JINJA JOINT EXAMINATIONS BOARD

MOCK EXAMINATIONS 2022

FOR FOOD & NUTRITION P640/1 2022

MARKING GUIDE

SECTION A

1 a .Descibing the chemical and physical reactions which lead to denaturation of protein.

- **Heat**
- Disrupts hydrogen bonds and a lesser extent salt links.
- When heat is applied, the peptide chains are moved apart (bonds break) and the structure interfered with.
- The protein loses it's water binding power and there is considerable shrinkage.
- The protein coagulates as the protein molecules are packed more tightly together.
- This causes the skin to form on milk, the crusted to curdles and egg white to harden.

- **Vigorous agitation**
- Whipping or shaking can result in physical separation (breakage) and the hydrogen bond and salt links e.g whipping of an egg.

- **Organic solvents (such as alcohol)**

- These disrupt hydrogen bonds because they are capable of hydrogen bonding themselves to exposed polar bonds.
- Alcohol and vinegar have a preservative effect on food as they denature the autolytic enzymes, which cause spoilage of food.

- **PH – acids and alkalis**

- These provide charged ions which alter the charges of protein molecules and interfere with salts links e.g the addition of lemon juice to milk causes curding lactic acid formed when milk goes sour may bring about the coagulation of protein.
- Care should be taken to add acids or alkalis to food mixture slowly and sparingly.

- **Salts of heavy metals.**

- These provide such as ions as mercury (Hg+), silver (Ag+) and lead (Pb^{2+}) which disrupt salt links by producing salt links of their own.

- **Alkaloidal agents:**

Such as tannic acid and picric acid also disrupt salt links and form new bonds between themselves and protein chains. 08mks

b. How plasma proteins are synthesized.

- The process begins by the transfer of coded information of DNA (Deoxyribose Nucleic Acid) in the nucleus to the ribosomes in the cytoplasm by the single stranded messenger RNA (Ribose Nucleic Acid) formed by base pairing with the codons from one part of the DNA called a coding strand in a process transcription.
The enzyme RNA polymerase which catalyses the reaction attaches itself onto the double helix breaking down the hydrogen bonds in the region of DNA to be copied.
The DNA unwind and one DNA strand copied by base pairing of nucleotide which condense to make a strand of DNA (translation).
The mRNA then passes out of the nucleus into the cytoplasm and becomes attached to the ribosomes.
08mks

c. Explaining the following terms;

(i) Biological value of proteins

This is a measure of how nourishing a protein food is i.e how much of a protein will eventually be made available to the body for protein synthesis.

When a protein food is eaten as the sole source of dietary Nitrogen in amounts capable of just meeting the body's need for nitrogen, the percentage of nitrogen used for protein synthesis is the biological value of that protein.

BV = Quantity of nitrogen retained by the body X 100

Quantity of nitrogen absorbed from dietary protein

03mks

(ii) Nitrogen balance – is when the amount of nitrogen absorbed / assimilated from the protein is equal to the amount of nitrogen supplied to the body in form of amino acids in the proteins.

Nitrogen intake > nitrogen out put = positive nitrogen balance

Nitrogen output > nitrogen intake = negative nitrogen balance

03mks

(iii) Iso –electric point of proteins on solubility.

All amino acids have both carboxyl and amino groups, which are thought balancing each other producing an overall neutral state of amino acid as a whole.

The presence of the amino or carboxyl group in the side chain gives amino acids, and therefore proteins, their net basic or acid charge respectively.

Since proteins have electric charge they migrate in an electric field, the direction of migration depending on the net charge on the molecule .

For every protein, there is PH at which the positive and negative charges will be equal and proteins will not move in an electric field. This OH is known as the Iso-electric point of proteins and affects protein solubility
A protein has its lowest solubility at its Iso – electric point **03mks**

2a. Describe a diet suitable for an expectant mother.

- HBV protein and LBV – increase intake because growth/ development of the foetus/baby –both animal and vegetable protein.
- Carbohydrates intake increase in the first and second trimester but reduced in last trimester as it may lead to obesity in both mother and unborn baby.
  More high fiber rich carbohydrate to be consumed.
  Avoid starchy and sugary carbohydrates.
- Fats /Oils to be minimized . To use more poly unsaturated fats /Oils
- Mineral salts and vitamins intake to be increased.
  More iron rich foods to provide formation of red blood cells (heamoglobin) in both mother and unborn baby.
  Calcium and phosphorus intake to increase for formation of strong bones and teeth.
  Iodine is also needed for proper development of the unborn baby.
  Thereforemore fruits and vegetables to be consumed to provide the vitamins and mineral salts and dietary fiber.
  More vitamin B_1, and B_2 required for energy metabolism.
  Vitamin B_{12} and Folic acid needed to boost red blood cell formation.
  Vitamin C for absorption of iron and general health.
  Vitamin D for absorption of calcium.
  Vitamin K for prevention of excessive bleeding during delivery.
  Water for fluid formation.
  Vitamin A for growth **08mks**

b. Give four dietary problems associated with pregnancy.

- Anaemia
- Constipation
- Obesity
- Goitre
- Diabetes mellitus.
- Dental caries
- Pre-eclampsia

- Haemorrhage**04mks**

C (i) Explain how you would control any two of the above in (b)

Aneamia

- Provide a diet rich in iron and vitamin C.
- Give supplements i.e folic acid tablets**. 04mks.**

Constipation.

- A diet rich in dietary fiber e.g fruits and vegetables, use whole grains etc.
- Drink plenty of water.

Obesity.

- Avoid too much energy rich foods.
- Use fruits for snacks.
- Do some exercise.

Goitre.

- Provide a diet rich in Iodine
- Use iodized salt.

Diabetes mellitus.

- Reduce intake of foods rich in starch and sugars.
- Use more Non-starch polysaccharides i.e dietary fibre.

Dental caries.

- Avoid sweet foods e.g chocolates, sweets ,biscuits.
- Eat foods rich in calcium /phosphorus fluorine.

Pre-eclampsia

- Use little or no added salts in your meals
- Drink 6-8 glasses of water a day
- Avoid fried foods and junk foods.
- Get enough rest
- Exercise regularly
- Avoid drinking alcohol
- Avoid beverages containing caffeine..

4mks @ for two = 8mks.

(ii) What advice would you give a lactating mother to increase breast milk for her baby?

- Should eat regularly
- The diet should be rich in protein both animal and vegetable for milk production.
- Should drink a lot of water
- Should be rich in vitamin A and D for growth of bones and teeth for baby.
- Should breast feed the baby regularly .
- Should avoid stress.

05mks

3 a (i) Discuss the role of vitamin D in the body.

- Vitamin D, together with calcium and phosphorus is essential in the formation of bones and teeth .

It is of vital importance during pregnancy and early child hood as it controls the calcification in children's bones.

- It assists the absorption and distribution of calcium in the body. **04mks**

(ii) What happens when there is insufficient vitamin C in the body?

- Diseases of the skin, gums, teeth.
- Delayed healing of wounds, excessive bruising.
- Gradual deterioration of health leading to scurvy.
- Retarded growth.
- Susceptibility to infection
- Incomplete absorption of iron leading to anaemia.
- Tiredness, irritability, a feeling of being run –down **1mk @ for any six =6mks.**

b.What is the effect of the following in the human body?

(i) High blood cholesterol

- When too much cholesterol accumulates in the blood, it is deposited on the walls of the arteries particularly hose of the heart, causing them to become narrow. This is called Arteriosclerosis.

A small clot can easily block the narrow vessels, increasing the possibility of coronary thrombosis (heart attack).

03mks

(ii) Iron deficiency.

- The main effects of deficiency are tiredness, headache and lethargy.
- In severe cases anaemia results. **03mks**

(iii) Hypothyroidism.

- Enlargement of thyroid gland resulting in goiter.
- Lack of energy, obesity and mental retardedness. **03mks.**

c. Stating the sources of Thiamine.

- Wheat germ
- Cereal (including fortified breakfast cereals
- Yeast
- Oatmeal
- pork
- Bacon
- Beef
- Flour (if fortified)

1 mk @ for any six = 06mk

SECTION B

4 a. Explain the difference between a vegan and a lacto – vegetarian.

- A vegan or strict vegetarian is a person who eats no animal produce whatsoever. This diet may produce some nutritional deficiencies unless it is carefully planned. A lacto – vegetarian is a person who refuses to eat animal flesh and fish but will eat animal products such as milk, cheese and eggs.**2mks @ = 04mks**
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b. Discuss the limitations of;

(i) Planning meals for avegan.

- Vegetable proteins contain fewer essential amino acids than animal proteins. In order to obtain sufficient protein, vegans must eat more and varied amounts of vegetables and cereals this makes it bulky since a large amount of food has to be prepared
- Vitamin B_{12} deficiency and the iron is non heam form which is not easily absorbed.
- Vegetable diets become very monotonous
- A person needs to know how to combine foods in order to obtain all the essential amino acids.

04mks

(ii) Using convenience foods;

- Some convenience foods have an inferior taste ,texture and flavor compared to their fresh.
  Foods (harder to control, fat, salt and sugar levels).
- During processing, they lose most of the nutrients therefore need to be served with other foods which supply the lost nutrients.
- More expensive than fresh foods.
- Improper handling can lead to food spoilage **04mks.**
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c.Explain what happens to chemical and physical properties of foods during frying.

- Chemical properties of food during frying
- Starch gelatinisation
- Protein denaturation
- Flavoring and colour change through maillard reaction**.** **05mks**

Physical properties.

- Crisp texture
- Golden colour
- Fried flavours and aromas **04mks**

d . State four ways of developing gluten in bread making.

- Mixing water in flour
- Kneading
- Providing warmth
- Adding lemon juice
- Adding chemical substances or improvers.**1mk@ for any 4 points = 4mks**

5 a What are the principles underlying the preservation of fruits and vegetables.

- Prevention of re – contamination (aseptic technique) .
- Removal or reduction of micro organisms.
- The use of high temperature
- The use of low temperature
- Drying
- Fermentation and pickling
- Chemical preservation **12mks**

b. Discussing the factors affecting the rate of growth of micro – organism in food.

- Food
- Moisture
- Temperature
- PH**2mks@ for point explanation 08mks**

c. Outline principles and rules of pastry making.
- Measure the ingredients carefully
- Use good quality flour.
- Keep everything as cool as possible otherwise the fat may melt which would spoil the finished dish.
- Introduce as much air as possible during making.
- Allow to relax after making to allow the fat to harden
- Handle the pastry as little as possible. **1mk @ for points =5mks**

6 a. How are the following properties of eggs utilized in cookery?

(i) Coagulation

The protein of egg coagulate during cooking.

The egg white proteins coagulate at temperatures ranging between 60^0C and 65^0C.

This is associated with loss of translucency. The white becomes opaque and no longer flows.

The egg yolk proteins coagulate at slightly higher temperature than egg white.

The following are the functions associated withcoagulation
- Thickening
- Binding
- Coating
- Glazing
- Garnishing**06mks**

(ii) Emulsification;

Egg yolk contains lecithin which is an emulsifying agent.

The emulsifying properties of egg yolk are used in the preparation of cakes and mayonnaise **04mks**

(iii) Foaming;

When egg white is whisked, bubbles of air are incorporated into it forming an egg white foam.

Examples of foods which rely on this property are merigues, soufflés, cake, swiss roll**.** **04mks**

b. State the food handling practices that conserve nutrients and those that lead to nutrient loss.

Food handling practices that conserve nutrients;
- Cook in minimum liquid

- Do not throw away the liquid, use it as stock.
- Peel thinly, keep skins on when possible
- Avoid continuous reheating.
- Chop vegetables and cook immediately.
- Do not chop thinly
- Wash the vegetables and fruits before chopping.
- Use fresh vegetables and fruits.
- Do not over cook
- Cover food while cooking to avoid nutrients escaping from the steam.
- Use sharp knives to avoid over rupturing of cells/tissues. **½ mk for 6points = 03 mks**
- Choose steaming instead of boiling.

Food handling practices that lead to nutrient loss

- Leaving vegetables and fruits lying on the chopping board after chopping
- Washing vegetables and fruits after chopping
- Cooking large amounts of food and reheating them several times.
- Boiling for a longtime in a lot of liquid

- Using bruised vegetables or fruits**1mk@ for any three = 03mks**
- Leaving the vegetable or fruits in the sun for long

c. Outline the dietary guidelines that are recommended for healthy lifestyle.

- Eat plenty of fruits and vegetables regularly to provide dietary fibre and natural sugars.
- Drink plenty of water
- Avoid using a lot of salt and refined sugar.
- Minimize eating between meals (snacks)
- Avoid junk foods, they are high in empty calories.
- Use both animal and plant protein and minimize the consumption of red meats.
- Minimize the use of processed foods and make use of natural fresh foods.
- When using oil/fats, look up for poly unsaturated oils/fats.**1mk @ for five points = 05mks**

END