e) Neurons--oxygen dependent, irreversible damage.

12. At cellular level, a toxicant can:
    a) Interfere with receptor-ligand binding.
    b) Interfere with membrane function.
    c) Interfere with cellular energy production.
    d) Bind to biomolecules.
    e) Perturb homeostasis (Ca).
13. Toxicants are eliminated from the body by several routes:
    a) Urinary excretion/Kidney.
    b) Exhalation/Breathing.
    c) Biliary /Fecal route.
    d) Milk.
    e) Sweat or Saliva.
14. Metabolism in toxicology:
    a) Parent compounds are modified by the organism
    b) Increases ionization.
    c) Bioactivation.
    d) May decrease toxicity.
    e) Biotransformation
15. Main organs involved in biotransformation or metabolism of toxicants are:
    a) LIVER (high).
    b) Lung.
    c) Kidney.
    d) Intestine (medium).
    e) Others (low).
16. Individual susceptibility to toxicants may depend on:
    a) Genetics-species.
    b) Gender (gasoline nephrotox in male mice only)
    c) Nutritional status
    d) Health conditions
    e) Age...Young or Old
17. Treatment of intoxication with ethylene glycol uses:
    a) Ethyl alcohol
    b) Isopropanol
    c) Methanol
    d) Ethylene
    e) Paracetamol & ethanol.
18. Common samples for GIT intoxication:
    a) Vomitus
    b) Gastric aspirates
    c) Gastric washings
    d) Urine
    e) Blood
19. The sample of choice for arsenic poisoning:
    a) Hair about 200gm
    b) Urine 50ml
    c) Blood 10ml
    d) Diarrhoeic stool

(d) All of the above.

9. Dermatophototoxicants include:
   a. Chemical photoallergens as coumarin derivatives
   b. Phytophotoallergens as ragweed(compositae family)
   c. UV light in susceptible persons
   (d) All of the above

10. Photosensitisation is a complex dermatotoxic phenomenon and includes:
   (a) Congenital
   (b) Primary
   (c) Secondary
   d. None of the above

11. Alopecia maybe a manifestation of dermatotoxicants or therapy with cancer drugs, and is more closely associated with:
   (a) Thallium
   (b) Arsenic
   (c) Selenium
   (d) Radiotherapy

12. Skin cancer may be a manifestation of long term exposure to dermatotoxicants:
   a. UV & ionizing radiation
   b. Polycydic aromatic hydrocarbons
   c. Arsenic
   (d) All of the above

13. Diarrhoea and vomiting maybe viewed as a healing reaction of the GIT to:
   a. Chemical toxicants
   b. Phytotoxins
   c. Microbial toxins
   (d) All of the above

14. Direct or primary toxicants of the GIT are:
   (a) Acids
   (b) Alkalies
   (c) Herbicides
   (d) Mushrooms(Thallium Amanita)

15. Signs of Upper Alimentary Tract Toxicosis:
   (a) Salivation
   (b) Choking & coughing
   (c) Hyperaemia(Labia/buccal)
   d. None of the above

16. The functions of the stomach that maybe most affected adversely by toxicants include
   (a) Synthesis, storage & secretion
   b. Synthesis mainly.
   c. Secretion always
   d. All of the above

17. Macroscopic examination of vomitus is an evaluation method of
   a. Systemic toxicology
   (b) GIT toxicology
   c. Respiratory toxicology
   d. All of the above

18. Administration of antiemetics is discouraged in GIT toxicosis:
   (a) It may block elimination of toxicants
   b. It increases the effects of toxicants
   c. It slows down healing

# UNIVERSITY OF ZAMBIA
## SCHOOL OF MEDICINE
### BIOMEDICAL SCIENCES
TOXICOLOGY BMS 3135 TEST/I/2015

**OMPUTER No** _____

**nstructions:**

i. Fill in your computer number in the space provided above and on each answer sheet used.
ii. Attempt all questions in Part A MCQ.
iii. Attempt two(2) out of three (3) short answer questions in Part B
iv. Compulsory one (1) essay question in Part C

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**PART A MCQ (20marks)**
**Circle your most correct answer(s)**

1. The pestide DDT that enters the human body:
   a. Is easily excreted in urine
   b. Is absorbed in the red blood cells
   c. Is stored in the bones
   d. Is stored in adipose tissue
2. Absorption, distribution, biotransformation and excretion refers to:
   a. Disposition of a toxic substance
   b. Dilution of a toxicant
   c. Dynamics of a toxicant
   d. None of the above
3. The term Plumbism refers to intoxication with:
   a. Lead
   b. Arsenic
   c. ASA
   d. All of the above
4. Cyanide is more closely associated with
   a. Histotoxic hypoxia
   b. Stagnant hypoxia
   c. Anaemic hypoxia
   d. Anoxic hypoxia

4. Methyl mercury (choose the INCORRECT statement)

A) may be synthesized from inorganic mercury by bacteria

B) produces some of the same syndromes of toxicity as inorganic mercury

C) reaches lower concentrations in nerve tissue than inorganic mercurials

D) primarily affects the central nervous system

E) induced neurological damage is commonly irreversible

5. Which of the following leads to deposition of oxalate crystals in the urinary tract?

A) Dieffenbachia (dumbcane)

B) propylene glycol

C) methoxyflurane

D) philodendron

E) ethylene glycol

Oxalate Crystals in the Urinary tract.

6. The primary site of kidney damage resulting from acute exposure to inorganic mercury salts is the

A) glomerulus

B) proximal tubule

C) loop of Henle

D) renal papilla

E) entire nephron

7. Which of the following is NOT a chlorinated hydrocarbon insecticide?

a) Lindane b) DDT c) Dieldrin d) Mirex e) Carbofuran

8. After an oral ingestion of an alcoholic beverage

A) the blood concentration of ethanol in the tip of the toe and in the brain would be essentially equal

B) ethanol absorption is delayed until complete gastric emptying occurs

C) the brain selectively concentrates ethanol which accounts for the prominent action in that tissue

D) some of the ethanol completely escapes absorption

E) none of the above

14. Cyclodiene insecticides: - dieldrin.

A) cause intense stimulation of the nervous system. F
B) are antagonists of GABA. T
C) are potent inhibitors of $Na^+$, $K^+$-ATPase. T
D) inhibit the enzyme $Ca^{2+}$, $Mg^{2+}$-ATPase. T
E) inhibit the enzyme acetylcholinesterase. F

15. Compound 1080: (

A) is a phenoxy herbicide. T
B) replaces acetylcoenzyme A during metabolism and combines with oxaloacetic acid to form fluorocitrate. F
C) decreases concentrations of 5-hydroxytryptammine and GABA in the brain. F
D) blocks cellular energy production and respiration. F
E) inhibits cytochrome C oxidase. T

16) Discuss the uses of the following substances in clinical toxicology. Give a specific example of a toxicosis for which they may be used in each case:

a) Atropine — Alkaloid from belladona — used for antidote for nerve gas poisons
b) D-penicillamine — as a chelating agent = lead poisoning — wilsons disease
c) Phytonadion — Vit K1 ⊕ feed supplement
d) Apomorphine — white crystalline alkaloid derived from morphine and used to induce vomiting
e) Superoxide dismutase (orgotein) — Vomiting
f) Activated charcoal — tying gases by adsorption. Purging gases by adsorption at receptor sites. Toxic
g) Syrup of ipecac — Ethylene glycol poisoning. Induce vomiting & Emetic
h) 4-methylpyrazol — inhibitor of Alcohol dehydrogenase
i) Pralidoxime — treat poisoning of some insecticide and nerve agents. Used in conjunction with atropine
j) Diazepam — treat anxiety convulsion during alcohol withdrawal

Reduction

17) Give short explahatory notes on the following?

A) Fetal alcohol syndrome

Pattern of birth defects occurring as a result of excessive alcohol consumption by the mother during pregnancy and characterized by growth retardation, Cranial, Facial abnormalities and developmental disabilities. Limb defects, vision, hearing problems

B) Organophosphate induced delayed neuropathy

neuropathy caused by killing of neurons in the central nervous system especially in the spinal cord as a result of Chronic organophosphate poisoning

End of Test

25/30

S/B
- Growth Retardation
- Neuro Anomalies
- Developmental Anomalies
- ect

9. Alcohol depresses activity within the CNS; however, during the acute phases of ingestion a hyperactivity-hyperexcitement seems to occur in certain individuals. This action of ethanol is due to

A) Disinhibition or initial selective depression of inhibitory neurons
B) Initial excitation of higher cortical centers
C) Acute gastritis
D) Spinal stimulation
E) Initial depression of the reticular activating system

10. The following could be used to clear poisons from the stomach
A) manual stimulation of the pharynx to induce vomiting
B) apomorphine
C) gastric lavage
D) ipecac
E) all of the above

11. Batrachotoxin:

A) Binds to the sodium ion channel and keeps it open permanently by preventing channel inactivation. ---T---

B) changes the selectivity of the sodium ion channel to Na+ ions and makes it less selective, enabling larger ions to pass through the pore. ---T---

C) is secreted by glands of the poison dart frog ---T---

D) is a neurotoxin. ---T---

E) has effects on the heart. ---T---

12. State whether the following are true or false about tetrodotoxin:

A) It is secreted by the rough-skinned newt (*Taricha granulosa*) ---F---

B) It is secreted by the frog *Phyllobates terribilis* ---F---

C) It binds to sodium channels in nerve cells and interferes with the normal flow of sodium ions in and out of the cell. ---T---

D) Is a product of certain bacteria such as *Pseudoalteromonas tetraodonis*, certain *Pseudomonas* species and *Vibrio* species. ---T---

E) It is found in certain fish such as the puffer fish. ---F---

13. Atropine is produced by the following plants

A) *Dieffenbachia* (Dumbcane) ---F---
B) *Atropa belladonna* (Deadly Nightshade) ---F---
C) *Abrus precatorius* ---T---
D) *Datura stramonium* ---F---
E) *Nerium oleander* ---F---

5. The.....of a toxicant is the combination of exposure and toxidynamic or pharmcodynamic effects of such a substance:
   a. Endpoint
   b. Phase
   c. Biotransformation
   d. Excretion
6. The dose of a toxicant appears to define whether a substance is toxic or.....:
   a. Not
   b. Diluted
   c. Excreted
   d. None of the above
7. The samples required for toxic evaluation include:
   a. Hair and nails
   b. Blood
   c. Urine
   d. All of the above
8. What type of toxicologist takes sample of your blood, urine and hair for testing?
   a. Descriptive
   b. Analytical
   c. Mechanistic
   d. Forensic
9. The larger the amount of exposure and the greater the dose, the greater the observed response, or effect
   a. True
   b. False
10. The term *toxicant* is used when talking about toxic substances that are produced by or are a by-product of human-made activities:
   a. True
   b. False

11. Toxic agents can be classified in terms of:
   a. Their physical state
   b. Their effects
   c. Their source
   d. All of the above
12. You are worried about contamination of vegetables grown in contaminated soils. What type of toxicologist would you contact?
   a. Descriptive
   b. Environmental
   c. Regulatory
   d. Food
3. Which of these groups is usually designated as one of the most sensitive sub-populations for exposures to toxic substances?
   a. Adult women
   b. Infants
   c. Adult men

THE UNIVERSITY OF ZAMBIA

DEPARTMENT OF BIOMEDICAL SCIENCES

**PTH 342 (TOXICOLOGY) - TEST 2**

MONDAY, JANUARY 31, 2011 TIME ALLOWED: ONE HOUR

COMPUTER # 28007379

**INSTRUCTIONS: Answer all questions. For questions 1 to 10, choose the best answer. For questions 11-15, state whether True (T) or False (F).**

1. A 19-year old man was exposed to a chemical that caused pulmonary injury mediated by free radicals. The most likely responsible agent is:
   A) Benzene
   B) Carbon monoxide
   C) Malathion
   D) Paraquat
   E) 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin

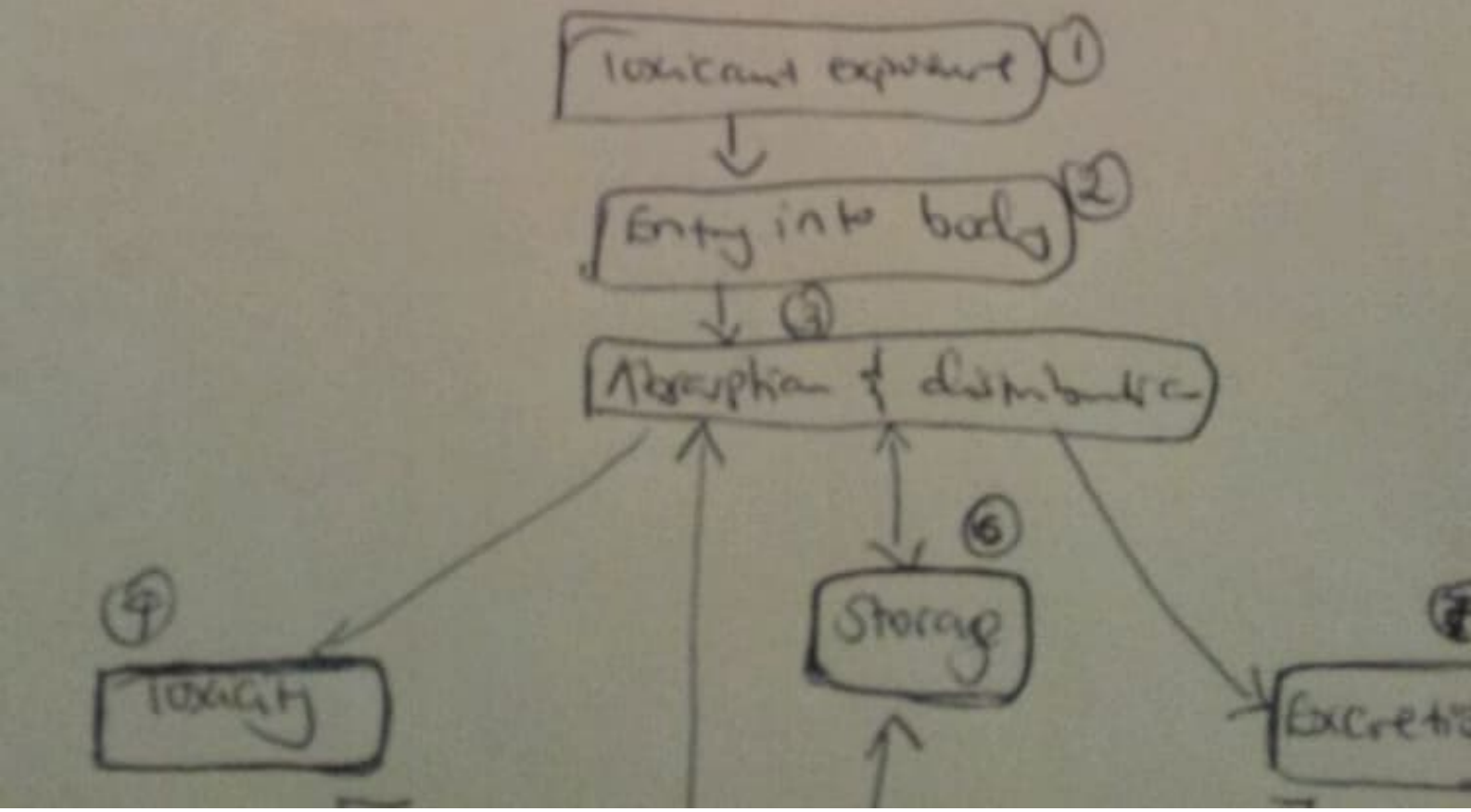
2. Which of the following statements is *not* true regarding cadmium.
   A) Cadmium induces the formation of metallothionein
   B) Dietary zinc reduces the toxicity of cadmium
   C) A dietary deficiency of calcium enhances cadmium toxicity
   D) A dietary deficiency of iron enhances cadmium toxicity
   E) Diets low in protein reduce cadmium toxicity

3. Which form of mercury was the predominant cause of Minamata Bay disease?
   A) metallic mercury
   B) mercuric salts
   C) mercurous salts
   D) organic mercury compounds
   E) mercury was not the causative agent

22. Briefly explain the following (5marks each):
    a. Cyanide poisoning
    b. Immunotoxicants
    c. Haemopoietic toxicants
    d. Toxic hypoxia
23. What do you understand by (5marks each):
    a) Toxicity
    b) Toxicity end-point
    c) Toxicity test
    d) Toxicity Risk Assessment

**PARTC COMPULSORY ESSAY QUESTIONS (40marks)**

24. Briefly explain the fundamental principles of toxicology



d. Adolescents

14. You are concerned about risks associated with growing vegetables in soil with high lead and arsenic concentrations. You are speaking of what type of substance?
   a. Toxin
   b. Toxicant
   c. Drug
   d. None of the above

15. Which of the following is a toxicant that cannot cause anoxia or ischaemia leading to neuronal damage and loss of function?
   a. Carbon monoxide
   b. Lead
   c. Cyanide
   d. All of the above

16. Cyanide is a classical example of
   a. Systemic toxicant
   b. Is as good as carbon monoxide
   c. Is as bad as cytochrome 450
   d. Its effect is always reversible.

17. Anaemic hypoxia is associated with exposure to:
   a. Carbon monoxide,
   b. Nitrates
   c. Nitrobenzene
   d. Aminophenols

18. This metal toxicant "lead" is regarded as:
   a. Ubiquitous
   b. Less toxic
   c. Never affects mammals
   d. Safe for domesticated animals.

19. Factors influencing toxicity maybe:
   a. Concomitant exposure
   b. Synergism
   c. Potentiation
   d. None of the above

20. Human(anthropogenic) activities are responsible for:
   a. Increased levels of toxicity with metallic toxicants
   b. Contamination of water sources with metallic toxicants
   c. All cancers
   d. Most mental disorders

**PART B SHORT ANSWER QUESTIONS (20marks)**
**Attempt any two(2) questions in this section.**

21. write short notes on all of the following(5marks each):
   a. Factors influencing toxicity
   b. Histotoxic hypoxia
   c. Macrophages toxicants
   d. Toxic responses

d. None of the above statement is correct

## PART B SHORT ANSWER ESSAY QUESTIONS

**Attempt two (2) out of three (3) short answer essay questions**

21. Explain the types (forms) of toxic particulates that maybe associated with respiratory intoxication.

22. How does the skin react to toxicants?

23. What are the mechanisms of GIT toxicological damage?

# UNIVERSITY OF ZAMBIA
## SCHOOL OF MEDICINE
### BIOMEDICAL SCIENCES
TOXICOLOGY BMS 3135 TEST/II/2016

OMPUTER No

**structions:**

i. Fill in your computer number in the space provided above and on
answer sheet used.
ii. Attempt all questions in Part A MCQ.
iii. Attempt two(2) out of three (3) short answer essay questions in Pa

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**RT A MCQ. Attempt all questions in this section**

1. Cytochrome P-450 significantly supports the biotransformation of toxicants in:
   a. Clara cells
   b. Macrophages
   c. Phagocytes
   d. All of the above cells
2. The herbicide paraquat:
   a. Maybe biometabolised in pulmonary capillary endothelial cells
   b. Is absorbed and excreted in the renal tubules
   c. Is concentrated in the bone marrow
   d. None of the above is correct
3. Environmental toxicants in air:
   a. Are readily absorbed in the lungs causing systemic and local toxic effects
   b. Are purified in the lungs
   c. Are arrested by macrophages
   d. Only hydrophilic toxicants are absorbed
4. Systemic toxicants reach high concentration in the lungs due to:
   a. High rate of blood flow to the lungs via pulmonary artery

e) Neurons--oxygen dependent, irreversible damage.

12. At cellular level, a toxicant can:
    a) Interfere with receptor-ligand binding.
    b) Interfere with membrane function.
    c) Interfere with cellular energy production.
    d) Bind to biomolecules.
    e) Perturb homeostasis (Ca).
13. Toxicants are eliminated from the body by several routes:
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    a) Parent compounds are modified by the organism
    b) Increases ionization.
    c) Bioactivation.
    d) May decrease toxicity.
    e) Biotransformation
15. Main organs involved in biotransformation or metabolism of toxicants are:
    a) LIVER (high).
    b) Lung.
    c) Kidney.
    d) Intestine (medium).
    e) Others (low).
16. Individual susceptibility to toxicants may depend on:
    a) Genetics-species.
    b) Gender (gasoline nephrotox in male mice only)
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    a) Vomitus
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    d) Urine
    e) Blood
19. The sample of choice for arsenic poisoning:
    a) Hair about 200gm
    b) Urine 50ml
    c) Blood 10ml
    d) Diarrhoeic stool

4. The dose is dependent upon:
   a) The environmental concentration
   b) The properties of the toxicant
   c) The frequency of exposure
   d) The length of exposure
   e) Exposure kinetics
5. A dose response is a change from normal state & could be at:
   a) Molecular level
   b) Cellular level
   c) Systemic level
   d) Organ level
   e) Organism level--the symptoms
6. The LD50 of nicotine is:
   a) 1
   b) 0.001
   c) 0.0001
   d) 15
   e) 150
7. The acronym ADME refers to:
   a) Kinetics
   b) Dynamics
   c) Absorbption
   d) Digestion
   e) Toxic reaction
8. Absorption:
   a) Ability of a chemical to enter the blood.
   b) Inhalation--gases.
   c) Ingestion--through GIT.
   d) 1st Pass Effect (liver can modify).
   e) Dermal--via epidermis.

9. The following toxicants are prone to storage in the bone and include:
   a) Calcium.
   b) Fluoride.
   c) Lead.
   d) Strontium.
   e) Chemicals analogous to calcium.
10. The pesticide DDT is
   a) Is distributed & stored in adipose tissue.
   b) Deposited in lymph nodes.
   c) Absorbed & metabolized in the liver.
   d) Biotransformed in the macrophages
   e) Is excreted via the anus.
11. Not all organs are affected equally by toxicants:
   a) Higher concentration of active compound.
   b) Liver--high blood flow, oxidative reactions.
   c) Kidney--high blood flow, concentrates chemicals.
   d) Lung--high blood flow, site of exposure.

e) Neurons--oxygen dependent, irreversible damage.

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19. The sample of choice for arsenic poisoning:
    a) Hair about 200gm
    b) Urine 50ml
    c) Blood 10ml
    d) Diarrhoeic stool

e) Haemtatoxic

28. Organic lead compounds are:
    a) Neurotoxic
    b) Nephrotoxic
    c) Hepatotoxic
    d) Dermatoxic
    e) Haematoxic
29. Black foot disease is associated with exposure to:
    a) Arsenic
    b) Copper
    c) Cadmium
    d) Zinc
    e) Methyl mercury
30. Itai-Itai disease is associated with:
    a) Consumption of vegetables or rice contaminated with cadmium
    b) Lead intoxication
    c) Inorganic lead
    d) Copper sulphate
    e) Selenium
31. Chromium is known to induce:
    a) Occupational lung cancers
    b) Anaemia
    c) Fever
    d) Leucopenia
    e) Obesity
32. Acute exposure to cadmium:
    a) Leads to testicular injury
    b) Leads to ovary injury
    c) Promotes spermatogenesis
    d) Inactivates spermatogenesis
    e) Leads to vomiting.
33. Broiled foods may contain:
    a) Polycyclic aromatic hydrocarbons(PAHs) –carcinogens
    b) Sulphide
    c) Phosphide
    d) Carbon monoxide
    e) Carbon dioxide
34. Common effects of modern cosmetics are:
    a) Allergic reactions
    b) Contact dermatitis
    c) Diarrhoea
    d) Skin cancers
    e) Pruritis
35. The following may be viewed as "toxicological barriers":
    a) Blood/Brain
    b) Placental(maternal-foetal)
    c) Mammary(Blood-milk)
    d) CSF

c) A poison may have numerous toxic effects
d) Poison is a qualitative concept
e) A xenobiotic administered above its toxic dose is always poisonous

44. Concerning acute and chronic toxicity:
a) Acute toxicity produces immediate effect
b) Acute toxicity may be due to exposure over the short term
c) Chronic toxicity is usually associated with higher exposure doses than acute toxicity
d) For a particular chemical, both forms of toxicity always affect the same system
e) Acute toxicity does not results in long term pathology

45. What is true about biotransformation of xenobiotics:
a) All toxicant that undergo phase I reaction undergo a second series of reactions known as phase II reactions
b) Hydroxylation always terminated the toxic effects of xenobiotics
c) Products of phase I reactions are usually more water-soluble than those of phase II reactions
d) Cytochrome p450 reductases are the major haem protein enzyme family involved
e) For any xenobiotic, phase I biotransformation precedes phase II biotransformation

46. Regarding phytotoxic agents:
a) Clinical signs/symptoms and lesions should be compatible with the known effects of the suspect toxic plants.
b) Specific antidotes are available for many plant toxins
c) Ricin inhibits ribosomal protein synthesis
d) Poisoning with belladonna alkaloid containing plants produces symptoms that are similar to atropine over dosage.
e) All mushrooms produce toxic effect within 6 hours of ingestion

47. A toxin maybe considered a:
a) Natural chemical
b) Xenobiotic
c) Poison
d) Venom
e) All of the above

48. Which of the following are sources of anthropogenic pollutants:
a) Forest fires
b) Combustion sources that burn fossil fuel or exhaust emissions from vehicles that use gasoline or diesel fuels
c) Dust storms
d) Industrial processes
e) Mining and drilling

49. Environmental hormones:
a) Pollutants that mimic hormones
b) Can be industrial chemicals
c) Can be pharmaceutical drugs
d) Also known as endocrine disrupters

e) Adipose tissues

36. Human(anthropogenic) activities are responsible for:
    a) Increased levels of toxicity with metallic toxicants
    b) Contamination of water sources with metallic toxicants
    c) All cancers
    d) Most mental disorders
    e) Most skin cancers
37. Non-regulated mining activities
    a) Increase the risk of toxicity of humans, animals, plants, & ecosystem with metallic toxicants.
    b) Affect food safety
    c) Are associated with occupational diseases
    d) Increase risk of occupational diseases.
    e) All of the above are not correct
38. Mercury toxicity results mainly from or gives rise to:
    a) Eating fish contaminated with methylmercury
    b) Eating seed grain treated with mercury fungicides
    c) Minamata disease
    d) Mercury poisoning
    e) None of the above.
39. Treatment of metal poisoning uses:
    a) Chelating agents e.g. EDTA, calcium salt
    b) Acidified water
    c) Bicarbonates
    d) Dilute benzene
    e) Rectified spirit
40. Absorption phase of toxicology involves:
    a) Membrane morphology e.g. lipoprotein bilayer
    b) Physiochemical processes governing transmembrane movement.
    c) The pH of the saliva
    d) The sites of absorption
    e) Excretion
41. Chemical toxicants damage can be classified as being either:
    a) Local
    b) Acute
    c) Chronic
    d) Systemic
    e) Generalized
42. Toxicology
    a) Is rarely classified as a signal molecular event
    b) Does not include the harmful effects of physical phenomena such as noise
    c) May aid the development of drugs
    d) Many disciplines contribute to toxicology including mathematics
    e) All of the above
43. Regarding poisons:
    a) Do not include endogenous compounds
    b) Poison is a quantitative concept

**Section A. Attempt only FOUR (4) out of the five questions in this section. Each question must be answered on a SEPARATE answer sheet. Each question carries 10 marks.**

**Question A1:**

When translating any double-stranded DNA, there are six possible reading frames.

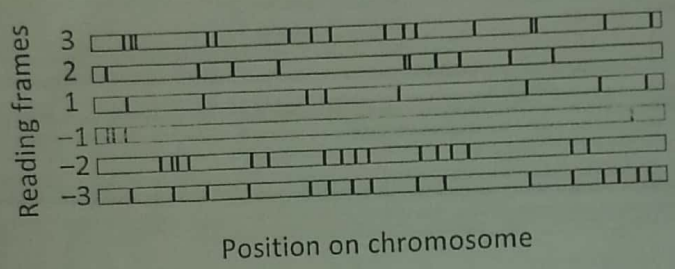
a) What is an open reading frame (ORF)? **[2 marks]**

b) How are ORFs identified in a DNA sequence? **[2 marks]**

c) Why is it relatively easy to identify ORFs in prokaryotic genomes by computer analysis? **[2 marks]**

d) Why is it more complex to identify ORFs in the genomes of higher eukaryotes? **[2 marks]**

e) The schematic drawing below shows the six different reading frames of a genomic region in *Escherichia coli*. Stop codons in each of the reading frames are indicated by black bars. In which reading frame do you think the open reading frame (ORF) is translated in this region? **[2 marks]**




**Question A2:**

Many genetic diseases are caused by point mutations that result in modification or inactivation of a gene product. Describe **two (2)** different ways recombinant DNA technology can be used to identify these mutations. **[10 marks]**

**Question A3:**

a) Define a genome **[2 marks]**

b) What was the human genome project and briefly describe its phases **[8 marks]**

**Question A4:**

Briefly describe the methods used to insert foreign DNA into cells **[10 Marks]**

3

Section C

2018/HD/44648

MWANGAZA KYOMBO

## QUESTION 1

The main factors influencing food choice among adolescents are as follows:

- Appetite: they are mostly driven by what they see. ✓
- Taste: As long as the food is nice to the mouth they end up eating or buying ✓
- economic factors – they buy food or eat based on how there economy. ✓
- Social factors – also influence the type of food to eat ✓
- Built environment – ✓

This has impacted negatively on their health they most of these food are risk factors for diabetes, hypertension,

- physical determinant
- Biological

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R018/44448

QUESTION 2

High complex carbohydrates are made up of several carbon sugar units.
examples of polysaccharides are;
Starch
Carbohydrates can be found in foods like, bread with wholegrain or white bread, cereals, green vegetables

Food processing is the method or technique used to transform raw ingredients to food for consumption
There are many methods used for food processing some of them are as follows;
Chopping, pasteurising, cooking, spry-drying, emulsifying

I have chosen cooking as a choice of method of food processing.

These positive effect of cooking is that it improves the nutritive content of food in the sence that some condiments can easily be added to the food making it more nutritions. Coking food also kills microorganisms that can cause disease to our bodies
Cooking improves the sensory of food (taste is improved)
Cooking softens the food for easy consumption.
The negative effect of cooking include; cooking can destroy some vitamins like vitamin C which easily leak out of food due to heat.
- over cooked foods have high GI due to increased surface area which can result into easy digestion

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## Question 3

(A) Overnutrition is when a food product contains higher than the normal nutrients needed for consumption

Under nutrition is when a food product has less than normal nutrients required for consumption

(B) Three major sources of macronutrients

- Whole grain bread / cereals (carbohydrates)
- Meat (beef) (proteins)
- Poultry (fats and oils)

3 Three sources in each Macro nut

(C) Three major sources of micronutrients

- green vegetables
- nuts
- sweet potatoes

3 Name 3 major sources of 3 Micro nutrients

(D) Energy balance is the balance between energy intake and expended

Weight maintenance is when the energy intake equals energy expended

5 It significance is that it maintains the body weight. You will neither be overweight or Obesity or loose weight

5. After digestion and absorption, dietary carbohydrate may be:
   a) Used For Energy
   b) Converted To Glycogen And Stored In Liver Or Muscle Tissue
   c) Synthesized Into Fat
   d) A, B, And C

6. Which of the following nutrients is needed to build and maintain the structural muscles of the body?
   A. Carbohydrates
   B. Protein
   C. Fat
   D. Fibre

7. The difference between fats and oils is, fats
   A. have a high percentage of fatty acids as saturated fatty acids
   B. have a high percentage of fatty acids as unsaturated fatty acids
   C. are solid at room temperature
   D. are usually obtained from plant sources
   E. both a and c

8. The foods most often contaminated with aflatoxins are
   A. cheeses made from unpasteurized milk
   B. meats from wild animals such as bear and deer
   C. fish and shellfish
   D. wheat, corn, peanuts and tree nuts

9. How does Cross-contamination of foods occurs
   A. when perishable foods are kept at room temperature up to two hours
   B. when two or more food handlers are working with the same food
   C. when two or more different microorganisms are growing in the same food
   D. when a utensil contaminated with a microorganism from a previously handled food is allowed to come in contact with a second food and contaminates it

10. A substance intentionally added to food products which has potential to alter the nature and quality of food is called _____
   a) Food poison
   b) Food adulterant
   c) Food contaminant
   d) Food material

11. **Glycemic** Index is based upon
   a) A measurement of insulin in the body.
   b) A measurement of carbohydrate on blood sugar levels.
   c) A diet that cuts out carbohydrate

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d) Answers (a and b are correct)

12. Which of these food items has the highest GI?

a) Dried fruit

(b) Fruit juices

c) Vegetables (not potatoes)

d) Yams

## SECTION B. ANSWER ALL QUESTIONS (40 Marks)

1. You are a fresh biomedical scientist, very familiar with principles of nutrition and dietetics in prevention/ management of health conditions of public concern. **Scenario,** you observe that a close family friend takes his family out to feast on **Big Bite 2**, Deep Fried chips, Deep Fried chicken thigh, tomato source, and cool drink (***Fanta Orange*** or ***Coca-Cola). Given that there is a rapid increase in cases of emerging conditions of public health concern? Provide an augment for or against this type of meal and the general life style. (10 marks)***

2. Theoretically, Consumption of complex carbohydrates is a good practice in management and preventing the escalation of Diabetes conditions. Explain a ***choice method*** of food processing and its positive or negative effect on the nutritional quality of the final product. (10 marks)

3. Discuss with brief notes on the following **(20 Marks)**
   A. What is over nutrition or under nutrition? (5 marks)
   B. Name three major sources of three macronutrient? (5 Marks)
   C. Name three major sources of three micronutrients? (5 Marks)
   D. What is Energy balance and weight maintenance and its significance to human health (5 Marks)

## SECTION C ANSWER ONE-QUESTIONS (20 Marks)

1. What are the main factors influencing food choice among adolescents? To what extent are these choices impacting on diet related diseases? **(20 marks)**
2. What should be the main diet and lifestyle of consumers to avoid over nutrition and under nutrition related disease. Give examples of such nutrition related diseases **(20 Marks)**

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## Section B

### QUESTION 1

Argument against the type of food family friend feed their family. (Big Bite?)

There are ~~many~~ diseases that come abot as a results of eating behaviour. These include; Cadiovascolar disease, Atherosclerosis, diabetes, hyperlipidemia ~~Now looking~~ These diseases come about as a results of high cholesteral level in ~~the~~ food we eat, to much low density lipoprotein LDL, foods with high glycemic index. If these aforementioned foods are consumed ~~in high~~ can bring health problems to our bodies.

Now looking at ~~the~~ type of food My family member bought for ~~his~~ his family most of them have nutrients which can course disease.
Deep fried chips have high glycemic index in the sense that over fried foods are easily digested giving high blood glucose levels. Deep fried chicken has a health harzard in that the skin of poultry has high cholesteral level because of the saturated fatty acids it contains.
Fanta or coco-cola these have high glucose (energy) levels which have been added of free sugars.
Therefore high cholesteral can cause atherosclerosis, high glycemic index or high blood glucose level ~~is~~ a risk factor of diabetes.

A - 33
B - 31
C - 14

78

**THE UNIVERSITY OF ZAMBIA**
**SCHOOL OF PUBLIC HEALTH**
**DEPARTMENT OF BIOMEDICAL SCIENCES**

**BMS 3160: INTRODUCTION TO NUTRITION AND DIETETICS**

**Nutrients: (sources, digestion and metabolism)**
**Macro and Micronutrients**

**SECTION A: ANSWER ALL** (MCQ) (40 marks)

**Circle or Tick the right answer**

1; which food group is our body's best source of energy?

a) Meat Group
b) Fats, oils and sweets
c) Breads and cereals
d) Milk and cheese

2. Which of these nutrients is NOT considered a nutrient?

a) Vitamins
b) Minerals
c) Fibre
d) Fats

10 x 3.3

33

3. Which of these is required on the food label?

a. Total Carbohydrate
b. Sugars
a) Iron
b) All Of The Above

4. Foods from the meat, poultry, fish dry beans, eggs and nuts group are an important source of _____?

a) Iron
b) Fibre
c) Beta Carotene
d) Calcium

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A - 36
B - 23
C - 14
73%

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## SECTION C

## QUESTION 2

A diet should be the main diet
(1) what should it contain ?
(2)

Over nutrition and under nutrition related diseases can be corrected by the following measures

(1) Over nutrition – The following are the high sugar charges and diet changes that can be used to avoid or correct a over nutrition condition such as obesity

(2) High protein intake- especially as breakfast is a good measure in the correction of obesity because proteins have a high thermic energy allowing the body to burn more energy as it is been digested. proteins also delay gastric emptying making someone to be full for a long period of time. proteins also stimulate the action of glucagon therefore breaking the glycogen as a source of energy while proteins are being digested

(3) Low calories – this will prevent further gaining of weight as calories are the main cause of weight gain. reduce intake of high fat foods

c) Physical activity – increase in physical activity will allow the body to burn more energy, breaking the stored energy in form of fats

d) High fiber intake – fibre delays gastric emptying making one to be full for a long period of time because they are not easily digested. Fiber intake also have a high thermic energy the energy used to break them down is high allowing the body to burn more energy

e) Low Reducing the amount of food intake this can be done by by reducing the size of the cups and plates at home so that you can not cook more food so that energy intake will be less than energy output

d) Incorporating fruits and vegetables in the diet – these have a high content of fiber which takes time to digest delaying the gastric emptying making some to be full for a long period of time

## QUESTION 1

Eating Big bite 2 which are deep fried chips, deep fried chicken thigh and a cool drink such as coca-cola have potential to cause a non communicable disease such as obesity cholesterol or cardiovascular disease because of the content or the combination of food.

1. coca-cola ⇒ this drink contains sweetened sugars with no nutrient value, this type of sugars first of all are easily digestible increasing the glycemic index and amount of glucose in the body which are stored as fats leading to overweight or obesity.

2. Deep fried chips - deep fried chips are rich in fats especially saturated fat, frequently eating this kind of food eventually lead to the increase and deposition of fat particularly cholesterol in the body leading to obesity. These fats or can then be deposited in the blood vessels as plaques and can lead to cardiovascular diseases such as heart failure and cholesterol can also occur

3. Deep fried chicken thigh just like deep fried chips is rich in cholesterol fats which can lead to obesity, stroke and heart attack as a result of deposits of plaques in the arteries supplying the brain and heart respectively.

Therefore looking at the contents of these this type of meal be against it because of the major heart diseases it can such as cholesterol, stroke, obesity and cardiovascular dise

SECTION B

KABIRU MOSES 2018146963

QUESTION 2

Complex carbohydrates such as starch are a source of energy and generally speaking complex carbohydrates such as starch have a high glycemic index because it takes time for the body to digest these nutrients and are a good and health source of energy especially in Diabetic patients compared to simple carbohydrates such as glucose because in diabetes will want to maintain a constant steady release in glucose. However the type of processing also influences the glycemic index either increasing it or decreasing it (GI index). An example is over cooking or increased period of cooking at an increased temperature, overcooking will break down the complex bonds in the complex carbohydrate (such as pasta) making the nutrient to be easily digested by the enzyme therefore increasing the glycemic index and compare to moderately cooked foods of the same type and quality. In other words highly processing of food increases the rate of digestion and gastric emptying therefore increasing the glycemic index. Highly processing food might have an advantage of being easily digestible but the method is not good for diabetic patients because the increase (rapid increase) in glucose will not be effectively controlled by a diabetic patient since they are either insulin resistance or deficiency. This will have a very negative impact on them

## SECTION B

## QUESTION 3

a Over nutrition - this is a state when someone is taking in more nutrients than the bodys ability to use them or need. In other words over nutrition is is energy input is more than the energy out put, this will lead to a positive energy balance leading to weight gain because excess energy will be stored as fats

Under nutrition - this is when over a prolonged period some takes in less nutrients than the bodys need. Since the energy input is less than the energy out put, stored energy such as fats will be used as a source of energy leading to a negative energy balance leading to under weight or weight loss.

b

| Carbohydrates | protein | Fats |
|---|---|---|
| 1. potatoes | (i) meat | (i) nuts |
| 2. Maize Grain | (ii) fish | (ii) fish |
| 3. Green vegetables (starchy) | (iii) beans | (iii) meat |

c

| Vitamin A | Vitamin E | Iron |
|---|---|---|
| (i) Carrots | (i) Vegetable oils | (i) Legumes |
| (ii) Sweet potatoes (red) | (ii) Seeds eg sunflower | (ii) dried fruits |
| (iii) Starchy green vegetables eg spinach | (iii) vegetables | (iii) White grain maize |

D. Energy balance is when energy input in the form of nutrients is equal to the energy output, this results in weight maintenance because the energy whom was taken can be used up out of energy used in the form of respiration, digestion and physical activity. It is significance in the case of obesity when someone we do to lose in weight)

2. Theoretically, Consumption of complex carbohydrates is a good practice in management and preventing the escalation of Diabetes conditions. Explain a ***choice method*** of food processing and its positive or negative effect on the nutritional quality of the final product. (10 marks)

- Contain fiber, vitamins and minerals, and they take longer to digest
- They have less of an immediate impact on blood sugar, causing it to rise more slowly
- Consumption of high extraction methods of food processing such as whole meal, roller meal, et is useful to control the risk of Diebetics

3. Discuss with brief notes on the following

A. What is over nutrition or under nutrition? (5 marks)

- A state in which nutritional intake greatly exceeds the body's needs.
- Failing health that results from a long-standing dietary intake that is not enough to meet nutritional needs.

B. Name three major sources of three macronutrient? (5 Marks)

C. Name three major sources of three micronutrients? (5 Marks)

- Magnesium
- Sodium

c) Vegetables (not potatoes)

d) Yams

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***Answer:***

Fast food isn't necessarily bad, but in many cases it's

- Highly processed foods contains large amounts of carbohydrates, added sugar, unhealthy fats, and high salt (sodium). ...
- When fast food frequently replaces nutritious foods in your diet, it can lead to poor nutrition, poor health, and weight gain.
- High fat content, particularly cholesterol, sugar and salts have their adverse effects on health.
- High calorie content can lead to obesity whereas dense sugar content can cause dental cavities and type 2 diabetes mellitus

2. Theoretically, Consumption of complex carbohydrates is a good practice in management and