UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

P640/1 FOOD AND NUTRITION

SCORING GUIDE

FOR THE SAMPLE PAPER

Turn Over

Item 1.

a) *To attain the highest level of achievement, a candidate is expected to**:***

Give a brief introduction about the challenge in the scenario, present the idea, explain it with an example, comprehensively describing how an efficient kitchen/food processing unit with proper ventilation and adequate illumination, work surfaces etc., can be designed, using appropriate, durable, and hygienic materials and suitable colour schemes that enhance workflow

Sample Responses

Introduction:

The workers in this food unit suffered from fatigue. Fatigue in the kitchen often comes from poor layout, awkward work surface heights, inadequate poorly-placed illumination and inefficient air movement. A Good kitchen design reduces unnecessary bending, stretching, and to much walking, so you can work longer with less strain.

The following kitchen design features would help reduce the fatigue suffered by the workers in the food unit:

Correct height of work surfaces

Work surfaces set at the wrong height force you to hunch or shrug your shoulders, which strains your back, neck, and arms over time. Surfaces matched to the task and user's height let you work with elbows at a natural 90° angle, using less muscular effort. For example, setting preparation counters at appropriate height (85–90 cm) for standing tasks like chopping, and lower surfaces at 75–80 cm for tasks requiring downward force like kneading dough, prevents you from bending excessively or overreaching.2. Adequate and well-placed illumination

Adequate and well-placed illumination

Poor lighting causes eye strain and makes you lean forward to see details, which fatigues your eyes and back. Layered, task-focused lighting provides clear visibility without glare or shadows, so you maintain an upright posture.For example, installing bright, shadow-free LED task lights under wall cabinets for counters, plus focused lights over the stove and sink, means you can see clearly without moving closer to the work.3. Effective ventilation

Effective ventilation

Heat, steam, cooking odors, and poor air quality raise body temperature and make you feel sluggish and mentally drained. Proper ventilation removes excess heat and humidity, keeping the air cool and fresh so your body doesn't work harder to stay cool. For example, correctly sized range hood vented to the outside, combined with make-up air and an exhaust fan, keeps the kitchen 5–8°C cooler during heavy cooking and reduces the stuffiness that causes fatigue.4. Efficient layout and workflow

Efficient layout and workflow

A poor layout makes you walk long distances and backtrack between tasks, wasting energy and time. A logical layout groups related functions and minimizes unnecessary movement, conserving physical and mental energy. For example, arranging the fridge, sink, and cooktop in a compact work triangle with landing space next to each zone means you can prep, cook, and clean without crossing the kitchen repeatedly.

b) ***A candidate is expected to:***

Give a brief introduction about the challenge in the scenario and illustrate electric power costing and various ways of using fuels economically and sustainably.

Introduction:

The cost of electricity in Uganda is still so high despite the increasing number of power gerations plants. As a result of the costs, consumers of electric power often complain usually blaming such high cost on wastage of power by careless workers or suspected instalation faults such as faulty metres.

The propriator of this food unit needs to know that the units used many appliances that consume a lot of power leading to high costs.
The appliances in this food unit consume power as follows:
Refrigerator: power rating (KW)*Time (Hours) * Period in use(days)
200/1000 × 24×14(2weeks)
0.2×24×14=67.2 units(kwh)
Fillament bulbs: 6×0.01×3×14=2.52 units(kwh)
Cooker: 3×204×6×14=51408 units(kwh)
Dish washer: 1500/1000×3×14
1.5×3×14=63 units(kwh)

Total number of units of electricity(power) used by the food unit in two weeks(14days)
67.2+2.52+51408+63=**51,672.72 units**
Power Cost is as follows:
First 15 units cost 1000 shillings each
Therefore cost for the first 15 units =15×1000=15,000 UGX
Next (16-200) units cost 900UGX
16-200=185 units. Thus 185×900=166,500 UGX
Remaining units(201 and above) =51,672.72-(15+185)=51,472.72units
Thus the cost for the remaining units= 51,472.72×800=41,178,176 UGX
Total cost of power before taxes: 15,000+166,500+41,178,176=41,359,676 UGX
VAT 18% of total cost =18/100×41,359,676=7,444,741.68 UGX
Sevice fee is 2000 a month.
Final cost for power=41,359,676+7,444,741.68+2000=**48,806,417.68 UGX**
Conlusion:
The high power cost is as a result of using many appliances for a long time each day, the high cost per unit and the high tax levied on power.
Recommendations
Match equipment size and use to demand: Running a 20kW oven for 10 samosas wastes energy. Oversized or idle equipment burns power for no output. Use smaller countertop combi ovens for low-volume preparations and only fire up the large deck oven during peak hours. Set up batch cooking schedules so equipment runs closer to 80-90% capacity.
Switch to energy-efficient lighting and appliances: Older incandescent and fluorescent lights, plus non-ENERGY STAR rated fridges and ovens, use 30-60% more power for the same output. Replace kitchen fluorescent tubes with LED battens. When replacing equipment, choose induction cooktops and inverter-driven fridges/freezers—they ramp power down when temperature is reached.
Shift high-energy tasks off peak hours:
In many regions, electricity tariffs are higher during peak demand times.
Do bulk baking, blanching, and chilling overnight or early morning. Pre-cool walk-in fridges before peak hours so compressors cycle less during the day.
Reduce heat load in the kitchen:
Every degree of excess heat from ovens and fryers makes AC and refrigeration work harder. Heat and cooling costs are linked. Install proper range hoods with variable speed fans. Use lids on pots, and avoid opening oven doors unnecessarily. This cuts both cooking energy and High Voltage AC load
Train staff on energy habits:

Even the best equipment wastes power if staff leave doors open, run equipment empty, or ignore settings. Post quick checklists: “Close walk-in door”, “Switch off salamander after service”, “Use lids”. Make one staff member responsible for end-of-shift shutdown

Use timers, thermostats, and auto-shutoff features:

Equipment left on “just in case” during slow periods is pure waste. Controls let you run only when needed. Set timers on cookers, fryers and bain-maries to heat up 30 min before service and auto-drop to standby between rushes. Use programmable thermostats on blast chillers instead of manual on/off.

Item 2

A candidate is expected to:

Give a brief introduction about the challenge in the scenario, present the idea, explain it with an example, critically evaluating food value addition techniques and principles suitable for producing processed food products for children with SAM, from sorghum, groundnuts and simsim. Clearly link the food value addition techniques to improved food safety, high quality processed food products, and extended shelf life.

Sample Responses

Introduction:

Children with severe acute malnutrition (SAM) need products that are energy-dense, protein-rich, micronutrient-dense, easy to digest, and safe, since their gut function and immunity are compromised.Sorghum, groundnuts, and simsim are a good base: sorghum provides carbohydrates, groundnuts and simsim provide protein, fat, and micronutrients. But when raw, these foods have limitations for SAM: low protein quality in sorghum, anti-nutrients like phytates and tannins, and choking/aspiration risk from coarse texture in case of simsim.

There are a number of techniques that can be used to produce nourishing products for children with SAM.

Germination/Malting: Soaking and sprouting sorghum activates enzymes that break down starch, protein, and phytates. It increases bioavailability of iron, zinc, and B vitamins. It reduces viscosity of porridge, so children can get more energy/nutrient per feed without making it too thick for a child to swallow. It reduces phytates and increases digestibility. Malted sorghum flour is used in SAM foods to increase nutrient density per volume.However, it takes long processing time, requires hygiene to avoid mold growth. Must be followed by drying/roasting to stop germination and ensure safety.

Fermentation: Lactic acid fermentation lowers pH, reduces phytates and tannins, inhibits pathogens, and can increase B vitamin content. It improves micronutrient bioavailability, extends shelf life, and improves gut tolerance in some cases. It a traditional and low-cost technique.However, it can produce sour taste that reduces acceptability for SAM children. If not controlled, there is a risk of undesirable microbes. It also increases acidity, which can irritate a compromised gut if overdone. Short, controlled fermentation of sorghum flour before blending is useful, but it’s rarely used in therapeutic foods due to taste and consistency challenges.

Extrusion Cooking: High temp, short time cooking under pressure gelatinizes starch, denatures protein, and inactivates anti-nutrients and pathogens. It produces instant, pre-cooked flour. It produces a safe, instant, low-viscosity, highly digestible product suitable for SAM children. It kills pathogens—critical for SAM.. However, Requires equipment and capital. Some heat-sensitive nutrients are lost, so post-fortification is needed. Many RUSF products use extrusion to ensure safety and instant reconstitution.

Germination/malting of sorghum:

Is the single best technique for making nourishing food products for children with SAM. It solves the viscosity challenge, which is the main problem for SAM feeding. SAM children

also can't eat large volumes yet raw sorghum porridge is thick and has low in energy density. One needs to feed 500-700 ml per meal, which SAM children can't manage. Germination of sorghum produces enzymes that break down starch, so you can make a porridge with twice or thrice more calories and protein per spoonful without it being too thick. That directly addresses the "high nutrient density, low volume" requirement for SAM.

Germination/malting of sorghum also improves nutrient availability without expensive equipment. Germination cuts phytates by about 60%, making iron, zinc, and calcium in sorghum, groundnuts, and simsim more bioavailable. It also increases B vitamins. One only needs water, time, and sun/air drying, which is feasible in low-resource settings where SAM is most common.

It improves digestibility and safety since enzymatic breakdown makes protein and starch easier to digest for a compromised gut. When you follow germination with drying/roasting, you also reduce microbial load. Roasting alone improves flavor and safety but doesn't reduce viscosity or phytates much. Children still can't get enough nutrients per feed.

Extrusion is excellent for safety and instant products, but it's expensive, needs equipment, and isn't feasible for most local production units treating SAM.

Fermentation helps with phytates but gives a sour taste that reduces acceptability in SAM children with low appetite.

Milling/blending is necessary, but without germination you're stuck with low-density, high-viscosity porridge. Fortification is essential, but it's an additive step, not a processing technique on the base ingredients themselves.

Germination/malting of sorghum:

The process of germination, or malting, of sorghum transforms a hard, low-density grain into a flour that is safer, easier to digest, and more suitable for children with severe acute malnutrition. The change occurs through a sequence of controlled steps, each activating specific biological and biochemical principles within the seed.

THE PROCESS OF GERMINATION TECHNIQUE:

Cleaning and sorting of the sorghum grain: This is not a biochemical step, but it is essential for ensuring that only viable, undamaged seeds are used. Non-viable or broken grains will not germinate uniformly and can introduce mold and contaminants that compromise safety, which is critical for foods meant for malnourished children.

Steeping: The clean grain is soaked in clean water for 12 to 24 hours at room temperature. At this stage the principle of rehydration and metabolic activation occurs.

Germinating: After steeping, the grain is drained and spread in a thin layer on a damp sack or tray for germination, which lasts 48 to 72 hours in a dark, ventilated place. Moisture is maintained by sprinkling water periodically. This is the core stage where enzyme synthesis and hydrolysis take place. The gibberellins stimulate the aleurone cells to produce amylases, proteases, and phytase. Amylases convert starch into maltose, glucose, and dextrins, which lowers the viscosity of the grain and increases the availability of simple sugars. Proteases break down storage proteins into smaller peptides and free amino acids, improving protein digestibility. Phytase hydrolyzes phytic acid to free iron, zinc, and calcium in sorghum and increase the bioavailability of these minerals.

Drying: Once the sprouts reach about 1 to 2 cm in length, germination is stopped drying. The grain is dried at 50 to 60°C in the sun or in a mechanical dryer until the moisture content falls below 10 percent. The principle here is enzyme inactivation and moisture reduction. Heat denatures the active enzymes, halting further breakdown of starch and protein and preventing excessive loss of dry matter. Reducing moisture also prevents mold growth and makes the grain brittle, which is necessary for the next step.

De-rooting and milling: The dried sprouted grain is rubbed to remove the rootlets and shoot and then milled into a fine flour. The principle involved is separation and particle size

reduction. Removing the rootlets improves palatability, while milling reduces particle size to produce a smooth flour that is safe for young children and allows rapid reconstitution during cooking.The product of this sequence is malted sorghum flour. Because of the enzymatic hydrolysis that occurred during germination, the flour produces a porridge with much lower viscosity than raw sorghum flour at the same solids concentration. This allows a higher energy and protein density per spoonful, which is essential for children who cannot consume large volumes. The flour can be used directly in porridge, or blended with roasted groundnut and simsim flour, oil, sugar, and a micronutrient premix to produce ready-to-use foods for the management of severe acute malnutrition.

Item 3

a) *To attain the highest level of achievement, a is expected to:*

Give a brief introduction about the challenge in the scenario, present the idea, explain it with an example, evaluating preventive measures with comprehensive application of knowledge from preventive nutrition to support optimal health and development across all stages of the life cycle, Demonstrate application of knowledge of age-specific nutrient needs, appropriate food choices, and dietary practices that prevent deficiencies and diseases and integrate principles of balanced diets, healthy lifestyles, and cultural relevance, with well-justified decisions and practical application.

Sample Responses

Introduction:

It is a common practice in schools for some students to dodge some meals for various reasons ranging from not wanting to show others that are dependent on the school food to wanting to 'keep in shape.' This has cause students many challenges both social and nutritional. Basing on the signs and symptoms suffered by the students in this scenario, the students developed peptics ulcers as a result of wanting to keep low body weight.

However, such students can still maintain a small eight through following appropriate nutrition guide lines other than dodging school meals.

The following are some such ways:

Use the "Plate Method" to control portions without skipping meals:

The plate method is about changing the proportions on your plate, not the number of meals. Keep eating school meals to get nutrients, but shift the balance to foods with high fiber and lower in calories. The rule is simple, fill ½ your plate with vegetables/fruit, ¼ with protein, and ¼ with carbohydrates. For example, If the school meal is served as one dish, choose smaller servings of the starchy/carbohhydrate part and take more vegetable, or lean protein when available. Vegetables and fruit add bulk and water, which trigger fullness signals to the brain before one eats many calories. Reducing the proportion of refined carbohydrates and fried foods cuts excess calories without making one feel deprived.

Prioritize protein and fiber at every meal:

Protein and fiber slow down digestion and keep you satisfied longer. When you get enough of these, you're less likely to feel hungry and snack on high-calorie foods after school.

For example, make sure each meal includes something like beans, eggs, fish, groundnuts, or meat for protein, and vegetables, fruit, or whole grains for fiber. If the meal is low on these, take an extra serving of the beans or veg rather than a second helping of posho.

Add a short activity after the meal:

Light movement after eating helps the body use the glucose from the meal instead of storing it, and it reduces post-meal sluggishness. It doesn't burn a lot of calories, but it helps with energy balance over the day. For example, instead of sitting immediately after lunch, spend 10 minutes walking around the compound, playing catch, or helping clear the eating area before settling down to study.

b) ***A candidate is expected to:***

To attain the highest level of achievement, a candidate is expected to give a brief introduction about the challenge in the scenario, and design a well-balanced therapeutic diet that clearly addresses the identified nutritional imbalance with justified food selection, portioning, and meal planning. Ensure that the diet promotes recovery, supports overall health, and is practical, safe, and suitable for the individual's condition.

SAMPLE RESPONSE FOR ITEM

Introduction:

For peptic ulcers, the goal is to reduce stomach irritation and acid stimulation while providing adequate nutrition. This means choosing bland, soft, low-acid, low-fat foods and avoiding spicy, acidic, fried, caffeinated, and alcoholic items. Eat small, regular meals and chew well.

This is a sample 1-day meal plan for a ptient with peptic ulcers.

Meal	Food & Portion	Reason it's suitable
Breakfast	1 bowl oatmeal made with water or low-fat milk ½ banana, sliced 1 glass water or weak herbal tea (chamomile)	Oatmeal is soft, low-acid, and soothing. Banana is low in acid and provides potassium.
Lunch	Grilled chicken breast, 80-100g, skinless 1 cup mashed potatoes or soft white rice ½ cup steamed carrots and zucchini 1 glass water	Lean protein, soft carbohhydrates, and well-cooked non-acidic vegetables are easy on the stomach.
Dinner	Baked white fish 80-100g 1 cup soft sweet potato ½ cup steamed green beans 1 glass water	Low-fat protein and soft carbs reduce acid stimulation at night. Keep portions moderate and finish eating 2-3 hours before bed.

NON-DIETARY RECOMMENDATIONS FOR PEPTIC ULCERS

The non-dietary recommendations for further management of peptic ulcers focus on reducing acid damage, treating causes, and promoting healing beyond food choices.

Manage stress with non-food coping strategies

While stress alone doesn't cause ulcers, chronic stress increases acid production and pain perception, and worsens healing. It also leads to behaviors like Non-Steroidal Anti-Inflammatory Drug overuse. For xample, the patient practices 10 minutes of deep breathing daily, ensures 7-8 hours sleep, and takes short walks instead of relying on cigarettes when stressed.

Get adequate rest and adjust activity during flashes

Severe pain and bleeding can cause fatigue. Rest reduces physical stress on the body, allowing energy to be used for tissue repair. For xample, during an active ulcer episode, the patient avoids heavy lifting and strenuous exercise until pain improves and the doctor clears them.

Attend follow-up appointments and testing

Ulcers can recur or develop complications like bleeding or perforation. Follow-up confirms H. pylori eradication and checks that the ulcer has healed, especially if symptoms persist.

For example, 4-6 weeks after finishing antibiotics, the patient returns for a stool antigen test or urea breath test to confirm the bacteria is gone. An endoscopy may be repeated if the ulcer was large.

Avoid tight clothing around the abdomen

Tight belts or waistbands increase pressure on the stomach, pushing acid up and aggravating ulcer pain. For example, a patient switches to looser-fitting trousers and avoids sitting hunched for long periods after meals.

Item 4

a) *To attain the highest level of achievement, a: candidate is expected to give a brief introduction about the challenge in the scenario, present the idea, explain it with an example, evaluating other preventive measures against scurvy other than just changing meal preparation methods, with comprehensive application of knowledge from preventive nutrition to support optimal health and development for children, demonstrate application of knowledge of age-specific nutrient needs, appropriate food choices, and dietary practices that prevent deficiencies and diseases and integrate principles of balanced diets, healthy lifestyles, and cultural relevance, with well-justified decisions and practical application. the individual's condition.*

SAMPLE RESPONSE

Introduction:

Scurvy is caused by vitamin C deficiency, so prevention goes beyond just how food is cooked. Here are ways mothers can prevent it through other actions other than just changing food preparation methods

Diversify food sources through home gardening

Relying only on market-bought or staple foods limits vitamin C intake, especially if fresh produce is expensive or unavailable. Growing vitamin C-rich foods at home ensures a steady, fresh supply that isn't degraded by long transport or storage. For example, a mother plants guava trees, sukuma wiki, and tomatoes in a small backyard or sack garden. These provide fresh sources of vitamin C daily without depending on market prices or cooking practices.

Encourage consumption of raw vitamin C-rich fruits as snacks

Vitamin C is destroyed by heat and long cooking. Promoting raw intake of fruits/vegetables as part of a child's daily routine bypasses losses from cooking altogether. Children often accept fruit more readily than cooked vegetables. For example, giving a child an orange, mango slices, or guava after school instead of biscuits. One medium orange provides over 70% of a child's daily vitamin C need.

Use health services for nutrition education and supplementation

Mothers may not know which foods contain vitamin C or how deficiency presents. Regular clinic visits provide access to health education and, where necessary, vitamin C supplements for at-risk children. For example, during child immunization visits, a mother attends the nutrition talk and learns that cabbage and pawpaw are good vitamin C sources. If her child is underweight or sick often, the nurse may prescribe vitamin C drops as a short-term preventive measure.

Practice proper post-harvest handling and storage

Vitamin C breaks down when fruits and vegetables are exposed to sun, heat, and air for long periods. How produce is stored after harvest or purchase affects how much vitamin C remains when eaten, separate from cooking. For example, storing fresh greens in a cool, shaded basket and covering them with a damp cloth instead of leaving them in the sun at the market. This preserves vitamin C until meal time.

Improve family income through small income-generating activities

Scurvy often occurs in households that can't afford diverse diets. Increasing income improves access to vitamin C-rich foods year-round, regardless of season or cooking habits.

For example, a mother starts selling liquid soap or rears a few chickens for eggs. The extra income lets her buy fruits like pineapples or passion fruit weekly for the family.

b) *To attain the highest level of achievement, a candidate is expected to give a brief introduction about the challenge in the scenario and design a well-balanced therapeutic diet that clearly addresses the management of scurvy with justified food selection, portioning, and meal planning. Ensure that the diet promotes recovery, supports overall health, and is practical, safe, and suitable for the condition.*

SAMPLE RESPONSE

Introduction:

For a child with scurvy, the goal is to provide high amounts of vitamin C at every meal to restore body stores. Vitamin C is water-soluble, so frequent intake through the day works best. Cooking time should be minimal to avoid losses.

This is a sample 1-day meal plan a child with with scurvy.

Meal	Food & Portion	Reason it's suitable
Breakfast	1 cup pawpaw slices + 1 boiled egg + 1 slice brown bread + 1 cup fresh orange juice	Pawpaw and orange juice are very high in vitamin C. Egg provides protein for tissue repair. Juice is raw, so no vitamin C loss from heat.
Lunch	Steamed matooke + bean sauce + lightly steamed sukuma wiki + tomato & onion salad with lemon juice	Sukuma wiki, tomatoes, and lemon juice add vitamin C. Steaming briefly keeps more vitamin C than boiling. Lemon juice on salad is raw. Beans give protein for healing gums and skin.
Dinner	Mashed Irish potato + steamed fish + lightly stir-fried cabbage, carrots & green pepper + 1 glass passion fruit juice	Green pepper and cabbage are excellent vitamin C sources. Stir-fry quickly to reduce loss. Fish provides protein and iron for recovery. Passion fruit juice adds extra vitamin C.

NON-DIETARY RECOMMENDATIONS FOR CHILD WITH SCURVY

The non-dietary recommendations for further managing scurvy are necessary to support recovery and prevent relapse beyond what patient is going through. These include:

Medical vitamin C supplementation

Food alone may not correct severe deficiency fast enough. Prescribed vitamin C tablets quickly restore blood levels and reverse symptoms like bleeding gums, joint pain, and fatigue. For xample, a health worker gives a child 100mg vitamin C 3times daily for 1 week, then tapers the dose as gums stop bleeding and energy improves.

Proper oral hygiene and wound care

Scurvy weakens collagen, so gums bleed easily and skin bruises/tears. Gentle cleaning prevents infection while tissues heal. Harsh brushing can worsen bleeding. For example, mother uses a soft toothbrush or clean gauze with warm salty water to clean the child's mouth twice daily. Skin sores are kept clean and dry.

Treatment of co-existing infections and anemia

Children with scurvy often have gum infections, anemia from chronic bleeding, or worms that worsen malnutrition. These must be treated for full recovery. For xample. at the clinic, the child is tested for anemia and given iron supplements. Deworming tablets are given if worms are present. Antiseptic mouth rinse is used if gums are infected.

Regular medical follow-up and growth monitoring

Scurvy can cause bone pain, stunted growth, and delayed healing. Follow-up visits check that symptoms are resolving and catch complications like joint hemorrhage early. For xample, the child returns after 2 weeks for weight, height, and gum checks. The nurse asks if the child can walk without pain, since leg pain is common in scurvy.

Health education for caregivers on prevention

If the reasons for scurvy aren't addressed, it will recur. Education targets behaviors like food taboos, poor storage, or lack of awareness, not just recipes. example,a nurse demonstrates how sun and long storage destroy vitamin C, and explains that children are allowed to eat fruits like oranges and pawpaw, even during illness.

Address underlying social/economic causes.

Scurvy is often a sign of poverty, neglect, or food insecurity. Linking families to support services helps ensure long-term access to healthcare and nutritious food. For example, the health worker refers the mother to a village health team or community development officer for enrollment in a kitchen garden project or savings group.

Rest and supportive care for bone/joint symptoms

Severe scurvy causes painful bleeding into joints and muscles. Limiting strenuous activity while vitamin C rebuilds collagen prevents further damage. For xample, the child is encouraged to rest and avoid rough play for 1-2 weeks. If walking is painful, the clinic may advise using support until pain subsides.Important: For severe cases with inability to walk, extreme swelling, or breathing difficulty, urgent referral to hospital is needed.