following. Note more than 3sentences

- (i) The olfactory epithelium
- (ii) Histology of taste buds
- (iii) Kiesselbach's plexus
- (iv) Von Ebner's glands
- (v) Bowmans glands

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