

**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?
- Is the primary somatosensory cortex
  - ☒ According to Brodmann is area 4
  - Has cognitive capacity as its main function
  - Located in the parietal lobe
6. The cuneus is separated from the lingual gyrus by the:
- Rhinal sulcus
  - ☒ Calcarine sulcus
  - Parietooccipital sulcus
  - Collateral sulcus
7. The following is correctly matched:
- ☒ Calcarine sulcus ..... occipital lobe
  - Broca's area ..... temporal lobe (Frontal lobe) → Speech Area.
  - Wernicke's area ..... frontal lobe (temporal lobe)
  - Primary auditory cortex ..... parietal lobe (temporal lobe) -
8. The following layer of the cerebral cortex is correctly indicated by its number:
- ☒ Outer granular layer ..... II
  - Multiform layer ..... V
  - Fusiform layer ..... III
  - Molecular layer ..... VI
9. The following commissure is located in the epithalamus:
- Hippocampal commissure
  - ☒ Posterior commissure A.K.A Epithalamic Commissure
  - Habenular commissure
  - 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?
- ☒ aqueductal stenosis
  - 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 Sylvius:
- 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:
- Homeostasis
  - Olfaction
  - Memory
  - Emotions and drives
34. The following is false about the relations of the cingulate gyrus:
- No sulcus separates it from the corpus callosum
  - Continues anteriorly and inferiorly as the subcallosal and paraterminal gyri
  - Joins with the parahippocampal gyrus posteriorly at the isthmus
  - Cingulate sulcus separates it from the superior, medial and inferior frontal gyri
35. About the uncus, the following is correct:
- Is a bump in the hippocampus
  - Has gustatory function
  - Herniation is likely to compress trochlear nerve
  - Uncal herniation results in ipsilateral pupil dilatation
36. The septum pellucidum connects the corpus callosum to which part of the fornix?
- Body
  - Crura
  - Hippocampal commissure
  - Alveus
37. Which thalamic nucleus relays somatosensory cranial nerve inputs to cortex?
- Ventral posterior lateral nucleus (VPL)
  - Ventral posteromedial nucleus (VPM)
  - Ventral lateral nucleus (VL)
  - Ventral anterior nucleus (VA)
38. Which thalamic nucleus relays auditory input to the cortex?
- Anterior nucleus
  - Lateral geniculate body
  - Medial geniculate body
  - 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 mmH<sub>2</sub>O
- c. 20-31 mmHg
- d. 20-31 mmH<sub>2</sub>O

43. True regarding the lens of the eye:

- a. Has no capsule
- b. Opacification leads to glaucoma
- c. Contributes about 60 dioptries 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 H<sub>2</sub>O
  - 60-150 cm of H<sub>2</sub>O
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
  - (b) Cochlea**
  - Ductus reuniens
  - Saccul
- \* Ductus reuniens  
- Connects the lower part of the Saccul 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  $39.7^{\circ}\text{C}$ . 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  $\text{Cl}^-$  or  $\text{K}^+$  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 weal 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 $\mu$ (mu) opioid receptors and full agonist at $\kappa$ (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 <sub>2</sub> receptors (D <sub>2</sub> receptors are still involved to some extent) |
| 16. How antipsychotics cause prolactinemia              |  | D. Inhibition of D <sub>2</sub> 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

**END OF CAT1**



**THE UNIVERSITY OF ZAMBIA**  
**SCHOOL OF MEDICINE**

DEPARTMENTS OF ANATOMY AND PHYSIOLOGICAL SCIENCES  
NOVEMBER 2020

## PGY 4110

NEUROSCIENCES CAT2

**DURATION:**

**TWO (2) HOURS**

COMPUTER NO.: .....

[illegible]

### INSTRUCTIONS TO CANDIDATES

1. Write your computer number on the question paper and Special MCQ answer sheet provided
2. Carefully follow the instructions pertaining to each section.

**SECTION A. Questions 1-25.** Provide the option of either True or False for each statement A-D in the questions provided. Each full question carries 2 marks.  $\frac{1}{4}$  mark will be deducted for a wrong judgement so avoid guessing, rather leave it blank if not sure.

1. Otoliths are mainly involved in sensing
  - a) Sound amplitude and frequency
  - b) Angular velocity and acceleration
  - c) Linear velocity
  - d) Linear acceleration
2. In the upper motor neurone lesion affecting one side of the body, the following abnormalities occur in the affected limb:
  - a) Wasting of muscles
  - b) Increased response to phasic stretch reflex
  - c) Greater weakness in the flexor muscles of the affected arm than extensors
  - d) Increased firing in the type of afferent fibres from the muscle
3. What are the results of unilateral damage to the cerebellum in man
  - a) Disturbances of posture and disorganization of voluntary movement
  - b) Hemiplegia on the same side
  - c) Hemiplegia on the opposite side
  - d) Loss of sense of position on the same side of the body causing uncoordinated movements if the eyes are shut
4. In which of the following tracts in the spinal cord do second-order sensory neurons with cell bodies in the dorsal horn ascend to more rostral spinal segments or to the brain?
  - (a) Ventral corticospinal tract
  - (b) Lateral spinothalamic tract
  - (c) Anterior vestibulospinal tract
  - (d) Ventral spinothalamic tract
5. General sensory pathways:
  - (a) The anterior spinothalamic tracts transmit pain and crude touch
  - (b) The pain receptors are free nerve endings
  - (c) Information from the muscle spindle and golgi tendon organ does not reach consciousness
  - (d) Both the spinothalamic and dorsal column pathways are highly discrete
6. The pyramidal system:
  - (a) Destruction causes weakness and clumsiness
  - (b) Has fibres which originate from the pre-motor area
  - (c) Is also concerned with gross movements
  - (d) Controls posture



7. In the descending tracts in the spinal cord:
  - (a) The lateral corticospinal tract extends laterally to the surface of the spinal cord
  - (b) The vestibulospinal tract is a major crossed tract from the opposite vestibular nuclei
  - (c) The vestibulospinal tract predominantly inhibits extensor motoneurons
  - (d) Reticulospinal fibres are scattered throughout the anterior white columns
8. The ascending tracts in the spinal cord:
  - (a) The fasciculus gracilis and cuneatus contain fibres that mediate tactile discrimination
  - (b) The lateral spinothalamic tract carries vibration and pressure modalities
  - (c) The spinocerebellar tracts convey impulses from Golgi tendon organs
  - (d) All afferent fibres cross the midline at some stage in the spinal cord
9. Lower motor neuron disease:
  - (a) Causes loss of voluntary movements but not of reflex movements
  - (b) Causes eventual wasting of muscles concerned
  - (c) Does not affect ventilation of the lungs
  - (d) Is associated with involuntary twitching of small fasciculi in the affected muscles
10. The cerebellum receives its information concerning muscle movement from the:
  - (a) Cortex
  - (b) Muscle spindles
  - (c) Golgi tendon apparatus
  - (d) Medulla
11. Aqueous humour:
  - (a) Is produced by diffusion and active transport in the ciliary bodies
  - (b) Pressure is close to mean arterial pressure
  - (c) Is absorbed into veins at the junction of iris and the cornea
  - (d) Is more easily absorbed when the pupil is widely dilated
12. The hair cells in the semicircular canals are stimulated by:
  - (a) Movement of the perilymph
  - (b) Linear acceleration
  - (c) Gravity
  - (d) Movement of endolymph relative to hair cells
13. The tympanic membrane:
  - (a) Modifies the frequencies of sound waves impinging on the ear
  - (b) Stops vibrating almost immediately after the sound stops
  - (c) Transmits sound more effectively when the small muscles of the middle ear are contracted
  - (d) Transmits sound more than 80% less efficiently when the membrane is perforated

14. The basilar membrane:
- (a) Is broader at the base of the cochlea than at the apex
  - (b) Vibrations stimulate receptors to generate impulses at the frequencies of the applied sounds
  - (c) In the apical region vibrates only to incoming sounds of low frequency
  - (d) Can be made to vibrate by pressure waves traveling through skull bone
15. Poor balance is more likely when there is:
- (a) Semicircular canal rather than cochlear damage
  - (b) Spinothalamic tract rather than posterior column damage
  - (c) Dim rather than bright light
  - (d) Recent rather than long-standing destruction of one labyrinth
16. In long sightedness:
- (a) Objects at infinity cannot be focused sharply on the retina
  - (b) Objects at the usual near-point are focused behind the retina
  - (c) Ciliary muscle contracts more strongly to bring objects in mid-visual range into clear focus
  - (d) The near-point can be brought closer to the eye by the use of a biconcave lens
17. Interruption of the visual pathway in the:
- (a) Left optic tract causes blindness in the right visual field
  - (b) Optic chiasma causes blindness in the nasal half of each visual field
  - (c) Left optic radiation causes loss of vision to the right
  - (d) Occipital cortex causes loss of the light reflex
18. The lateral lobe of cerebellum (neocerebellum):
- (a) Integrates the vestibule – cerebello – spinal reflexes
  - (b) Receives inflow from the cerebropontine fibres
  - (c) Primarily integrates proprioceptive information from joints and ligaments received from the dorsal spino-cerebellar tract
  - (d) Controls rapidly alternating voluntary movement
19. These areas of cerebral cortex are involved in the following functions:
- (a) The precentral gyrus of the frontal lobe and motor activity
  - (b) The temporal lobe and the perception of light touch
  - (c) The occipital lobe and visual field of the opposite side
  - (d) The parietal lobe and the perception of speech
20. Hearing loss is best diagnosed as either conductive or sensorineural by:
- (a) Examination of the tympanic membrane with an otoscope
  - (b) Testing vestibular function
  - (c) Comparing air and bone conduction thresholds
  - (d) Looking for a low frequency hearing loss



21. Regarding sound energy:

- (a) Humans can hear over a range of 70 – 2000 Hz
- (b) The bel scale is logarithmic usually expressed in decibels (dBs)
- (c) Absolute lack of sound corresponds with an intensity of zero decibels
- (d) Pitch reflects the pressure attained with each sound wave cycle

22. Regarding vestibular function:

- (a) The semicircular canals respond to all rotational positions of the head
- (b) Nystagmus is usually labeled in the direction of slow phase
- (c) Small changes in the volume of the endolymph cause an illusion of movement which is unrelated to the actual body/head position
- (d) Optokinetic nystagmus is typified by a slow involuntary oscillatory eye movement with a fast return

23. Visual acuity is greatest in:

- (a) An area that contains mostly rods
- (b) The fovea centralis
- (c) The lateral edges of the retina
- (d) Dark lighting conditions

24. The functions of the limbic system include:

- (a) Regulation of sexual behavior in the males
- (b) Expression of fear
- (c) Olfaction
- (d) Temperature regulation

25. In unilateral vestibular disease typical features include:

- (a) The sensation that the external world is revolving
- (b) A tendency to stagger when walking
- (c) A tendency to fall in the dark
- (d) Nausea and vomiting

**SECTION B-Select One Best Answer** in this section. Questions 1-40.

1. What are neuroleptic drugs?
  - a. Drugs used to treat dementia
  - b. Drugs used to treat psychosis
  - c. Drugs used to treat brain tumors
  - d. Drugs used to treat brain cancer
2. The following are adverse effects of antipsychotic drugs except
  - a. Postural hypotension
  - b. Sedation
  - c. Anti-muscarinic effects
  - d. hypoprolactinaemia
3. All of the following are drugs used in the treatment of psychosis except
  - a. Risperidone
  - b. Succinylcholine
  - c. Pimozide
  - d. Sulpiride
4. The atypical antipsychotic drugs work on all of the following receptors to produce their desired effect except
  - a. 5-HT<sub>2</sub> receptors
  - b. D<sub>3</sub> receptors
  - c. D<sub>1</sub> receptors
  - d. D<sub>2</sub> receptors
5. Cholinesterase inhibitors are used in the treatment of dementias where they produce all of the following except;
  - a. Slowing the accumulation of intracellular calcium.
  - b. Increase the levels of acetylcholine in the brain
  - c. Gastrointestinal effects
  - d. Produces dose related adverse effects
6. Lithium is used in the treatment of all of the following except
  - (a) Bipolar disorder
  - (b) Epilepsy
  - (c) Acute mania
  - (d) Prophylaxis of resistant recurrent depression



7. During the process of general anaesthesia, what drugs are used to reduce bronchial and salivary secretions?

- (a) Non-depolarizing muscle relaxants
- (b) Inhalational anaesthetics
- (c) anti-muscarinic drugs
- (d) Neuroleptanalgesia

8. The rate of systemic absorption of local anaesthetics is affected by all of the following except

- (a) Pharmacodynamics properties
- (b) Concentration of the solution
- (c) Vascularity of the area
- (d) Pharmacokinetic properties

9. The techniques of local anaesthesia will include all of the following except

- (a) Epidural anaesthesia
- (b) Neuroleptanalgesia
- (c) Intravenous regional anaesthesia
- (d) Infiltration

10. All of the following are used in treatment of the maniac phase of affective disorders except

- (a) Lithium
- (b) Carbamazepine
- (c) Olanzapine
- (d) Nortriptyline

11. Which of the following drugs that is used to treat bipolar depression is called a *mood stabilizing agent*

- (a) Memantine
- (b) Amitriptyline
- (c) Moclobemide
- (d) Valproate

12. Which of the following drugs will show interaction with 'cheese containing foods' causing severe hypertension

- (a) Phenelzine
- (b) Reboxetine
- (c) Mirtazapine
- (d) Fluvoxamine

13. Which statement about the drugs that are used in the treatment of dementia is true
- (a) These drugs are used to cure the underlying cause of dementia
  - (b) These drugs are used to treat the cognitive and behavioral symptoms of dementia
  - (c) They are used to cure dementia
  - (d) They are drugs that are meant to prevent the cause of dementia
14. All of the following drugs are used in the treatment of dementias except
- (a) Antidepressants
  - (b) Anti-seizure drugs
  - (c) Anxiolytic drugs
  - (d) Anaesthetic drugs
15. Manic episodes of bipolar disorder may be treated using
- (a) Lamotrigine
  - (b) Donepezil
  - (c) Galantamine
  - (d) NSAIDs
16. The following are the common clinical uses of antidepressant drugs except
- (a) Anxiety disorders
  - (b) Neuropathic pain
  - (c) Bipolar depression
  - (d) Schizophrenia
17. The following are all indicated to use in the treatment of dementia except
- (a) Benzodiazepines
  - (b) Memantine
  - (c) Rivastigmine
  - (d) Clozapine
18. Which of the following antipsychotic drugs are effective in relieving both the positive and negative effects of schizophrenia
- (a) Haloperidol
  - (b) Chlorpromazine
  - (c) Risperidone
  - (d) Fluphenazine
19. All the following statements are true about antidepressant drugs except
- (a) These have delayed therapeutic efficacy
  - (b) These have similar therapeutic efficacy
  - (c) Patients may respond differently to different antidepressant drugs



- (d) Selection of which antidepressant drug to use is not affected by co-morbidities
20. Which of the following drugs has hepatotoxicity as a side effect
- (a) Donepezil
  - (b) Rivastigmine,
  - (c) Galantamine
  - (d) Tacrine
21. What are the most common adverse effects of CNS cholinesterase inhibitors
- (a) Dizziness and confusion
  - (b) Nausea and diarrhea
  - (c) Dry mouth and blurred vision
  - (d) Anxiety and sexual dysfunction
22. Mono-amine oxidase inhibitors are used in treatment of depression, what are the most common adverse effects of these drugs
- (a) Headache, CNS excitement, and postural hypotension
  - (b) Headache, nausea and vomiting
  - (c) Dry mouth, blurred vision and constipation
  - (d) Thirst, nausea and vomiting
23. The use of diuretics during lithium treatment is contraindicated because
- (a) It increases the renal clearance of lithium causing under-dosage
  - (b) Increases renal reabsorption of lithium causing toxicity
  - (c) It preserves water in the body causing swelling
  - (d) It prevents loss of sodium thus preserving water
24. Which of the following is a second generation psychotic drug
- (a) Haloperidol
  - (b) Clopenthixol
  - (c) Risperidone
  - (d) Chropromazine
25. What are the common unwanted effects of antipsychotic drugs
- (a) Weight gain, hypotension and sedation
  - (b) Dizziness, headache and confusion
  - (c) Nausea, diarrhea and Dizziness
  - (d) Drowsiness, dizziness and ataxia

26. Tricyclic anti-depressants are contraindicated in all of the following except
- (a) Recent myocardial infarction
  - (b) Manic phase
  - (c) Renal disease
  - (d) Seizure disorders
27. All of the following are inhalation anaesthetics except
- (a) Nitrous oxide
  - (b) Halothane
  - (c) sevoflurane
  - (d) propofol
28. Which of the following drugs can be used for both induction and maintenance of anaesthesia
- (a) Etomidate
  - (b) Propofol
  - (c) Thiopental sodium
  - (d) Suxamethonium
29. Which of the following anaesthetics should be avoided in cases with high intracranial pressure
- (a) Halothane
  - (b) Propofol
  - (c) Ketamine
  - (d) Thiopental sodium
30. The following is true of Pharmacology except:
- A. Fetal hydantoin syndrome characterized by cleft lip and palate
  - B. Gingival hyperplasia
  - C. Decreases the efficacy of oral contraceptives
  - D. It is safe in pregnancy
31. A 28-year-old man presented with elevated mood, rapid speech, muscle twitching, and dilated pupils. He kept on scratching himself repeatedly because he stated that "bugs are crawling under my skin." Vital signs were blood pressure 170/ 105, heart rate 120 bpm, respirations 20/ min. After a short time, stereotyped behaviour developed accompanied by paranoid delusions, but the man remained oriented and alert. Which of the following drugs most likely caused the patient's syndrome?
- A. Marijuana
  - B. LSD
  - C. Cocaine
  - D. Ethanol



32. The mother of a 16-year-old boy noticed a change in her son's behaviour. When he returned home in the evening after meeting with his friends, he was always very hungry, despite having eaten his dinner. He always appeared happy, would find everything amusing, and laughed a lot. Occasionally, his eyes would be rather red. In the morning he was reluctant to go to school and did not appear to care whether he did well or not. A drug with which of the following mechanisms of action was he most likely abusing?
- A. Activation of cannabinoid receptors
  - B. Blockade of norepinephrine reuptake
  - C. Activation of serotonin receptors
  - D. Activation of  $\mu$  (mu) opioid receptors
  - E. Blockade of dopaminergic receptors
33. An 18-year-old girl who had never used recreational drugs joined in smoking multiple marijuana cigarettes at a party. Which of the following signs and symptoms did the girl most likely experience just after smoking?
- A. Increased heart rate
  - B. Depressive mood
  - C. Hyperalgesia
  - D. Improved memory
34. A 22-year-old man complaining of muscle aches, nausea, and anxiety, reported that he was a heroin addict and that he had been smoking phencyclidine occasionally for the past 6 months. He was sweating, hyperventilating, hyperthermic, high blood pressure, and tachycardia. His pupils were dilated. Which of the following types of drugs would be most appropriate to provide immediate relief to this patient?
- A. 5-HT receptor agonist
  - B. Mu receptor agonist
  - C. Glutamate receptor antagonist
  - D. GABA receptor agonist
35. A 17-year-old girl who had never used drugs decided to join in with her friends who were smoking drugged cigarettes. In the first 5 minutes, she experienced euphoria, uncontrollable laughter, depersonalization, and sharpened vision. Her concentration became difficult, and she noticed that her heart was "pounding." Her friends noted reddening of her conjunctiva but no change in pupil diameter. Which of the following drugs most likely caused the girl's symptoms?
- A. Cannabis
  - B. Cocaine
  - C. Heroin
  - D. LSD
36. A 40-year-old female alcoholic was admitted to an alcohol rehabilitation center because she was determined to quit the habit. A drug was given to facilitate avoidance from ethanol dependence, based on research suggesting that compulsive alcohol drinking is influenced by opiate receptor activity. Which of the following drugs was most likely administered?
- A. Clonidine

- B. Disulfiram
  - C. Naltrexone
  - D. Methadone
37. A 28-year-old polydrug user self-injected a drug approximately 45 minutes prior to admission. Vital signs were blood pressure 100/ 50, heart rate 95 bpm, respirations 5/ min. Physical examination showed cyanosis and pinpoint pupils. Which of the following drugs did the woman most likely take?
- A. Amphetamine
  - B. Heroin
  - C. Cocaine
  - D. Diazepam
38. A 41-year-old man decided to stop smoking cigarettes and asked his family physician about a possible withdrawal syndrome. He had been smoking two packs of cigarettes daily for 24 years. Which of the following are the withdrawal symptoms the man was most likely to experience?
- A. Irritability and restlessness
  - B. Euphoria and elation
  - C. Tachycardia and hypertension
  - D. Decreased appetite and weight loss
39. A 48-year-old woman became agitated and visibly tremulous 1 day after being admitted to the hospital for elective surgery. Which of the following statements most likely explains the reason for the patient's behaviour?
- A. Benzodiazepine medication given before surgery
  - B. Depressive episode triggered by the operation
  - C. Ethanol withdrawal
  - D. Opioid medication given before surgery
40. A 24-year old man, who had started smoking marijuana 5 years ago, had been smoking 5 to 10 marijuana cigarettes daily and occasionally self-injecting pure hashish oil. The man was most likely at increased risk of which of the following adverse events?
- A. Death from parenteral injection of hashish oil
  - B. Death from acute cannabis withdrawal
  - C. Colon cancer
  - D. Driving or work accidents



## SECTION C

(Match the statement in column A with the answer in Column C)

### A. Types of seizures

| Types of Seizure (A)         | Answer | Name of seizures (C)                      |
|------------------------------|--------|---|
| 1. Types of partial seizures |        | A. Tonic-clonic, Absence and Myoclonic    |
| 2. Types of general seizures |        | B. Simple and Complex                     |
| 3. Grand mal seizures        |        | C. Another name for absence seizures      |
| 4. Petit mal seizures        |        | D. Another name for tonic-clonic seizures |

### B. Treatment of epilepsy and seizures.

| Drug                                       | Answers | Mechanism of Action or indication   |
|--|---------|---|
| 1. Phenytoin                               |         | A. Inhibition of axonal sodium channels to produce membrane stabilization                                       |
| 2. Valproic Acid (VA)                      |         | B. Treatment of status epilepticus  |
| C. Benzodiazepines; Diazepam and lorazepam |         | C. Inhibition of axonal sodium channels; inhibition of T-type calcium channels; inhibition of GABA transaminase |
| D. Ethosuximide                            |         | D. Drug of choice for treating absence seizures   |

### C. Drugs Abuse

| Description of drug  | Answer | Drug           |
|--|--------|----------------|
| 1. Drug sometimes used to decrease alcohol craving in alcoholics |        | A. Ethanol     |
| 2. Drug that mainly increases nonvascular release of             |        | B. Amphetamine |

|  |  |                  |
|--|--|------------------|
| dopamine from dopaminergic neurons                             |  |                  |
| 3. Elimination of this drug follows mainly zero-order kinetics |  | C. Naloxone      |
| 4. Drug is used in heroin detoxification programs              |  | D. Buprenorphine |

#### SECTION D- 20marks

##### 1. Very short notes ((Answer should be no more than 1 sentence.)

- What is the most common seizure type? (2 marks)
- What type of seizure most commonly presents during childhood? (2 marks)
- What is status epilepticus? (2 marks)
- Overdose or abrupt withdrawal of antiepileptic drugs may cause what adverse effect? (2 marks)
- How do phenytoin and carbamazepine decrease the efficacy of oral contraceptives? (2 marks)

##### 2. Short notes-

- Write short notes on the mechanism of action of antidepressant (5 marks)
- Write short notes on the general treatment of dementia (5 marks)

**END OF CAT2**