



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS**

**2021/2022 ACADEMIC YEAR**

**SECOND YEAR, SECOND SEMESTER MAIN EXAMINATION**

**FOR THE DEGREE**

**OF**

**B.Sc. HUMAN NUTRITION AND DIETETICS**

**COURSE CODE: HND 213**

**COURSE TITLE: PHARMACOGNOSY**

**DATE: 29<sup>TH</sup> APRIL 2022**

**TIME: 3.00 – 5.00 PM**

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**INSTRUCTIONS TO CANDIDATES**

Answer ALL questions in SECTION A and B

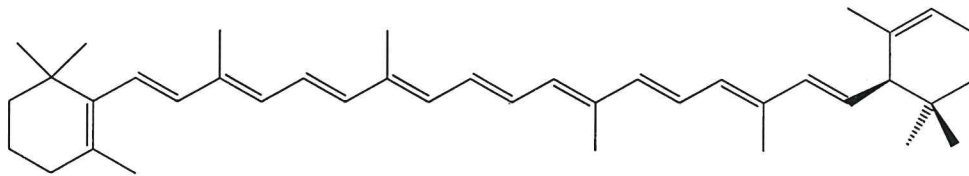
Answer TWO questions from section C.

**MMUST observes ZERO tolerance to examination Cheating**

*This paper consists FIVE printed Pages. Please Turn Over*

**SECTION A- Answer ALL question (10 MARKS)**

- 1) Functional foods provide two main advantages. Name them;
  - a) makes people work hard
  - b) provide commercial potential
  - c) lower cost of health care
  - d) Potential for the food industry.
  
- 2) The concept functional food was first developed in.....
  - a) China in the late 1980s
  - b) Japan in early 1900s
  - c) America in early 1800s
  - d) Japan in the late 1980s
  
- 3) Give an example of conventional foods containing naturally occurring bioactive substances
  - a) Probiotics
  - b) Prebiotics
  - c) Dietary fibre
  - d) Antioxidants
  
- 4) Give examples of orange carotenes (carotenoids?) found in tomatoes
  - a) lutein and zeaxanthin
  - b) lycopene and astaxanthin
  - c) alpha and beta
  - d) astaxanthin alone
  
- 5) The compound below is known as

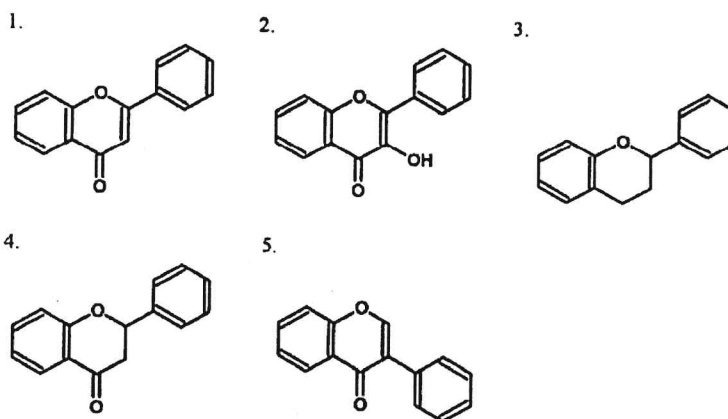


- a) *Beta*-carotene
  - b) *Alpha* carotene
  - c) Lutein
  - d) Zeaxanthin
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- 6) Flavonoids scavenge free radicals by;
    - a) Forming a stable radical that can react with another flavanoid radical to produce two non-radicals
    - b) Forming an unstable radical that can react with another flavanoid radical to produce two non-radicals. The citrus flavonoids include rutin, hesperidin and naringin.
    - c) Forming a stable radical that can react with another flavanoid stable radical to produce two non-radicals.
    - d) Forming a stable radical that can react with another flavanoid unstable radical to produce two non-radicals.

- 7) Select the method used for the fixed vegetable oil-preparation of pharmacopoeial quality:
- Solvent extraction.
  - Expression.
  - Cold-expression.
  - Expression and solvent extraction
- 8) How can tertiary alkaloids be extracted in the form of salts?
- Boiling with aqueous ammonia.
  - Extracting with organic solvent containing alkaline solution.
  - Extracting with organic solvent containing acidic solution.
  - Extracting with an acidic aqueous solution
- 9) Which of the following statements is FALSE in regard to probiotics?
- Probiotics are found naturally in many types of fruits and vegetables.
  - The regular consumption of certain probiotics helps to maintain the normal functioning of the digestive system.
  - Probiotics are generally considered to be safe.
  - Probiotics are living microorganisms, usually bacteria
- 10) Free radicals are highly unstable compounds that have the potential to damage cells. They are not produced in the body, but can come from the external environment.
- True
  - False

**SECTION B Answer ALL questions in this section (30 MARKS)**

11. State the difference between the molecules terms as used in the nutrition studies
- a) Omega-3 and omega-6 fatty acids. 2 Marks
  - b) Oleic, linoleic, linolenic and stearic acids 3 Marks
  - c) Nutraceuticals and functional foods. 2 Marks
12. List three Benefits of fiber in the diet. 3 Marks
13. Various phytochemicals in both plant and animal functional food can be identified by their structure which is associated with their benefits.
- a) What do you understand by the term phytochemicals? 2 Marks
  - b) What is the general name for the phytochemicals given below 1 Mark



- c) Match the structures above with their names provided below. 2 Marks
    - i) Flavonol
    - ii) Flavone
    - iii) Flavanone
    - iv) Isoflavanone
  - d) Name three types of lipids that exist in nature. 2 Marks
14. Insert the possible food stuffs (at least two) and their potential health benefits (one) that are responsible for the compounds listed below: 6 Marks

S/N	Phytochemical or zoochemical	Food source	Potential health benefits
1	Catechins		
2	lycopene		
3	sulfides		

15. Molecules with long carbon chains are common in a number of foods.
- a) What are the different carbon lengths of FA chains in animals and where are they most likely to be found? (e.g. LCFA, MCFA, SCFA) 3 Marks

- b) Which functional food contains omega 6 poly unsaturated and omega 3 polyunsaturated fats? **2 Marks**
- c) What dietary fats have the highest and lowest percentage of monounsaturated/saturated fat? **2 Marks**

**SECTION C Answer TWO questions. Question 16 is COMPULSARY (30 MARKS)**

16. Lean meat is considered a functional food.
- a) What do you understand by the term lean meat? **2 Marks**
  - b) Give a detailed explanation why lean meat is considered a functional food. **10 Marks**
  - c) The Maasai of Kenya are traditionally not known to suffer from clinical coronary heart disease and have shown low level of serum cholesterol despite the fact that their diet is composed majorly meat (Not lean meat). Why is this? **3 Marks**
17. Discuss TWO main phytochemicals and their importance in the following functional foods
- a) Spirulina **5 Marks**
  - b) Oyster mushrooms **5 Marks**
  - c) Cassava **5 Marks**
18. Write short notes on:
- a) High Performance Liquid Chromatography in food analysis **5 Marks**
  - b) Application of NMR in this study of secondary metabolites **5 Marks**
  - c) The usefulness of the secondary metabolites in chemosystematics of functional foods **5 Marks**